



# 2017 Electric Integrated Resource Plan Appendices



Long Lake Dam

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# 2017 Electric Integrated Resource Plan

## Appendix A – 2017 Technical Advisory Committee Presentations



*2017 Electric Integrated Resource Plan*  
**Technical Advisory Committee Meeting No. 1 Agenda**  
Thursday, June 2, 2016  
Conference Room 130

<b>Topic</b>	<b>Time</b>	<b>Staff</b>
Introductions	8:30	
TAC Meeting Expectations	8:35	Lyons
2015 IRP Commission Acknowledgements	9:00	Kalich
Break		
Energy Independence Act Compliance	10:00	Lyons
Energy Efficiency Modeling Discussion	11:00	Dillon/Gall
Lunch	12:00	
Resource Adequacy – Preliminary Results	1:00	Gall
Draft 2017 Electric IRP Work Plan	2:00	Lyons
Adjourn	3:00	



# 2017 Electric IRP TAC Meeting Expectations

John Lyons, Ph.D.  
First Technical Advisory Committee Meeting  
June 2, 2016

# Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington every other year
- Guides resource strategy over the next two years
- Resource procurements over the next 20 years – Preferred Resource Strategy (PRS)
- Snapshot of current and projected load & resource position

# Integrated Resource Planning (Cont)

- Based on significant modeling and many assumptions
  - Fuel prices
  - Economic activity
  - Policy considerations
  - Resource costs
  - Energy efficiency
- Action Items – areas for more research in the next IRP
- This is not an advocacy forum
- Not a forum on a particular resource or resource type
- Supports rate recovery, but not a preapproval process

# Technical Advisory Committee

- The public process piece of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants in all or some of the process
- Open forum, but we need to stay on topic to get through the agenda
- Welcome requests for studies or different assumptions.
  - Time or resources may limit the amount of studies we can do
  - The earlier study requests are made, the more accommodating we can be
- Planning team is also available by email or phone for questions or comments between the TAC meetings

# Expectations

- Avista:
  - Input about assumptions and areas to study
  - Six TAC meetings with set agendas that can change based on input. Topics will be covered later today in the Draft Work Plan.
- TAC Members: What are your expectations?



# 2015 IRP Commission Acknowledgements

Clint Kalich  
First Technical Advisory Committee Meeting  
June 2, 2016

# 2015 IRP Acknowledgement

- State of Idaho
  - Acknowledgement on February 4, 2016
  - Case No. AVU-E-15-08, Order No. 33463
- State of Washington
  - Acknowledgement on March 14, 2016
  - Docket UE-143214

# Comments Filed in the State of Idaho

- **Lewis County Commissioner Don Davis**
  - Concerned about shutting down coal due to pressure on rates and reliability
  - “the 2015 IRP is well balanced, utilizing a nice mix of hydro and other renewable energy, conservation, and thermal resources to provide customers in Idaho with a reliable and reasonably price energy for years to come.”
- **Snake River Alliance**
  - Concerned with continued use of coal and natural gas resources due to greenhouse gas emissions
  - Recommends accepting plan, but should also be exploring western energy imbalance markets, solar pilot, seeking demand response programs, and evaluating the effects of the Clean Power Plan in the next plan

# Idaho State Public Utilities Commission<sup>11</sup> Comments

- **Clean Power Plan**
  - Address and quantify the effects of the EPA’s Clean Power Plan, including scenarios involving Colstrip units 3 & 4
    - Including evaluation of the operating permit, emission compliance, plant operating life, and power supply costs
- **Demand Response**
  - Investigate programs as 2015 analysis shows programs are nearly cost effective
- **Resource Alternatives**
  - Continue to investigate the role of solar energy, and other resources might have in the Company’s resource planning

# Comments Filed in the State of Washington<sup>12</sup>

- **Nuclear Power**
  - Advocates for replacement of Colstrip and natural gas facilities with Nuclear power and renewables
- **Support for continued operation of Colstrip**
  - One individual comment
- **Divesting Colstrip**
  - Seven individual and 120 FUSE Washington signatures
  - Sierra Club - 119 form letter comments and 200+ signatures
- **Other Comments**
  - Commenter suggests “...NW should be more like Germany...” and “some things are best left in the ground”
  - Question asked, “Where does Avista plan to come up with the loss of hydro electric power caused by climate change...?”

# Washington State Commission Comments

- **Demand-Side Resource Potential**
  - ...expects Avista to work toward reconciling its own demand-side resource potential (including both energy efficiency potential and demand response potential) with that of the region as calculated by the Council
- **Conservation Potential Assessment**
  - ...requests that the economic and achievable potentials be calculated within the IRP model itself, rather than within a third-party model
- **Colstrip Units 3 and 4**
  - Incorporate new prospective carbon pricing policies into the expected case stochastic modeling. Avista may consult with its Advisory Group regarding assigning probabilities to these policies; and
  - Work toward developing a more complete suite of potential costs to include in a revised , "high-cost" scenario

# Washington Acceptance Letter (cont.)

- **Storage Resources**

- Continuing to acquire the most up to date data related to the operational characteristics of specific storage technologies as well as the costs of purchasing and operating those technologies
- Exploring the potential for incorporating the costs and benefits of storage resources to Avista's distribution system

- **Planning Reserves**

- Address the potential over-reliance on the regional capacity surplus for peak planning
- Work with regional stakeholders, including the Northwest Power and Conservation Council Staff, to publish information about Avista's reserve requirements needs



# Energy Independence Act Compliance (Renewable Energy)

John Lyons, Ph.D.  
First Technical Advisory Committee Meeting  
June 2, 2016

# The Energy Independence Act

- RCW 19.285 or Initiative Measure No. 937
  - Voted into Washington law November 2006
  - Only utilities with more than 25,000 customers qualify
  - Requires acquisition of all cost-effective conservation
- Renewable energy goals
  - Based on a percentage of the two year average of Washington state retail sales
  - 3% by January 1, 2012 (166,047 MWh or 19 aMW)
  - 9% by January 1, 2016 (513,809 MWh or 58.7 aMW)
  - 15% by January 1, 2020 (about 867,000 MWh or 99 aMW)

# Energy Independence Act

- RCW 19.285 – The Energy Independence Act (EIA) or Initiative Measure No. 937 (I-937)
  - Requires utilities with over 25,000 customers to obtain 15% of their electricity from qualified renewable resources by 2020.
  - Qualified resources include solar, wind, hydro upgrades, (new and legacy) biomass, geothermal, and wave/ocean/tidal power.
  - Requires the acquisition of all cost-effective energy conservation.
- I-937 approved by Washington voters on November 6, 2006.

# Reporting Requirements<sup>18</sup>

Annual compliance report (WAC 480-109-040) is due by June 1<sup>st</sup>:

- Report includes: background, alternative compliance (cost or low load growth), annual loads, renewable energy target for last year, current year progress, WREGIS certificates, incremental cost, and appendices
- Appendix A – UTC Compliance Report Spreadsheet: details about eligible resources and renewable resource credits (RECs)
- Appendix B – Incremental Cost Calculations
- Appendices C and D – Clark Fork River and Spokane River Hydro Upgrade Calculations (Wanapum no longer eligible since not in WREGIS)
- Appendix E – Department of Commerce EIA Renewables Report
- Appendix F: Biomass Methodology Report

# 2014 Final EIA Compliance

	MWh
<b>Required Renewable Energy</b>	<b>167,884</b>
<b>Spokane River</b>	
Long Lake Unit #3	14,197
Little Falls Unit #4	4,862
<b>Clark Fork River</b>	
Cabinet Gorge Units #2 – 4	95,333
Noxon Rapids Units #1 – 4	55,697
<b>Total Hydro Upgrades</b>	<b>170,089</b>



# 2017 Electric IRP Energy Efficiency Modeling Discussion

Mike Dillon & James Gall  
First Technical Advisory Committee Meeting  
June 2, 2016

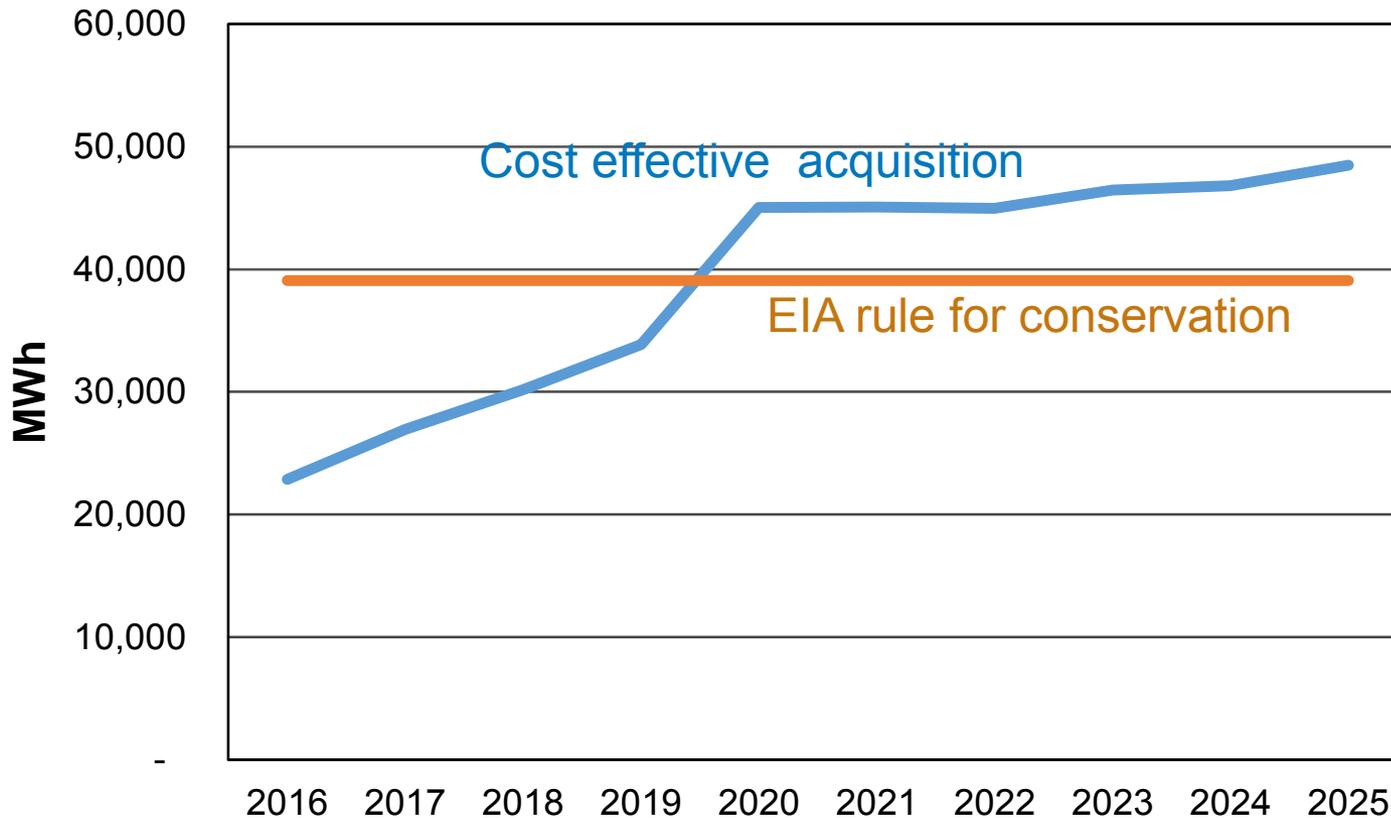
# Washington Action Item

- Explore a constraint within IRP model that forces the minimum conservation selection to comply with Washington law and Commission rules set forth in WAC 480-109.
- At a minimum, the two-year conservation potential should be linear, pro rata share of the 10-year potential.

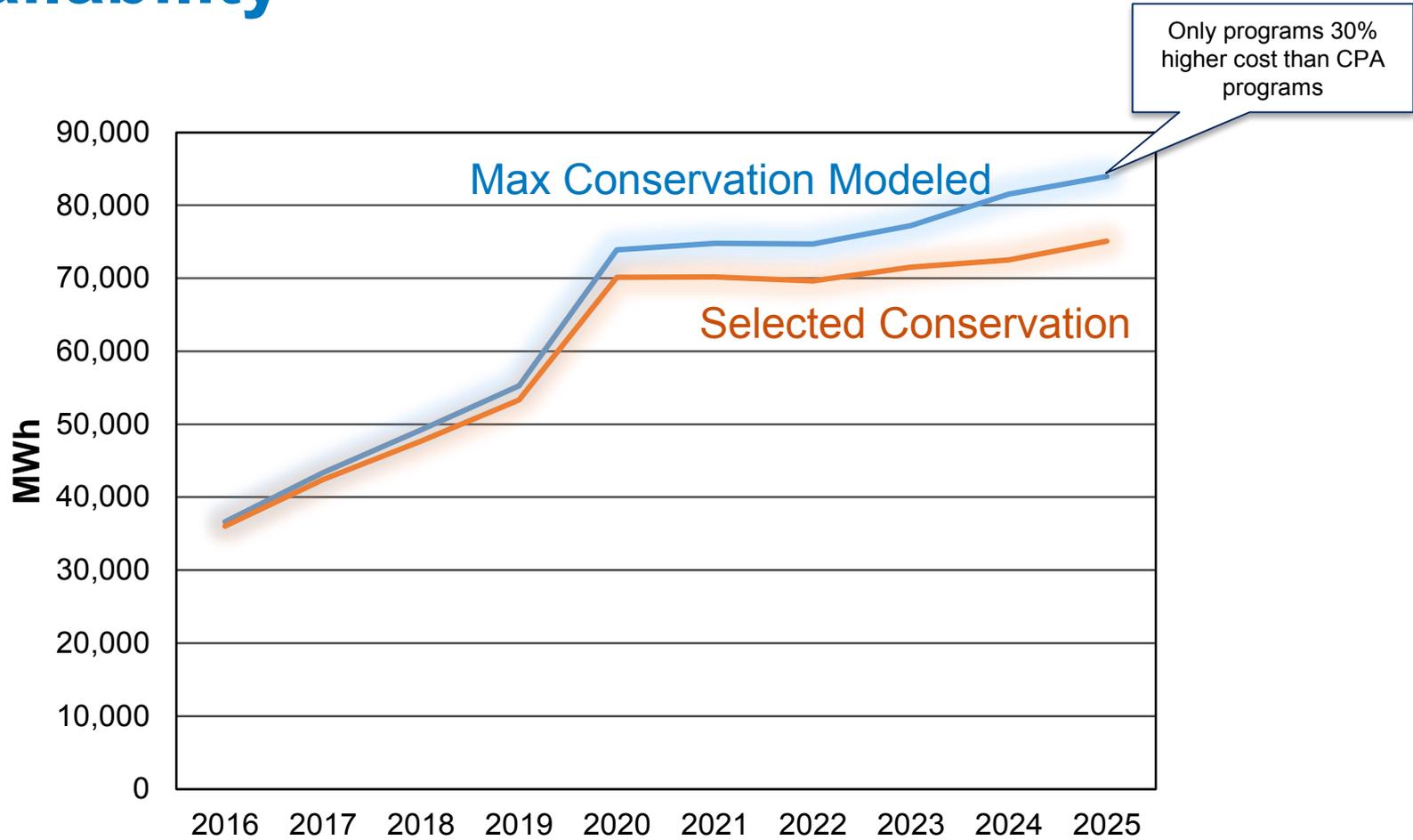
# Linear Conservation Acquisition (Washington)

22

## CPA vs. ProRata Annual Savings Goal (MWh)



# 2015 IRP System Conservation Availability



# Options to Require PRiSM to Acquire Conservation Equally Over 10 Years<sup>24</sup>

1. Constraint forcing each of first 10 years to have same conservation level
  - 2015 IRP dataset
    - Mathematically impossible due to limited amount of data in early years and programs were designed to be selected in 20-year strips
  - May lower conservation selection due to limited conservation available in year one vs. later years
  - May force non-cost effective conservation action in early years to match up with expected conservation in later years.

# Options to Require PRiSM to Acquire Conservation Equally Over 10 Years (cont.)

## 2. Two step process

- Constrain Washington measures to equal over 10 years, this would be the EIA target
- PRiSM would then select additional cost effective measures

## 3. Select conservation for IRP as modeled in previous IRPs and the EIA target will assume equal acquisition (2015 IRP Method)

- This method could over estimate EIA goals, but over 10 years the conservation estimate will be consistent.

## 4. Other ideas?

# Washington Action Item

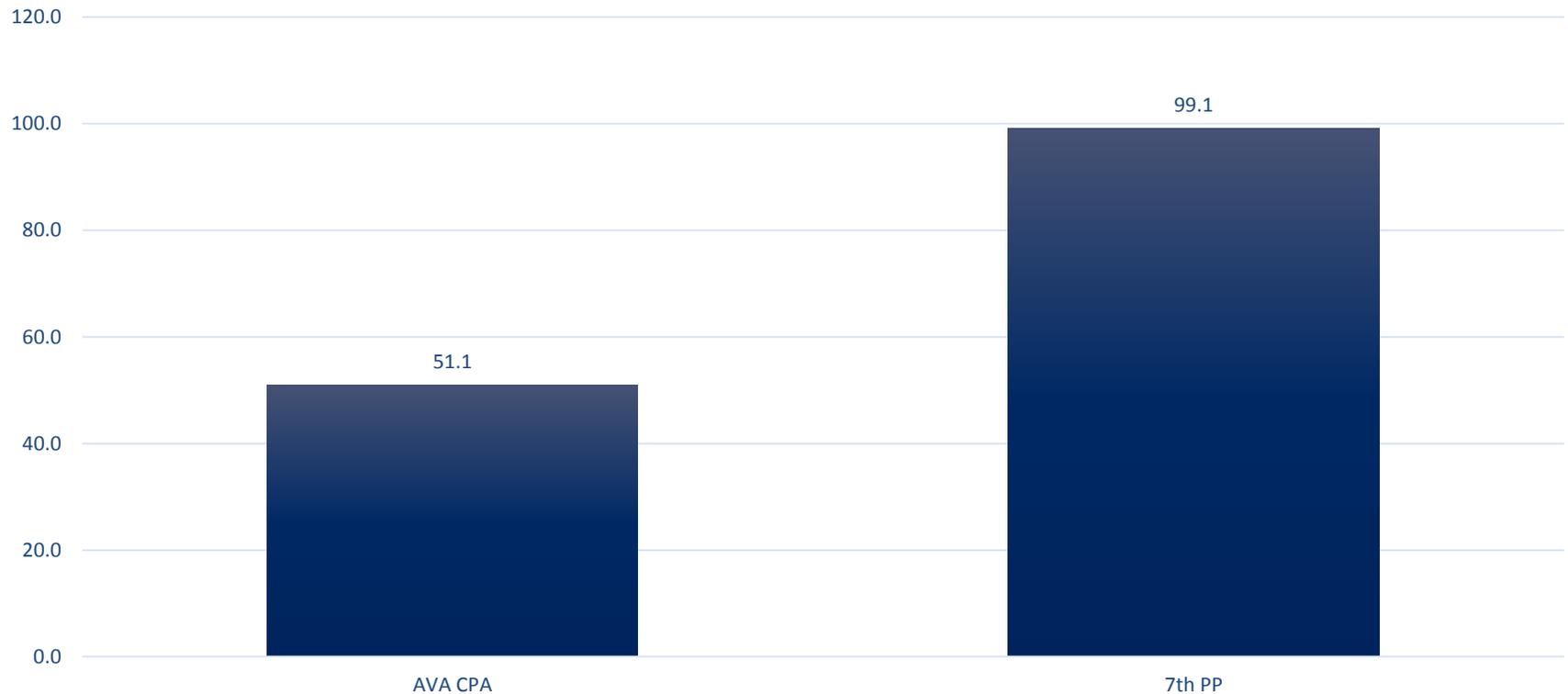
- Demand-Side Resource Potential – “For the 2017 IRP, the Commission expects Avista to work toward reconciling its own demand-side resource potential (including both energy efficiency potential and demand response potential) with that of the region as calculated by the Council”

# Analysis Caveats

- Avista's Washington portion based off of the 6<sup>th</sup> Plan Calculator (~3.5% of region)
- 60% natural gas space and water heating penetration
- CPA & 7<sup>th</sup> Plan categories do not perfectly match
- No agriculture or distribution in 7<sup>th</sup> Plan numbers presented
- Numbers are the 10-year cumulative savings
- Other considerations:
  - Avista continues to pursue fuel switching opportunities (~ 1.32 aMW in WA planned for 2016-17)

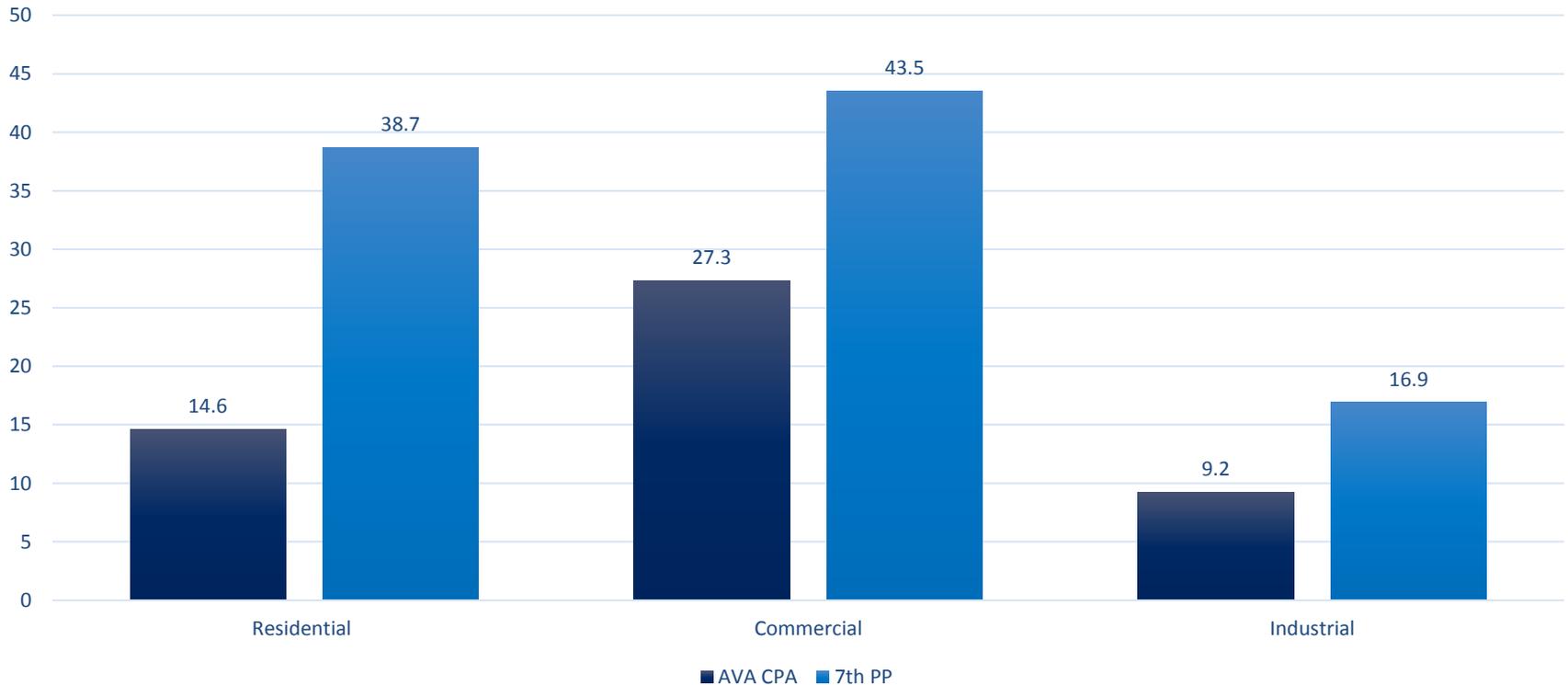
# 2026 AVA WA CPA vs. 7<sup>th</sup> Power Plan Savings (aMW)

2026 Cumulative Conservation (aMW)



# 2026 AVA WA CPA vs. 7<sup>th</sup> Power Plan Savings (aMW) By Sector

2026 Cumulative Conservation (aMW) by Sector



# Measures with difference greater than 1 aMW

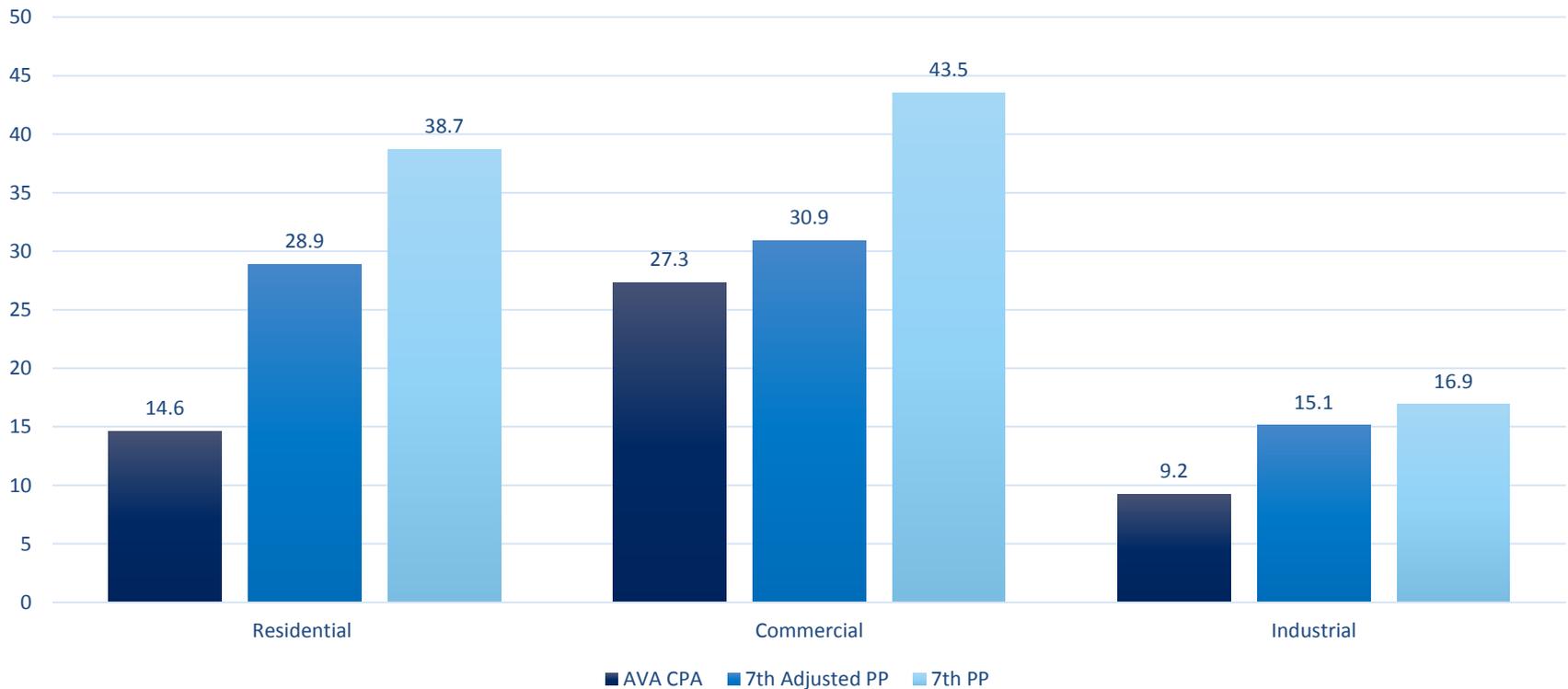
	delta (aMW)
Res Advanced Power Strips	4.1
Res Weatherization	5.6
Res DHP	2.8
Res Lighting	5.9
Res Showerheads	3.3
Com Advanced Rooftop Controller	2.9
Com Cooking Equipment	-1.1
Com Data Centers	7.8
Com DHP	1.2
Com Exterior Building Lighting	4.2
Com Lighting Controls	-1.0
Com Lighting Package	-7.3
Com Municipal Sewage Treatment	1.1
Com Smart Plug	1.4
Com Street Lightng	2.0
Ind Fans	1.1
Ind Refrigeration	2.1
Ind Integrated Plant Energy Management	1.3
Ind Motors	-1.7
Ind Plant Energy Management	1.0
Pumps	2.6

# Adjustments to 7<sup>th</sup> Power Plan

- Reduce space & water heating measures to 40%
- Reduce data center number to 5%
- Reduce industrial loads to 75% (2.6% industrial / 3.5% regional)
- Reduce street lighting savings to 0% (was added as part of distribution savings for EIA)

# AVA vs. 7<sup>th</sup> Power Plan After Adjustments

## 2026 Cumulative Conservation (aMW) by Sector



# 2015 Electric Avista IRP PRS

## Equation 11.2: Conservation Avoided Costs

$$\{(E + (E * L) + DC) * (1 + P)\} + PCR$$

### Where:

**E** = Market energy price. The price calculated by AURORA<sup>XMP</sup> is \$38.48 per MWh assuming a flat load shape.

**PCR** = New resource capacity savings for the PRS selection point is estimated to be \$102 per kW-year (winter savings only).

**P** = Power Act preference premium. This is the additional 10 percent premium given as a preference towards energy efficiency measures.

**L** = Transmission and distribution losses. This component is 6.1 percent based on Avista's estimated system average losses.

**DC** = Distribution capacity savings. This value is approximately \$12.30 per kW-Year

# 7<sup>th</sup> Power Plan Technical Available 2035

Table G - 7: Levelized Cost Bins for Conservation

Bin	Cost Range (2012\$/MWh)	Average Levelized Cost (2012\$/MWh)		Maximum Conservation (aMW)		
		LO	Retrofit	LO	Retrofit	Total
1	<\$20	<b>-\$21</b>	<b>-\$32</b>	959	883	1,841
2	\$20-50	36	36	1,802	1,598	3,400
3	\$50-80	64	65	2,220	1,857	4,078
4	\$80-110	92	94	2,317	2,055	4,372
5	\$110-140	126	125	2,506	2,079	4,585
6	\$140-170	156	160	2,621	2,129	4,750
7	>\$170	580	410	2,818	2,271	5,088

[http://www.nwcouncil.org/media/7149911/7thplanfinal\\_appdixg\\_consresources.pdf](http://www.nwcouncil.org/media/7149911/7thplanfinal_appdixg_consresources.pdf)

# 7<sup>th</sup> Power Plan Achievable Conservation (Summary Table G-9 7<sup>th</sup> Power Plan)

	aMW by 2021	aMW by 2026	aMW by 2035
<b>7th PP Total Achievable Savings (aMW)</b>	<b>1459</b>	<b>3001</b>	<b>4374</b>

[http://www.nwcouncil.org/media/7149911/7thplanfinal\\_appdixg\\_consresources.pdf](http://www.nwcouncil.org/media/7149911/7thplanfinal_appdixg_consresources.pdf)

# Table G-7 adjusted to 2026 Achievable

<b>Table G-7: Revised to achievable in 2026 (aMW)</b>					
<b>Bin</b>	<b>Cost Range (2012\$/MWh)</b>	<b>LO</b>	<b>Retrofit</b>	<b>Total</b>	<b>AVA Portion</b>
<b>1</b>	<b>&lt;\$20</b>	<b>562</b>	<b>518</b>	<b>1080</b>	<b>28.4</b>
<b>2</b>	<b>\$20-\$50</b>	<b>1057</b>	<b>937</b>	<b>1994</b>	<b>52.3</b>
<b>3</b>	<b>\$50-\$80</b>	<b>1302</b>	<b>1089</b>	<b>2391</b>	<b>62.8</b>
<b>4</b>	<b>\$80-\$110</b>	<b>1359</b>	<b>1205</b>	<b>2564</b>	<b>67.3</b>
<b>5</b>	<b>\$110-\$140</b>	<b>1470</b>	<b>1219</b>	<b>2689</b>	<b>70.6</b>
<b>6</b>	<b>\$140-\$170</b>	<b>1537</b>	<b>1249</b>	<b>2786</b>	<b>73.1</b>
<b>7</b>	<b>\$&gt;170</b>	<b>1653</b>	<b>1332</b>	<b>2985</b>	<b>78.3</b>

[http://www.nwcouncil.org/media/7149911/7thplanfinal\\_appdixg\\_consresources.pdf](http://www.nwcouncil.org/media/7149911/7thplanfinal_appdixg_consresources.pdf)

# Demand Response Potential Assessment Cost Differences Between Two Studies

Similarities	Differences	Council	Avista	Impact
Installation costs	Incentive payments to customers	Not included	Included	~45% of costs (\$63/kW-yr)
Enablement costs				
Turn-over rates	Measure Life of control equipment	n/a	3 to 8 years	Derated to 80% (~\$29/kW-yr)
Ramp-rate				
Saturation	Residential Programs	Included	Not included	22.7 MW by 2030

## Avista Residential Demand Response Pilots

- Avista’s service area has a high penetration of natural gas
- Electric heat and water heating primarily in apartment units – more costly to have on a DR program

**Lower Potential for C&I load curtailment** – identified by Account Executive relationship strong with C&I customers



# Demand Response Potential Assessment

- Avista's 2014 study
  - Six months to complete – intense focus on Avista's service area
  - Comprehensive in-depth analysis
- Costs and program expectations are in line with peer utilities' current DR programs in region
- Firm curtailment identified as Avista's most cost effective DR option at \$118.59/kW-year (2014\$ levelized)



# Reliability Planning (Power Supply)

James Gall, Senior Power Supply Analyst  
First Technical Advisory Committee Meeting  
June 2, 2016

# Washington UTC Planning Reserve Comments

- Address the potential over-reliance on the regional capacity surplus for peak planning
  - *Review 2015 IRP Assumptions*
  - *Update analysis for year 2025*
  - *Value of lost load*
- Work with regional stakeholders, including the Northwest Power and Conservation Council Staff, to publish information about Avista's reserve requirements needs
  - Review Power Council's latest analysis

# Power Council Analysis

# Power Council LOLP 2020/21 Analysis

Existing Resources and Conservation Forecast (5/24/2016)

**DRAFT**

Imports → ↓ Loads	3400 SW	2500 SW	1700 SW	Removes 650 MW 2500 SW
High Load	22.1	24.2	26.2	30.0
Med Load	7.8	9.9	12.0	13.2
Low Load	1.9	3.7	5.6	5.4

**DRAFT**

# Northwest Requirements

## DRAFT

- Power Council estimates 1,257 MW of new capacity needed to achieve 4.7% LOLP in Med Load/2,500 SW Import Scenario
  - Analysis was completed using DR assumptions designed for a shorter peak event than expected
  - Load forecast will need to be updated to match estimated peak & energy values in the 7<sup>th</sup> Power Plan
  - No estimate given if served by conservation or natural gas-fired resources
  - Model enhancements and analysis not expected to be completed until Q4 2017

# Avista Power Supply Reliability Study

# 2015 IRP Reliability Planning Requirements

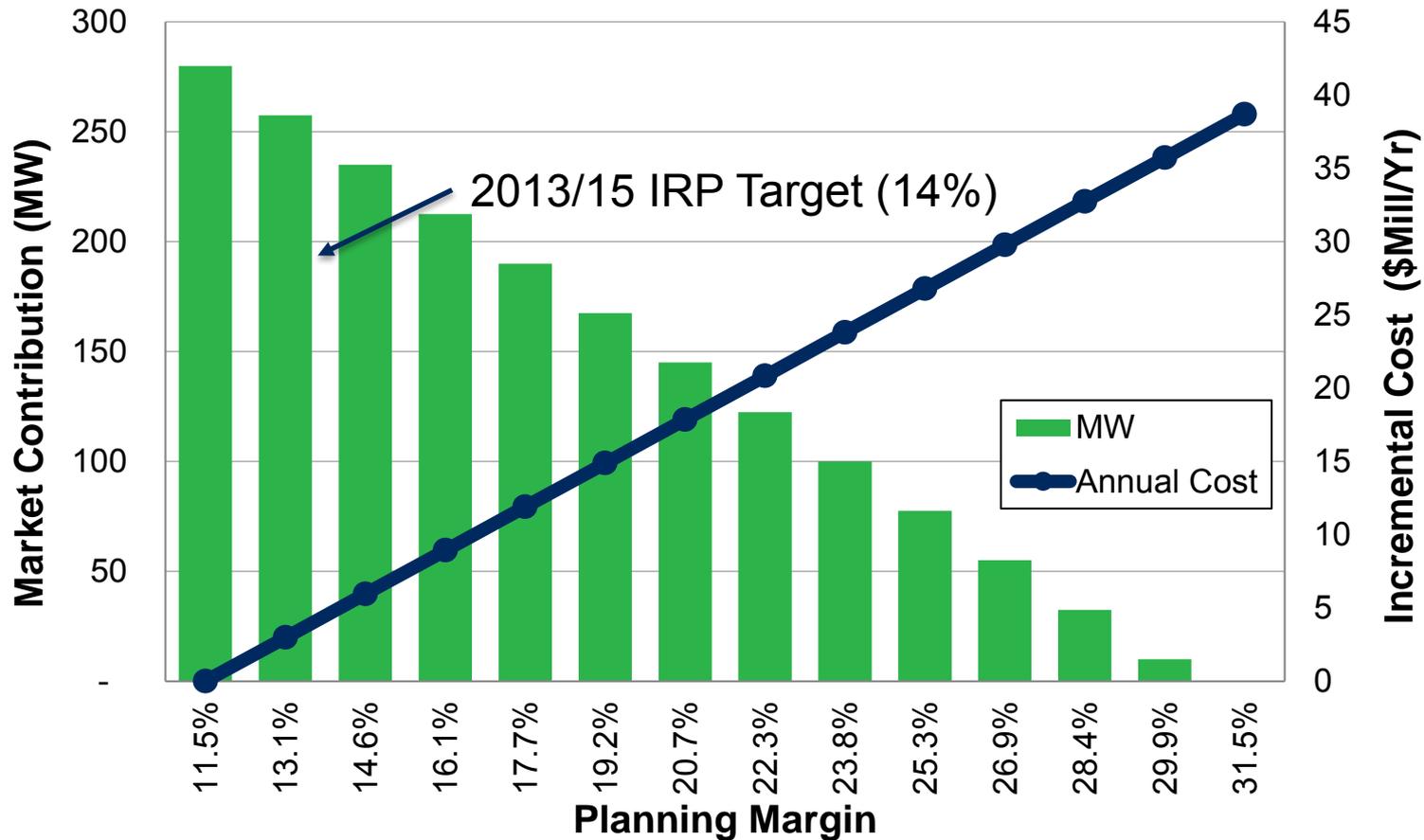
- Based on 2013 IRP's 5% Loss of Load Probability (LOLP) Analysis
- Planning margin: 14% of expected winter peak load
- Operating reserves: 3% generation, 3% Load, 16 MW of regulation at the peak hour
- Market reliance: ~240 MW during peak market events
- Total planning margin:
  - ~23.5% for winter months
  - Summer months only plan to meet operating reserves

# 2017 IRP Analysis Questions

- Is 14% margin plus operating reserves the right target to balance market reliance and controlled reserves?
  - How much market should we count on during peak events?
- What other metrics can we consider beyond 5% LOLP?
  - What is the acceptable level of reliability?
- What is the cost of an outage due to resource adequacy?
  - How does this compare to the cost of capacity?
  - Are power supply outages different from distribution outages from a customer's perspective?

# 2013 IRP: 2020 5% LOLP Analysis

- Trade off between planning margin, cost, and market analysis



# Reliability Metrics Options

- What we are modeling for?
  - Events not serving all load or reserve requirements due to insufficient resources/market availability
- Metrics
  - **2015 IRP: 5% LOLP** (percent of draws with an event)
  - LOLE: 2.4 hours per year
  - One event in 10 years
  - Outage costs equal resource acquisition costs

# LOLP Assumptions

- 1,000 simulations
- 80 years of hydro data
- 126 years of weather data (Load & Generation)
- Temperature correlated with wind output
- Randomized forced outages
- Off-peak market purchases limited to 1,000 MW
- On-peak market purchase limited to 400 MW
- Super peak market purchase constrained at  $> 95$  &  $< 5$  degrees Fahrenheit
- DR & storage can be modeled in future studies

# 2025 Study Results

Winter Market	Summer Market	Gen Added (winter)	LOLP	LOLH	LOLE	EUE	Events in 10 years	Winter LOLP	Summer LOLP	Planning Margin (excluding ST reserves)
0 No on-peak market included	0	0	81.1%	13.73	0.88	1,135	25.2	55.4%	84.9%	10.3%
0	0	0	52.0%	3.43	0.29	328	9.7	22.1%	41.5%	10.3%
0	250	0	26.8%	2.10	0.14	222	4.5	24.9%	5.3%	10.3%
200	200	0	12.7%	0.65	0.05	56	1.6	4.6%	8.3%	10.3%
0	0	372	5.0%	0.20	0.01	18	0.6	1.2%	4.0%	31.2%
240	240	66	4.7%	0.17	0.01	15	0.5	1.4%	3.3%	14.0%
275	275	24	4.9%	0.19	0.01	13	0.6	0.9%	4.0%	11.6%

# Outage Costs

# Cost of an Outage

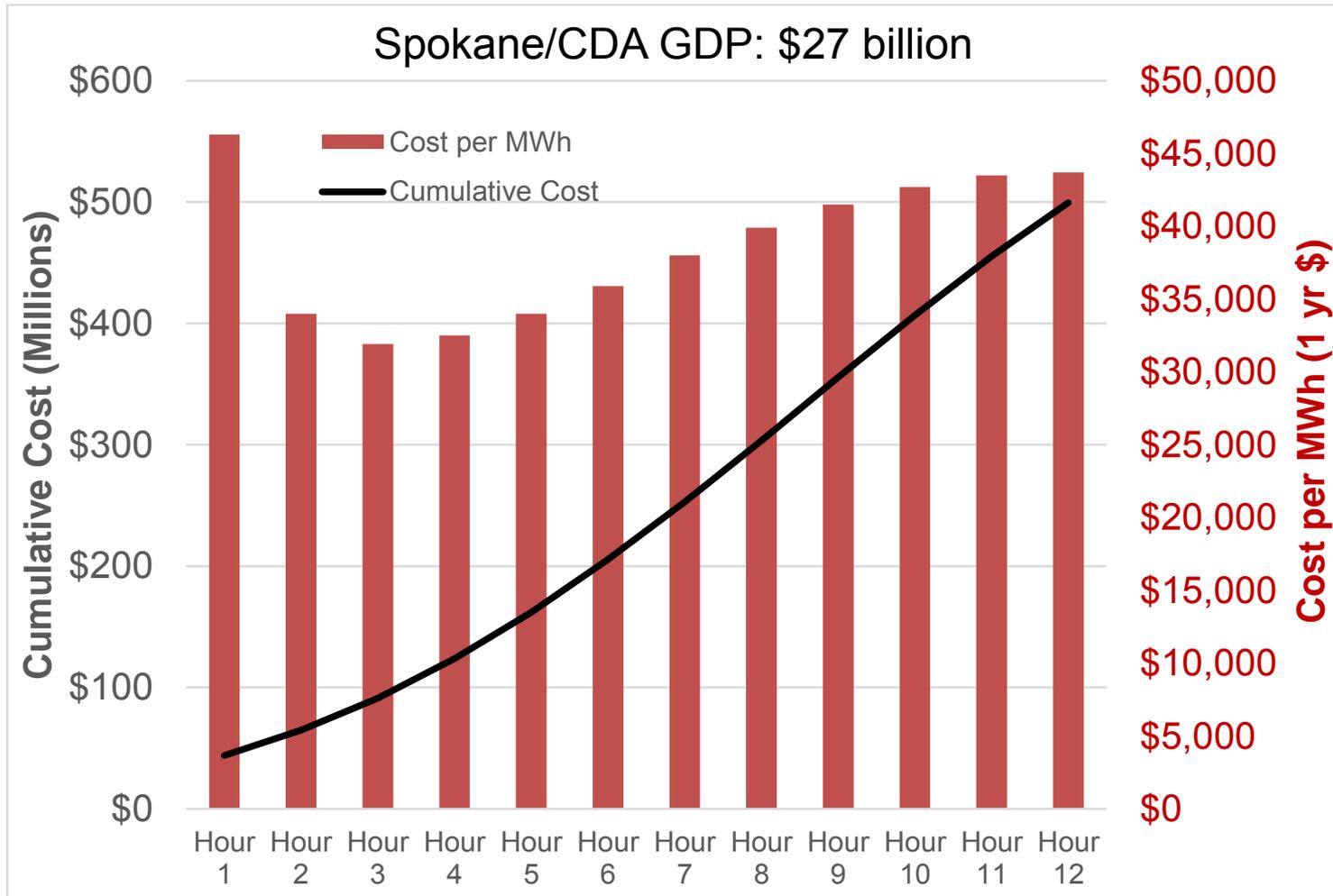
- Department of Energy Calculator
  - [www.icecalculator.com](http://www.icecalculator.com)
- Cost of a single hour of lost load for one hour to all customers
- Cost of lost power \$46,300/MWh (one hour)
  - Average of 12 hours outage is \$38,658/MWh (25 yr. levelized = \$48,762)

## Interruption Cost Estimates

Sector	No. of Customers	Cost per Event (2016\$)	Cost per Average kW (2016\$)	Cost per Unserved kWh (2016\$)	Total Cost of Sustained Interruptions (2016\$)
<b>Medium and Large C&amp;I</b>	5,041	\$4,257.4	\$49.2	\$49.2	\$21,461,386.2
<b>Small C&amp;I</b>	37,556	\$570.1	\$210.7	\$210.7	\$21,412,094.3
<b>Residential</b>	326,985	\$3.6	\$2.8	\$2.8	\$1,171,672.8
<b>All Customers</b>	369,582	\$119.2	\$46.3	\$46.3	\$44,045,153.3

- Net cost for new NG peaker Levelized \$400-\$900 per MWh (5% to 2% CF)

# Cost of Sustained Outages (entire system)



# How much reliability can we afford?

- If no new resources are acquired or we do not expect any super peak market reliance in 2025
  - The expected lost load is 328 MWh
  - Annual cost to customers is \$16 million ( $\$48,762 \times 328$  MWh)
- The cost of new “raw” capacity
  - Natural gas-fired peaker (100 MW size range)
  - \$103.3/ kW-yr. (levelized- 2015 dollars)
- Annual cost / cost of peaker = 155 MW
  - Implied planning margin = 27.2% (23.5% current)
  - Peak market reliance = 145 MW (240 MW current)

# Next Steps

- Continue to participate in NW Power Council RAAC Process
- Update NW regional load and resource balance forecast
- Continue 2025 analysis using final load forecast and resource assumptions
- Propose reliability metrics for 2017 IRP at next TAC meeting



# Draft 2017 Electric IRP Work Plan

John Lyons, Ph.D.  
First Technical Advisory Committee Meeting  
June 2, 2016

# Technical Advisory Committee Meetings<sup>57</sup>

## Tentative Schedule

- **TAC 1 (June 2, 2016):** TAC Meeting Expectations, 2015 IRP Commission Acknowledgement Letters, Energy Independence Act compliance, energy efficiency modeling discussion, resource adequacy – preliminary results, and draft 2017 Electric IRP Work Plan.
- **September 2016:** Review conservation selection methodology, energy and economic forecasts, generation options, and 2016 Shared Value Report.
- **November 2016:** Peak load forecast, Colstrip modeling assumptions, 2017 IRP modeling, resource needs assessment, and energy efficiency.
- **February 2017:** Electric and natural gas price forecasts, transmission planning, storage cost and benefits analysis, and market portfolio scenario development.
- **March 2017:** Draft Preferred Resource Strategy (PRS), review of scenarios and futures, and portfolio analysis.
- **June 2017:** Review of the final PRS and Action Items.

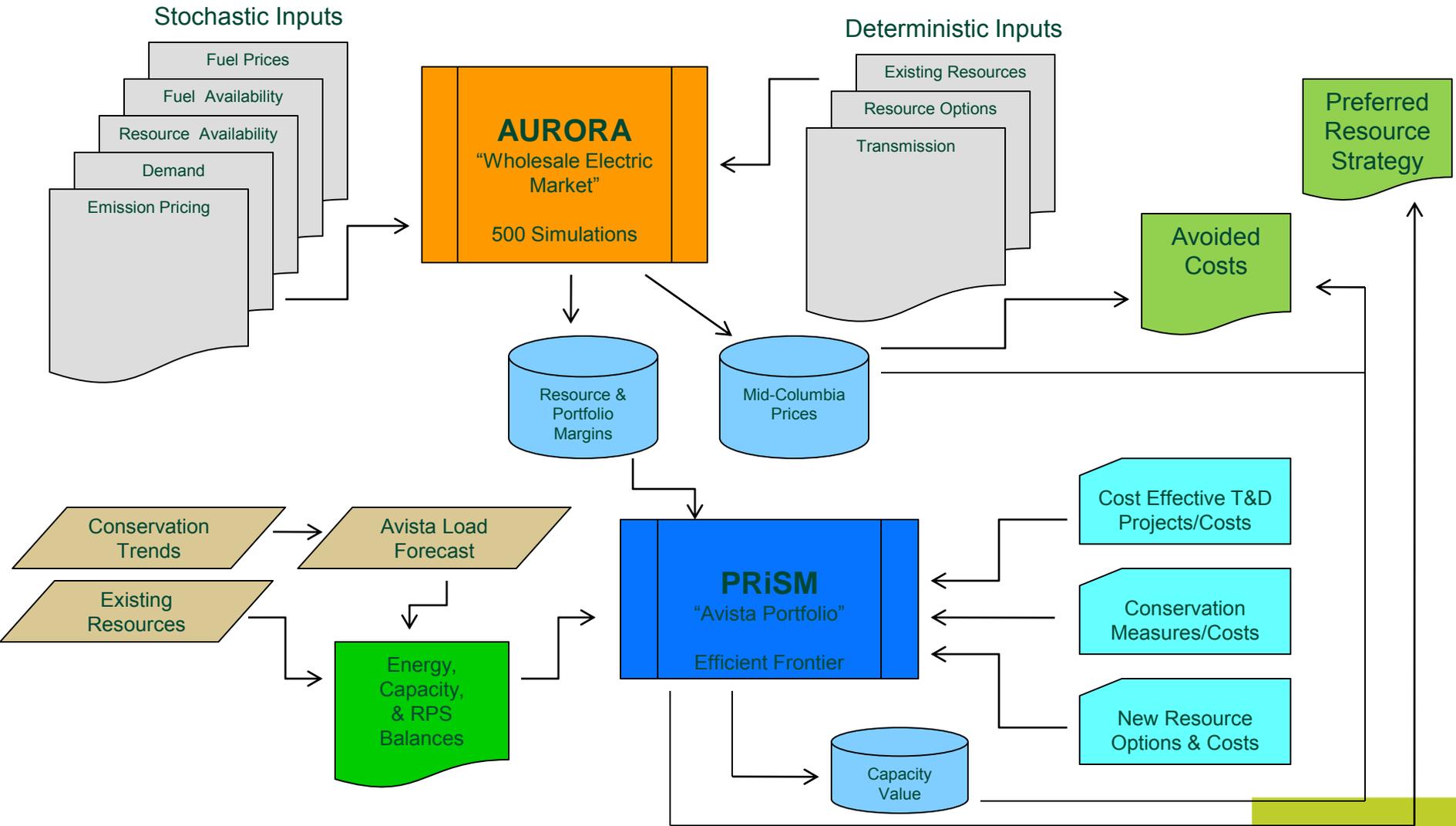
# 2017 Draft Electric IRP<sup>58</sup> Timeline

Preferred Resource Strategy (PRS) Tasks	Target Date
Finalize energy demand forecast	July 2016
Identify regional resource options for electric market price forecast	September 2016
Identify Avista's supply & conservation resource options	September 2016
Finalize Peak Load Forecast	September 2016
Update AURORA <sup>xmp</sup> database for electric market price forecast	October 2016
Finalize data sets/statistics variables for risk studies	October 2016
Energy efficiency load shapes input into AURORA <sup>xmp</sup>	October 2016
Draft transmission study due	October 2016
Final transmission study due	December 2016
Finalize distribution analysis	December 2016
Select natural gas price forecast	December 2016
Finalize deterministic base case	December 2016
Due date for study requests	January 13, 2017
Base case stochastic study complete	January 2017
Finalize PRiSM model	January 2017
Develop efficient frontier and PRS	January 2017
Simulation of risk studies "futures" complete	February 2017
Simulate market scenarios in AURORA <sup>xmp</sup>	February 2017
Evaluate resource strategies against market futures and scenarios	March 2017
Present preliminary study and PRS to TAC	March 2017

# 2017 Draft Electric IRP<sup>59</sup> Timeline

Writing Tasks	Target Date
File 2017 IRP Work Plan	August 31, 2016
Prepare report and appendix outline	October 2016
Prepare text drafts	April 2017
Prepare charts and tables	April 2017
Internal drafts released at Avista	May 2017
External draft released to the TAC	June 2017
Final editing and printing	August 2017
Final IRP submission to Commissions and distribution to TAC	August 31, 2017

# 2017 IRP Modeling Process



# 2017 Electric IRP Draft Outline

- Executive Summary
- Introduction and Stakeholder Involvement
- Economic and Load Forecast
  - Economic Conditions
  - Avista Energy and Peak Load Forecast
  - Load Forecast Scenarios
- Existing Supply Resources
  - Avista Resources
  - Contractual Resources and Obligations

# 2017 Electric IRP Draft Outline <sup>62</sup>

- Energy Efficiency and Demand Response
  - Conservation Potential Assessment
  - Demand Response Opportunities
- Long-Term Position
  - Reliability Planning and Reserve Margins
  - Resource Requirements
  - Reserves and Flexibility Assessment
- Policy Considerations
  - Environmental Concerns
  - Greenhouse Gas Issues
  - State and Federal Policies

# 2017 Electric IRP Draft Outline

- Transmission & Distribution Planning
  - Avista's Transmission System
  - Future Upgrades and Interconnections
  - Transmission Construction Costs and Integration
  - Transmission and Distribution Efficiencies
- Generation Resource Options
  - New Resource Options
  - Avista Plant Upgrades

# 2017 Electric IRP Draft Outline

- Market Analysis
  - Marketplace
  - Fuel Price Forecasts
  - Market Price Forecast
  - Scenario Analysis
- Preferred Resource Strategy
  - Resource Selection Process
  - 2017 Preferred Resource Strategy
  - Efficient Frontier Analysis
  - Avoided Cost

# 2017 Electric IRP Draft Outline

- Portfolio Scenarios
  - Portfolio Scenarios
  - Tipping Point Analyses
- Action Plan
  - 2015 Action Plan Summary
  - 2017 Action Plan

*2017 Electric Integrated Resource Plan*  
**Technical Advisory Committee Meeting No. 2 Agenda**  
 Wednesday, September 28, 2016  
 Conference Room 130

<b>Topic</b>	<b>Time</b>	<b>Staff</b>
Introduction and TAC 1 Recap	8:30	Lyons
TAC 1 Action Item Update <ul style="list-style-type: none"> <li>• Conservation Selection Methodology</li> <li>• Demand Response</li> <li>• Planning Margin</li> </ul>	8:40	Gall
Electrification Update	9:15	Farley
Break	9:45	
Load and Economic Forecasts	10:00	Forsyth
Lunch	11:30	
Supply Side Options	12:30	Lyons
Break	1:15	
Clean Energy Fund 2 Grant Project	1:30	Gibson
Adjourn	2:30	



# 2017 Electric IRP TAC Meeting Expectations and TAC 1 Recap

John Lyons, Ph.D.

Second Technical Advisory Committee Meeting

September 28, 2016

# Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington every other year
- Guides resource strategy over the next two years
- Resource procurements over the next 20 years – Preferred Resource Strategy (PRS)
- Snapshot of current and projected load & resource position

# Integrated Resource Planning (Cont)

- Based on significant modeling and many assumptions
  - Fuel prices
  - Economic activity
  - Policy considerations
  - Resource costs
  - Energy efficiency
- Action Items – areas for more research in the next IRP
- This is not an advocacy forum
- Not a forum on a particular resource or resource type
- Supports rate recovery, but not a preapproval process

# Technical Advisory Committee

- The public process piece of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants in all or some of the process
- Open forum, but we need to stay on topic to get through the agenda
- Welcome requests for studies or different assumptions.
  - Time or resources may limit the amount of studies we can do
  - The earlier study requests are made, the more accommodating we can be [plug in dates from work plan]
- Planning team is also available by email or phone for questions or comments between the TAC meetings

# TAC #1 Recap

- Introductions and meeting expectations
- 2015 IRP Commission acknowledgements
- Energy Independence Act Compliance
- Energy Efficiency Modeling Discussion
- Resource Adequacy Preliminary Results
- Draft 2017 Electric IRP Work Plan

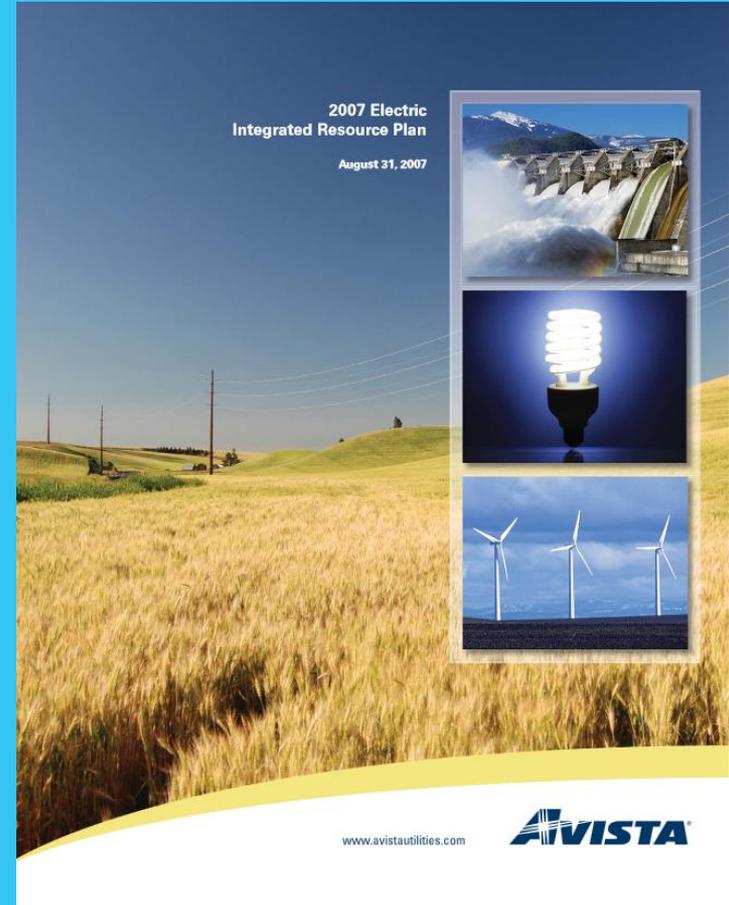
# Today's Agenda

- 8:30 – Introduction and TAC 1 Recap, Lyons
- 8:40 – TAC 1 Action Item Update (Conservation selection methodology, demand response and planning margin), Gall
- 9:15 – Electrification Update, Farley
- 9:45 – Break
- 10:00 – Load and Economic Forecast, Forsyth
- 11:30 – Lunch from The Mustard Seed
- 12:30 – Supply Side Options, Lyons
- 1:15 – Break
- 1:30 – Clean Energy Fund Grant 2, Gibson
- 2:30 – Adjourn



# 2007 IRP Forecasts

James Gall  
Second Technical Advisory Committee Meeting  
September 28, 2016



# Avista's 2007 Integrated Resource Plan

<http://www.avistautilities.com/resources/plans/documents/2007AvistaIRP.pdf>

- By 2017, the Preferred Resource Strategy investment is
  - 350 MW of natural gas-fired plants    Lancaster: +283, CS2: +28
  - 300 MW of wind    Palouse: +105, KF: inclusion in I-937
  - 38 MW of hydro plant upgrades    Noxon: +28, Nine Mile: +10, Mid-C
  - 34 MW of other renewables    QFs: 17 MW
  - 87 MW of energy efficiency, focusing on five areas:
    - Energy efficiency    Conservation estimated to be 92
    - Load management (smart grid)    aMW, with an additional 5 aMW
    - Transmission and distribution efficiencies    of T&D/Smart Grid Efficiencies
    - Analytics
    - Communications
- Of the total planned resource additions, 57% are renewable or energy efficiency improvements
- Total investment will be between \$1B and \$1.5B in the next 10 years

# Other Forecasts for 2017 in 2007

- Mid-Columbia: \$61/MWh
  - Henry Hub: \$7.47/Dth
  - Implied Market Heat Rate: 8,165
  - CO<sub>2</sub> Tax: \$9.54 short ton
  - Avista Winter Peak Load: 2,097 MW
  - Avista Summer Peak Load: 1,893 MW
  - Avista Annual Energy: 1,374 aMW
- Forwards: \$24.62/MWh  
 Forwards: \$3.29/Dth  
 7,483  
 varies  
 Est. 1,760 MW\*  
 Est. 1,624 MW\*  
 Est. 1,133 aMW\*,  
 low case:1,228 aMW

\* Adjusted for large industrial load

# 2007 Action Items Highlights

- Study wind potential in service territory
- Streamline IRP energy efficiency analysis
- Study T&D efficiency potential
- Evaluate potential greenhouse gas regulations
- Study long term natural gas price hedging
- Enhance the PRiSM model
- Monitor the load forecast, such as large loads, EVs, temperature changes



# 2017 Electric IRP TAC 1 Action Item Update

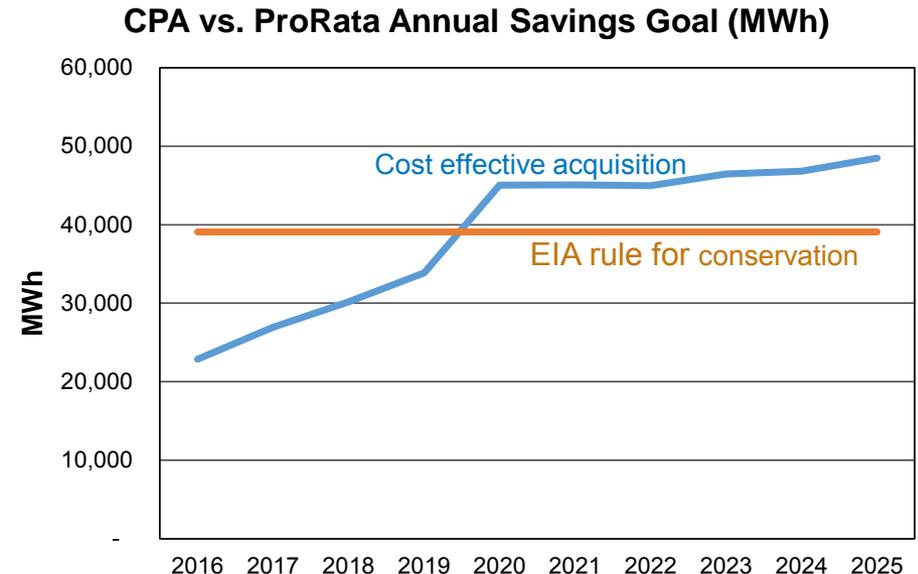
James Gall  
Second Technical Advisory Committee Meeting  
September 28, 2016

# TAC 1 Action Item Update

- Conservation Selection Methodology
  - How will we address the pro-rata 10 year requirement for the first two years of the plan?
  - NPCC 7<sup>th</sup> plan comparison
- Demand Response
  - What will we be including for this plan regarding demand response?
- Planning Margin
  - What planning margin will Avista assume for this IRP?

# Conservation Selection Methodology

- Technical/achievable savings for each measure to be modeled in PRiSM .
  - Change from only measures with +30% BC ratio in last IRP
- In the event 2018/19 selection differs from the average annual savings from 2018-2027
  - Energy savings will be moved forward to 2018/19 in preparation of the Preferred Resource Strategy



# Comparison to the 7<sup>th</sup> Plan

- At the prior TAC meeting an analysis comparing the 2015 IRP to the Power Council's 7<sup>th</sup> plan was reviewed.
- To further compare to regional analysis,
  - Avista will include a similar analysis in the 2017 document
  - Planned topic at a future TAC meeting.

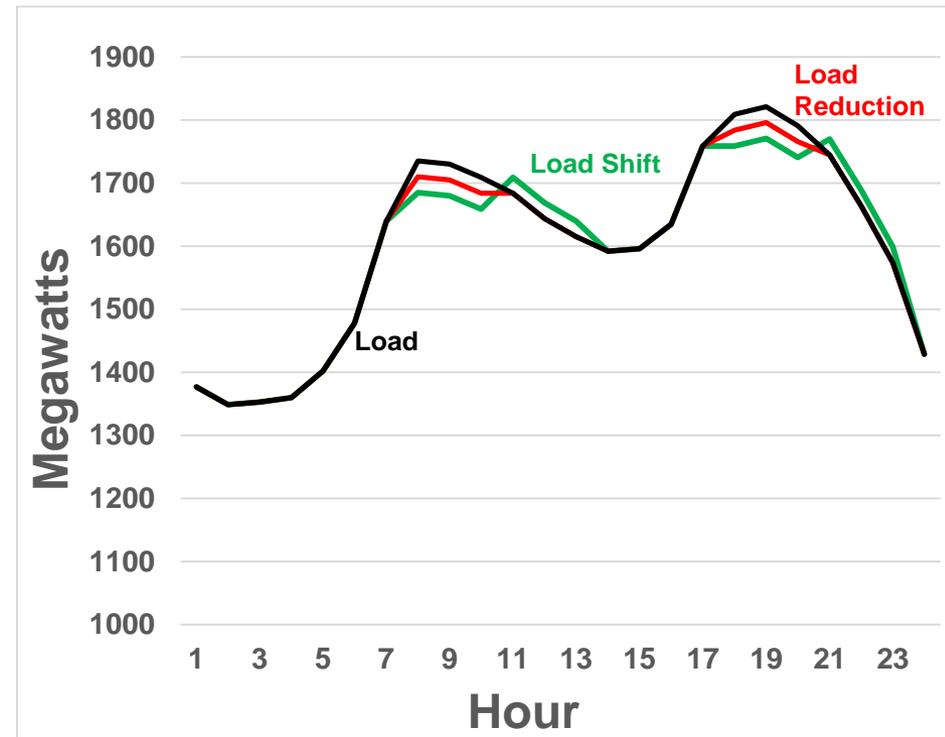


# Demand Response

## 2017 Proposal

- Continue to use commercial/industrial demand response potential assessment from 2015 IRP
- Work with large industrials to identify potential strategies and requirements to develop a meaningful demand response opportunity
- Consider a residential potential assessment for 2019 IRP, including summer DR applications if applicable.

## Example Peak Load Day



# Planning Margin

## Current Planning Margin

- 14% planning margin (winter)
- 0% planning margin (summer)
- Operating reserves
- 16 MW for regulation
- 240 MW constrained market availability

Avista proposes to check back with TAC in November after further analysis

## Planning Margin Concerns

- Power Council's latest analysis shows a regional deficit of 3,730 MW by Q4 2021
  - shortfalls occur in both winter & summer
- Power Council's regional LOLP approach is the best method to identify needs.
  - no regional authority exists to enforce capacity requirements
  - Therefore, is 240 MW a reasonable market expectation?
  - Should we include a summer planning margin?



# Transportation Electrification

Rendall Farley, P.E.

Second Technical Advisory Committee Meeting

September 28, 2016

Delivering reliable energy service and the choices that matter most to our customers.



Customer

Shareholder

Community

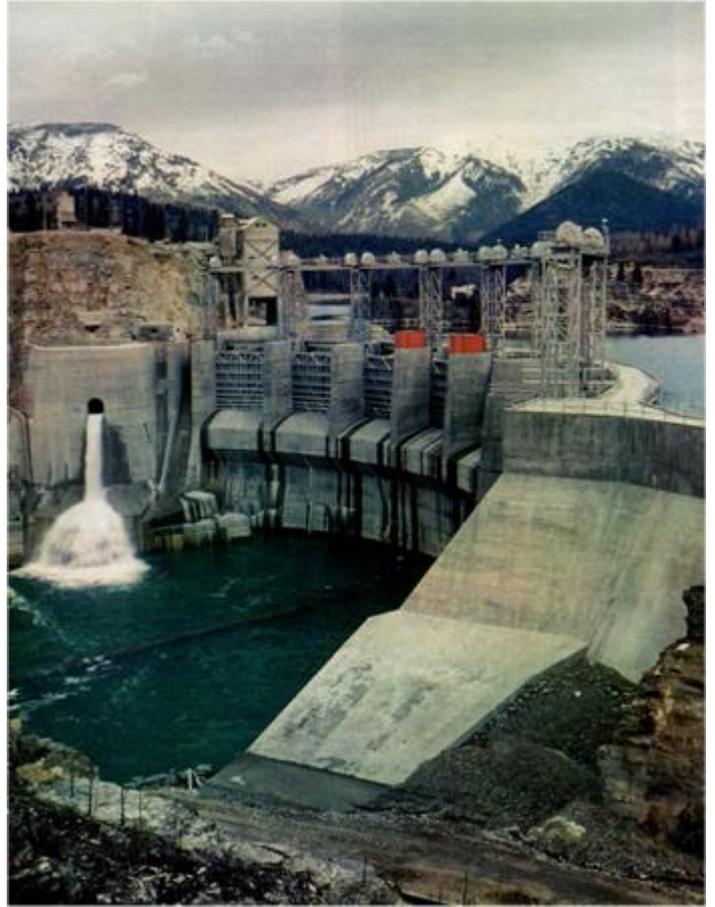
Employee



# Electric Transportation

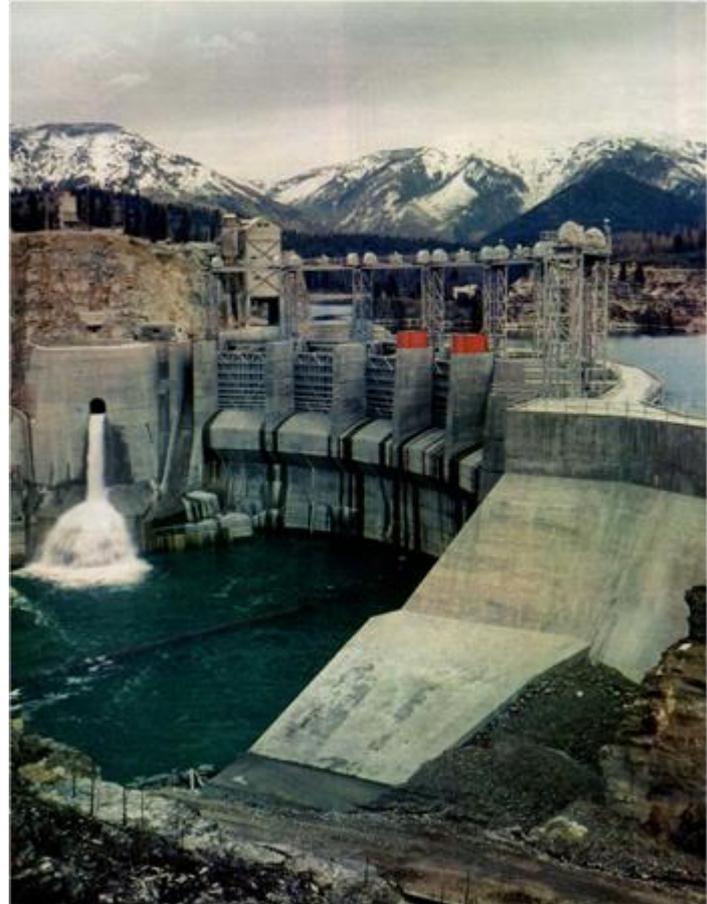
The movement of people and goods using electricity as a transportation fuel





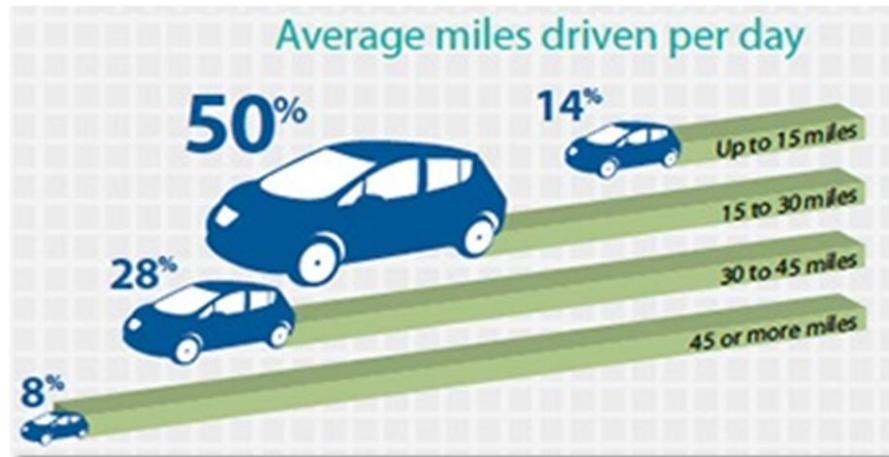
# Drivers & Benefits

- Technology Advances
- Emission Reductions
- Energy Independence
- Operational Cost Savings
- Economic Growth
- High Customer Satisfaction



# Adoption Barriers

- Low Awareness & Misperceptions
- Upfront Cost
- Limited Vehicle Choices
- Range Anxiety
- Low Infrastructure Investment





**PHEV**  
Plug-in Hybrid Electric  
Vehicle

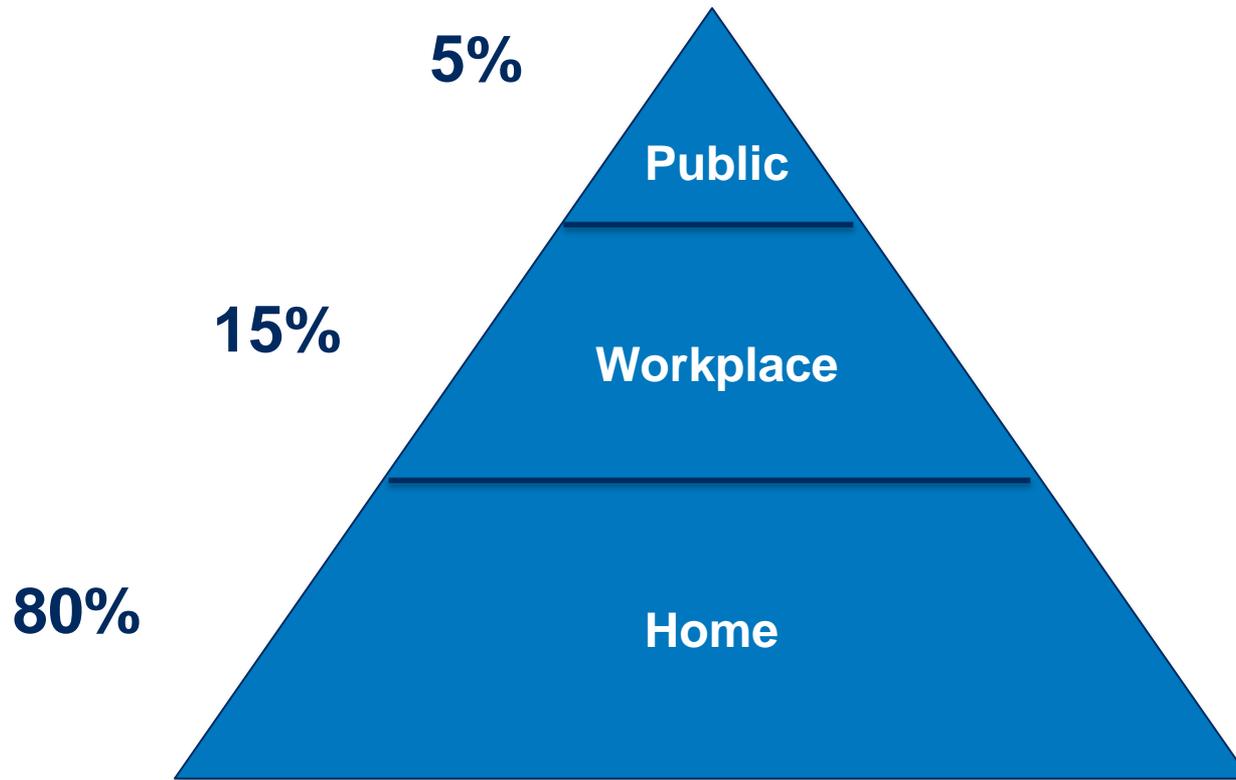
**BEV**  
Battery Electric  
Vehicle

**HEV**  
Hybrid Electric  
Vehicle



**PEV**  
Plug-in Electric Vehicle

# EV Charging Pyramid



# Future Power Requirements

## Current State

1,638 MW peak required load

## Extreme Future Scenario

- 500,000 EVs on Avista's system
- 20kW simultaneous demand per EV
- 10,000 MW peak load



## A Less Extreme Scenario . . .

- 30 miles/day average distance travelled = 9 kW-hr energy per day, per EV
- 500,000 EVs = 4,500 MW-hr/day
- Evenly spread over 18 hrs system off-peak = 250 MW peak load

# Rate Impacts - Benchmark Comparison (California Transportation Electrification Assessment)

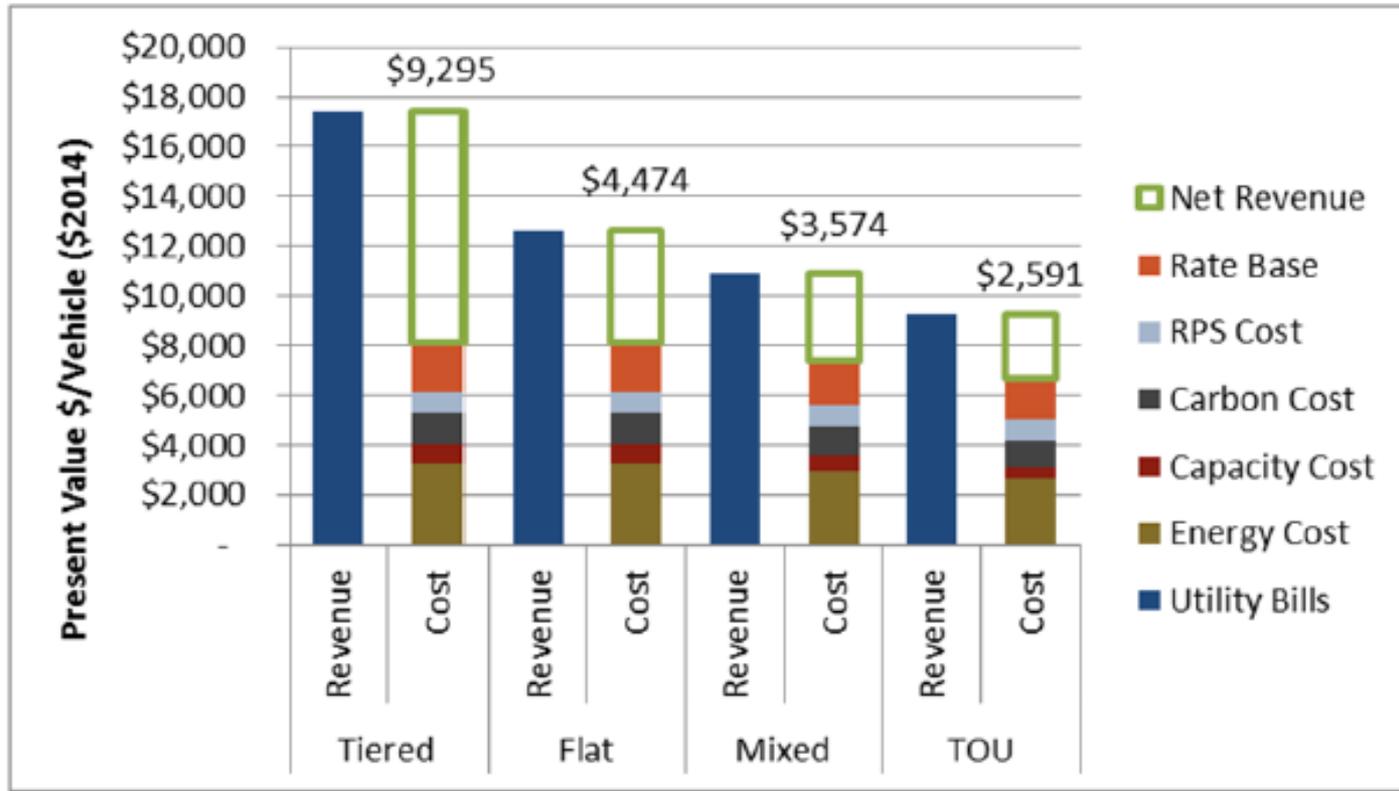


Figure 2. Utility Customer Benefits: Present Value of Revenue and Costs per Vehicle (Ratepayer Impact Measure Cost-test)

# EVSE Pilot Design

45 AC Level 2 in Public

120 AC Level 2 at Home



Integrated Network



7 DC Fast Chargers



100 AC Level 2 at Work



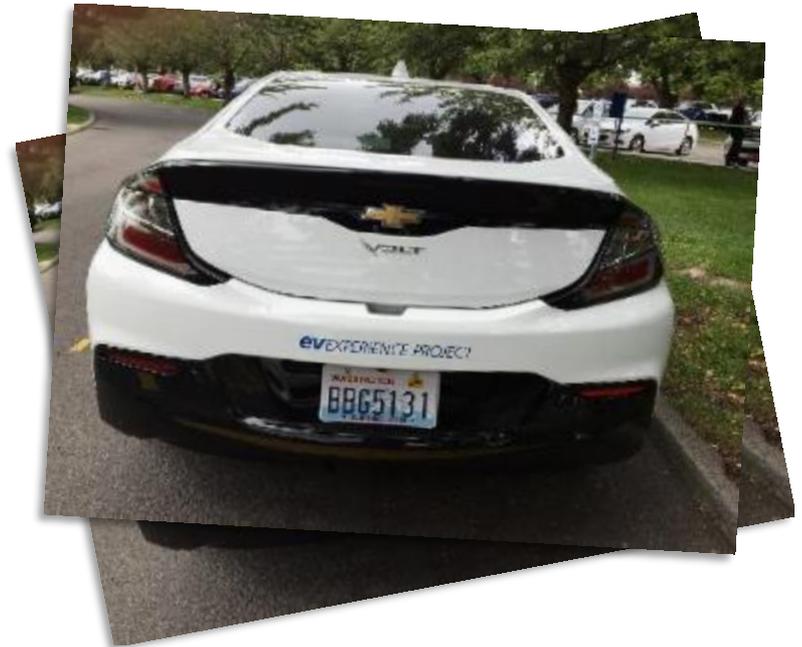
User Web Portal



Utility Web Portal

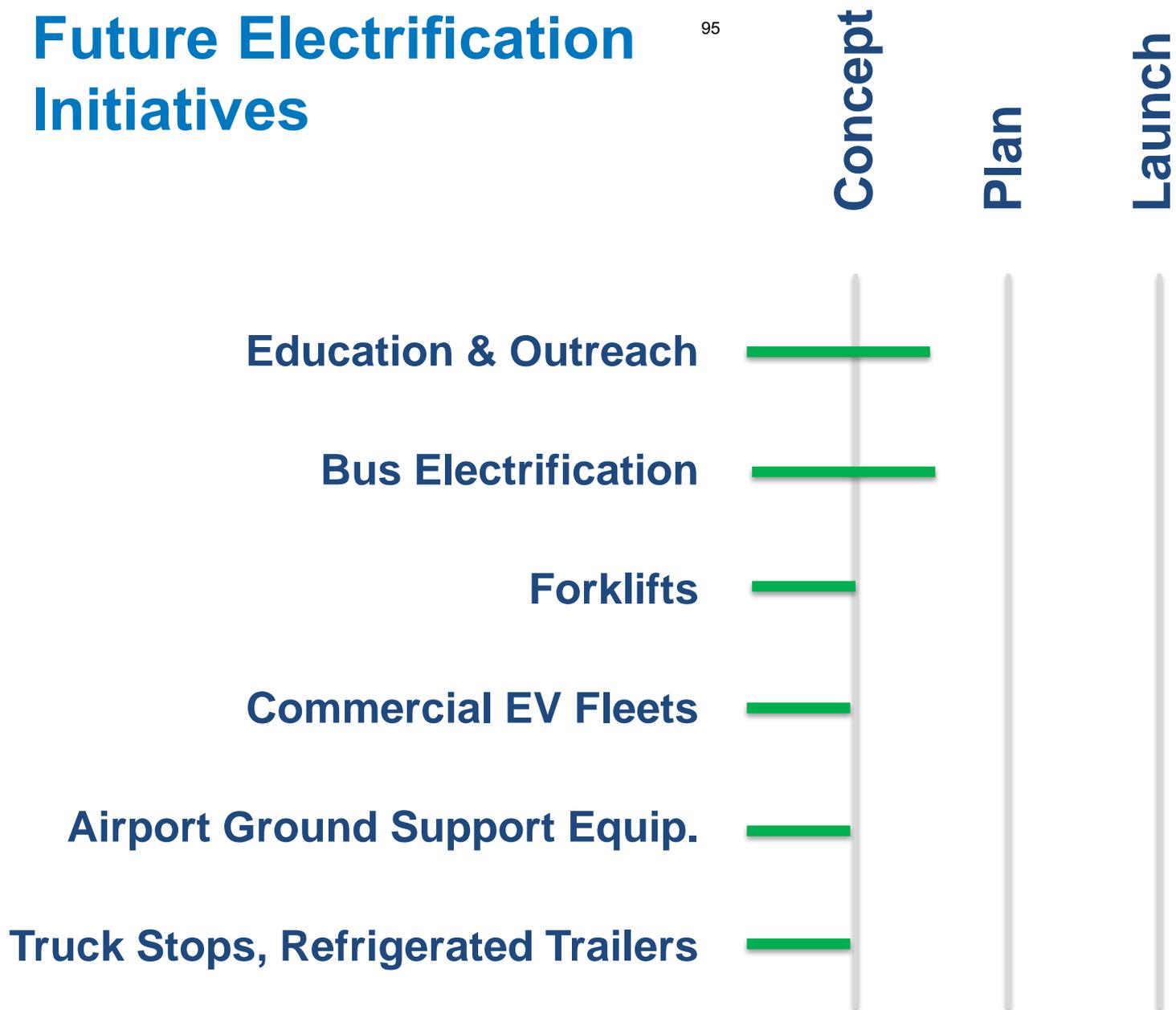
# EV Experience Project

- Drive one of 3 EVs for a week
- 6-9 month internal test to help develop a proposal for customers
- Is it the right fit for your life?  
Now you can test it out, no risk
- Test before and after perceptions,  
purchase decisions



# Future Electrification Initiatives

95





*Photo: Huntington Park, Spokane, Wash.*



Energy for Life.



# Load and Economic Forecasts

**Grant D. Forsyth, Ph.D.**

**Chief Economist**

**Second Technical Advisory Committee Meeting**

**September 28, 2016**

# Main Topic Areas

- **Service Area Economy**
- **Peak Load Forecast**
- **Long-run Forecast**



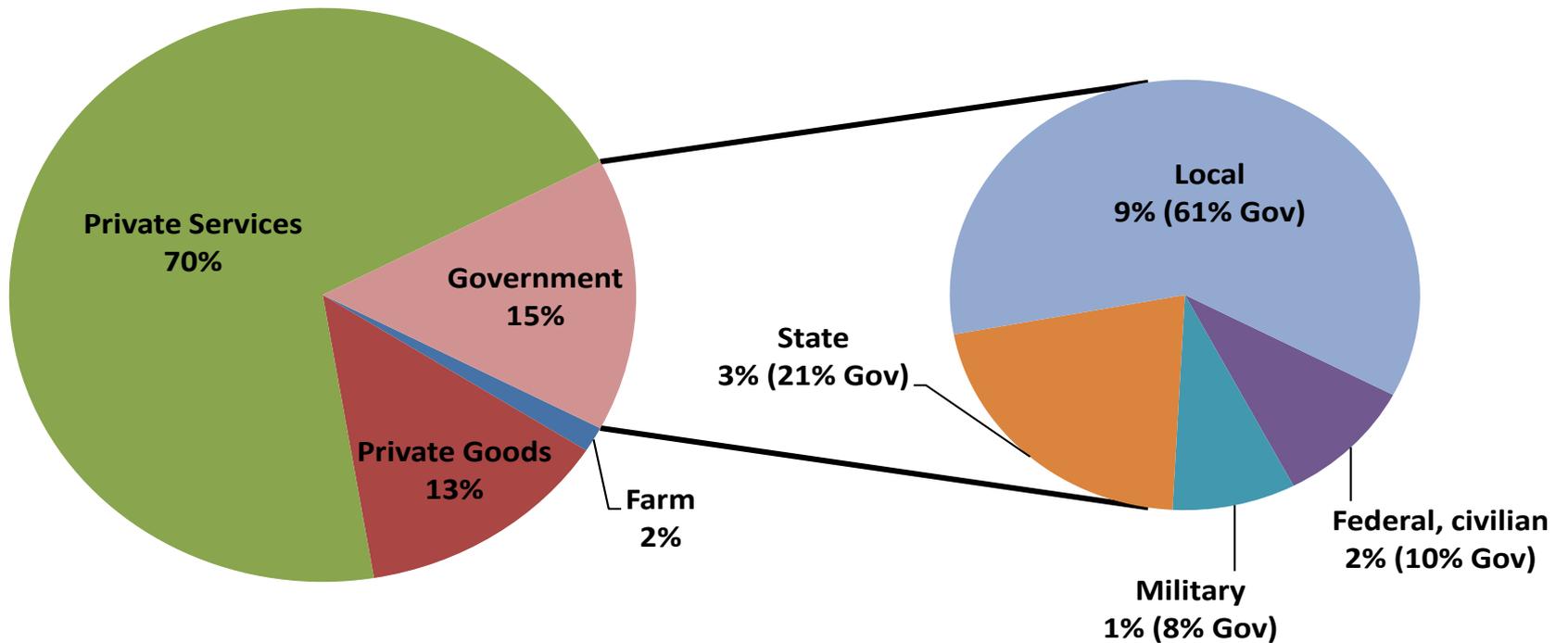


# Service Area Economy

Grant D. Forsyth, Ph.D.  
Chief Economist  
[Grant.Forsyth@avistacorp.com](mailto:Grant.Forsyth@avistacorp.com)

# Distribution of Employment: Services and Government are Dominant

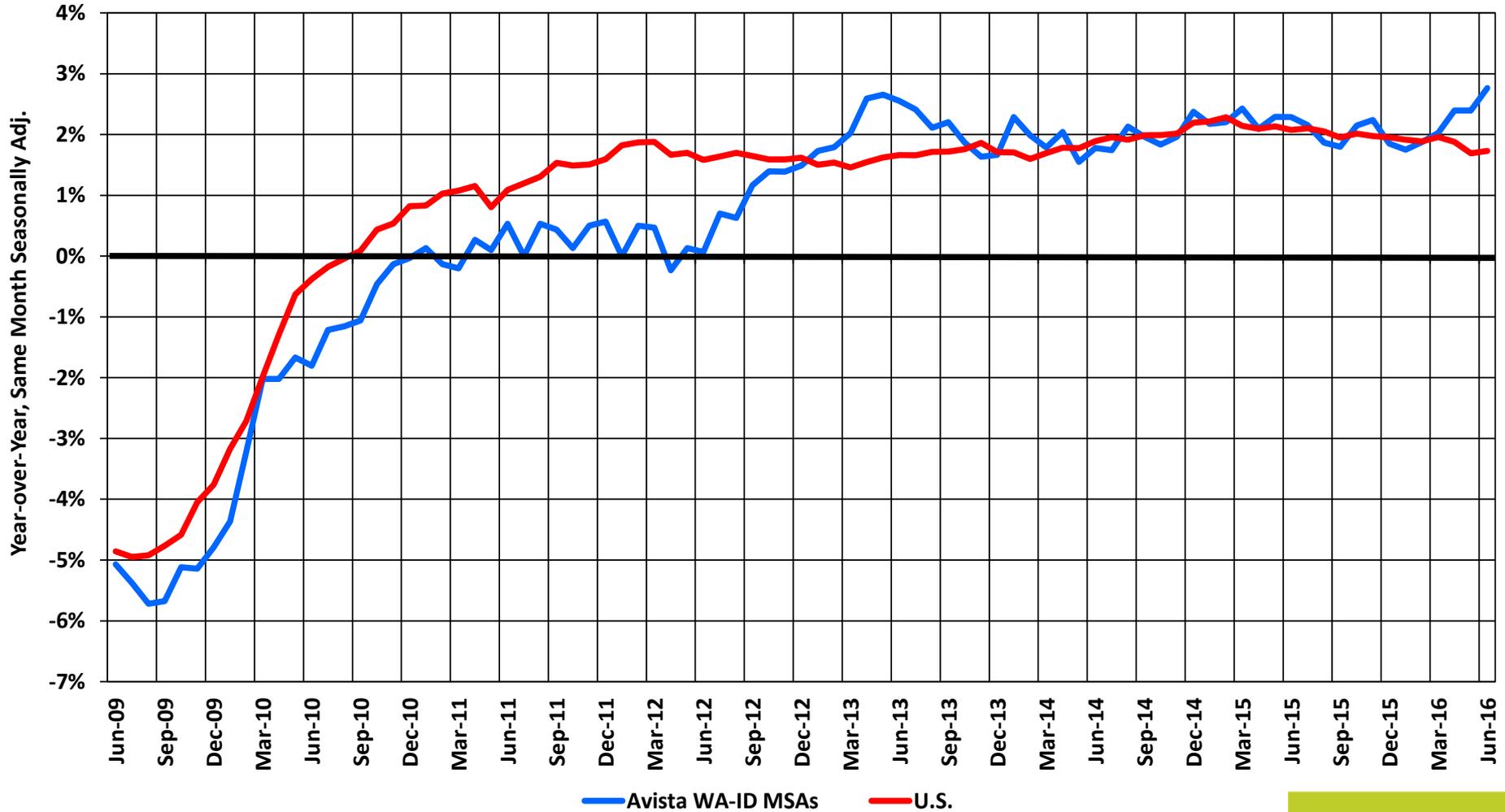
WA-ID MSA Employment, 2014



# Non-Farm Employment Growth, 2009-2016

102

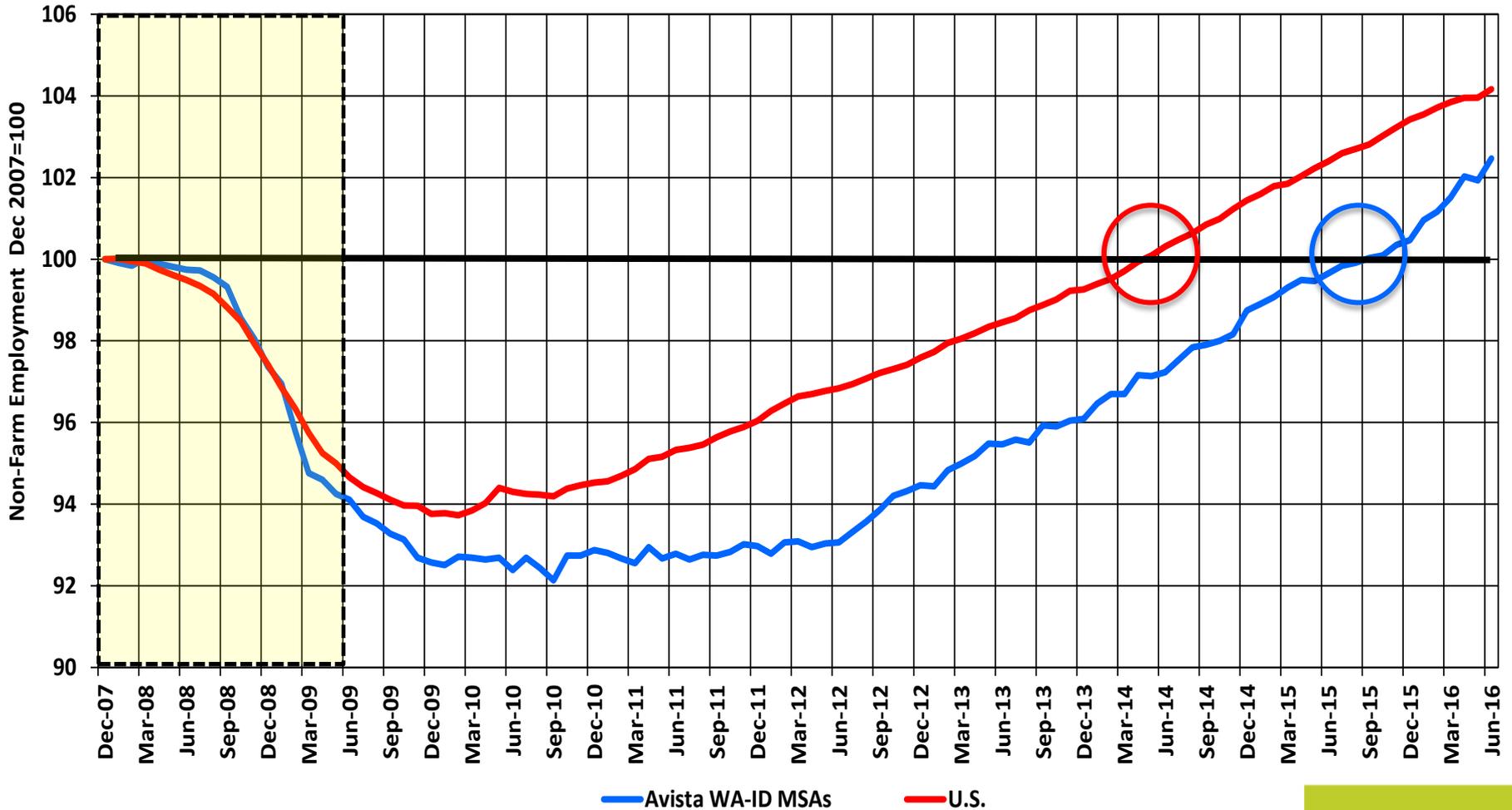
Non-Farm Employment Growth Since June 2009



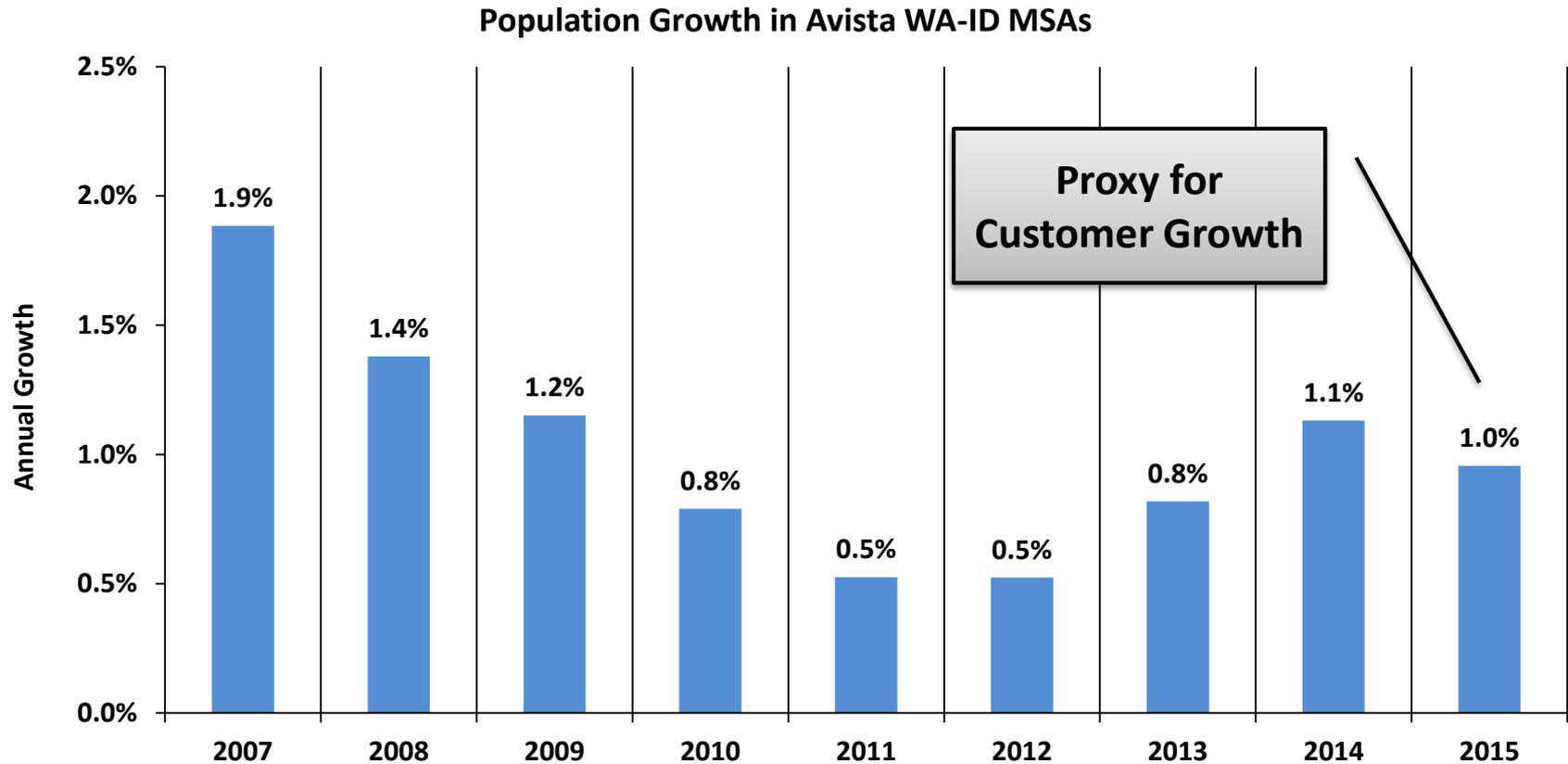
# Non-Farm Employment: A Long, Slow Recovery

103

Non-Farm Employment Level Since 2007 (Dashed Shaded Box = Recession Period)



# Population Growth: Recovering with Employment Growth





# Peak Load Forecast

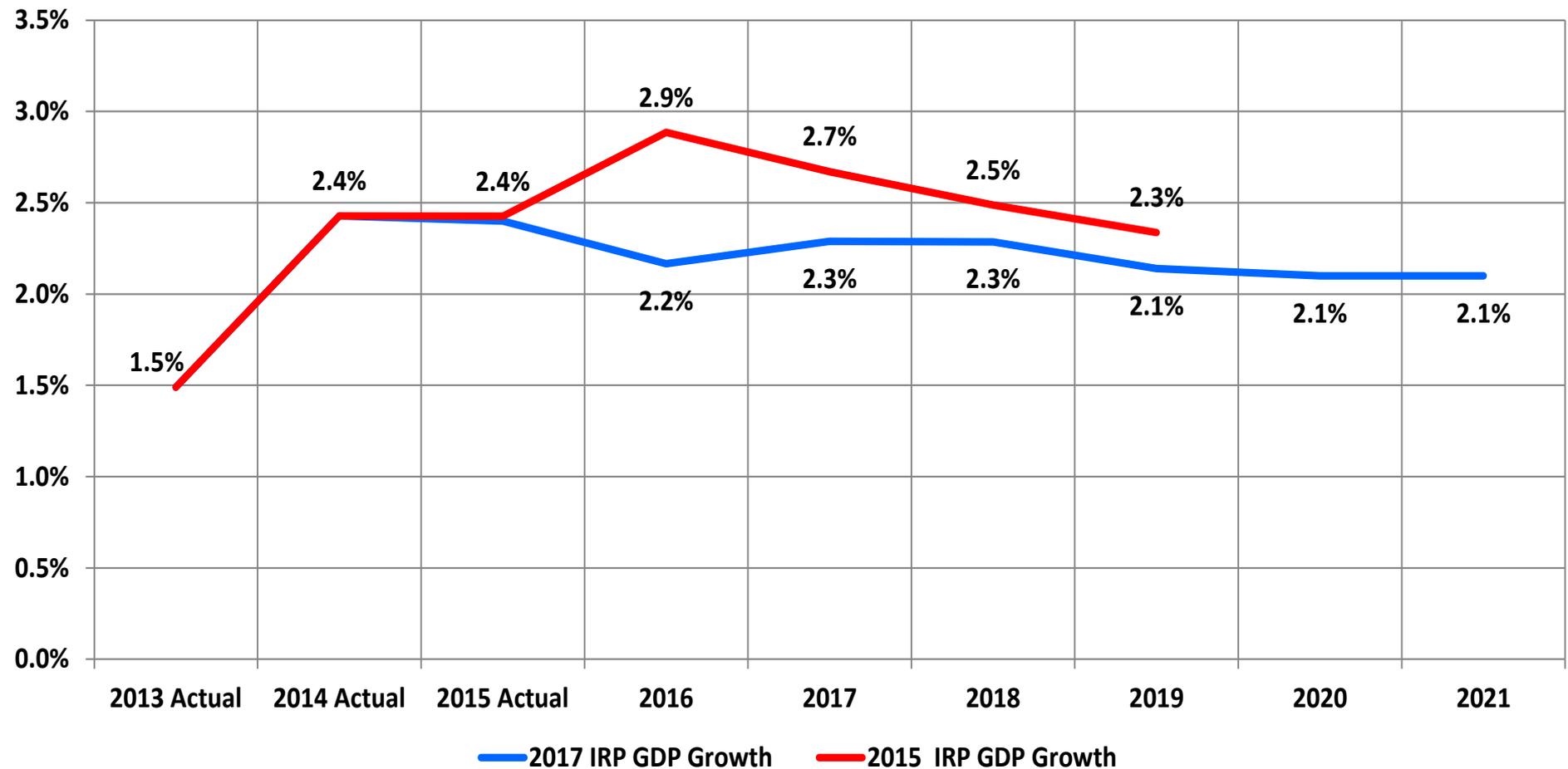
Grant D. Forsyth, Ph.D.  
Chief Economist  
[Grant.Forsyth@avistacorp.com](mailto:Grant.Forsyth@avistacorp.com)

# The Basic Model

106

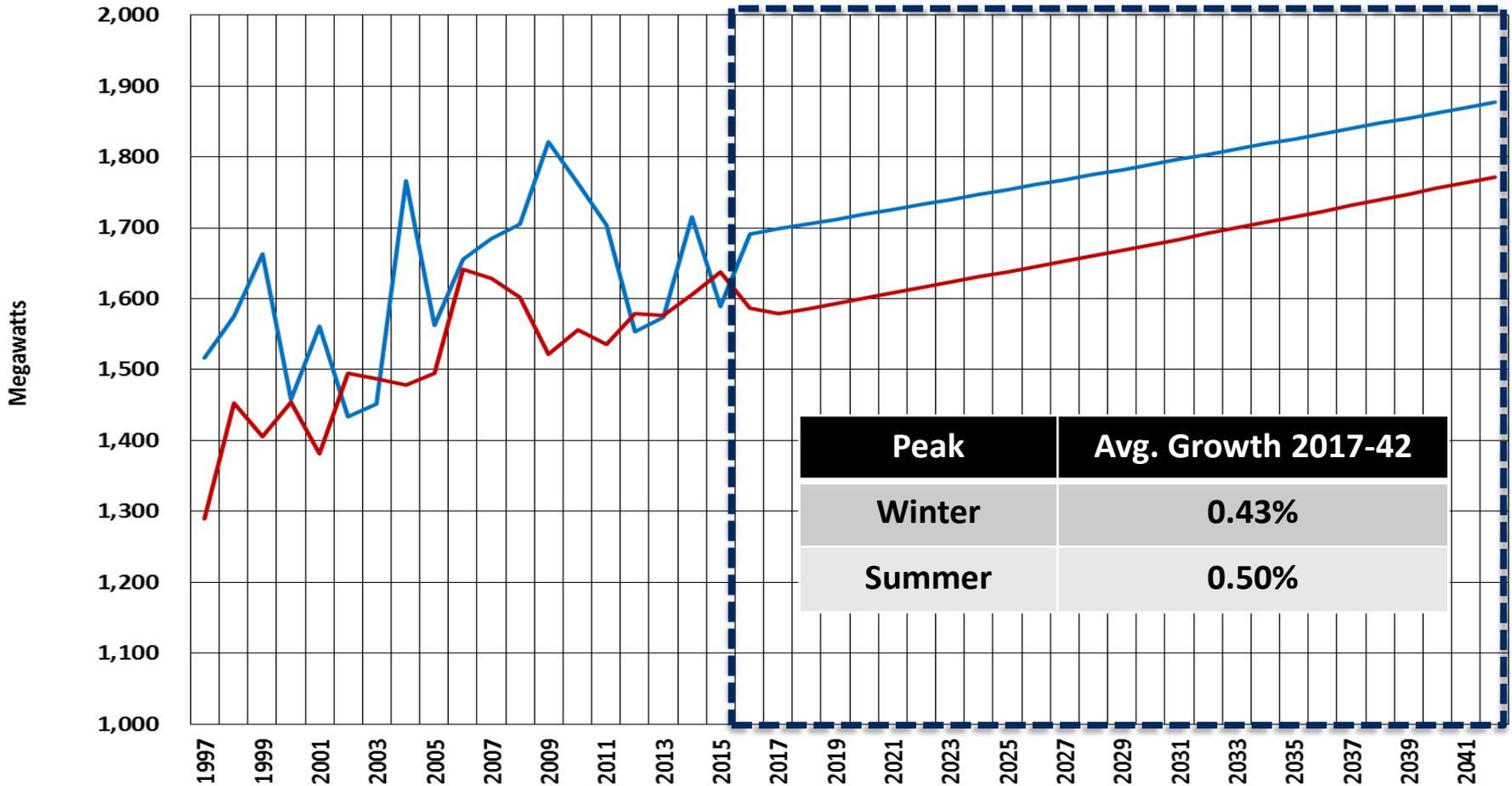
- **Monthly time-series regression model that initially excludes certain industrial loads.**
- **Based on monthly peak MW loads since 2004. The peak is pulled from hourly load data for each day for each month.**
- **Explanatory variables include HDD-CDD and monthly and day-of-week dummy variables. The level of real U.S. GDP is the primary economic driver in the model—the higher GDP, the higher peak loads. The historical impacts of DSM programs are “trended” into the forecast.**
- **The coefficients of the model are used to generate a distribution of peak loads by month based on historical max/min temperatures, holding GDP constant. An expected peak load can then be calculated for the current year (e.g., 2016). Model confirms Avista is a winter peaking utility for the forecast period; however, the summer peak is growing faster than the winter peak.**
- **The model is also used to calculate the long-run growth rate of peak loads for summer and winter using a forecast of GDP growth under the “ceteris paribus” assumption for weather and other factors.**

# GDP Growth Assumptions: 2015 IRP vs. 2017 IRP



# Current Peak Load Forecasts for Winter and Summer, 2017-2042

108

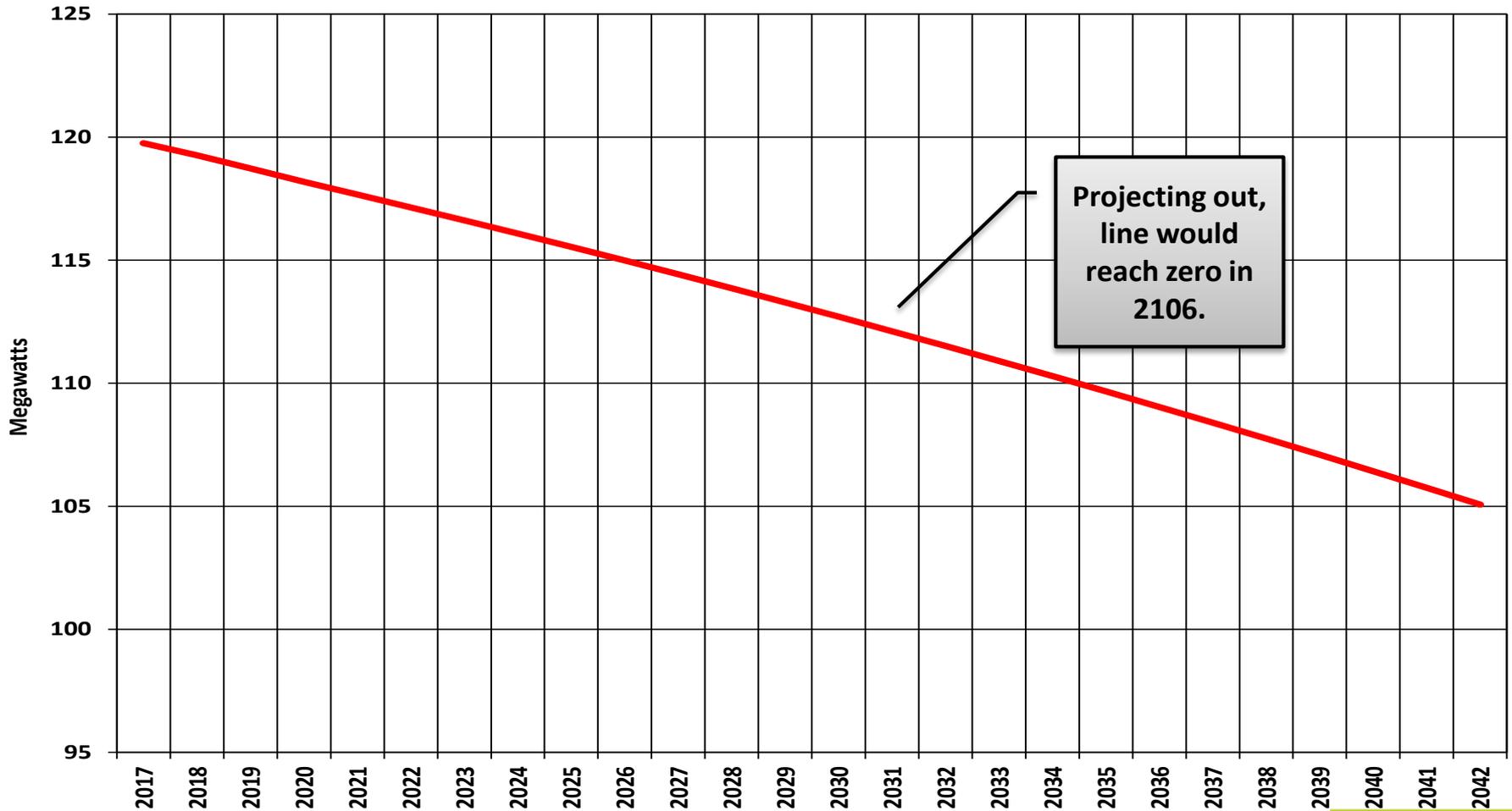


— Winter Peak — Summer Peak  
2017 Electric IRP Appendix A



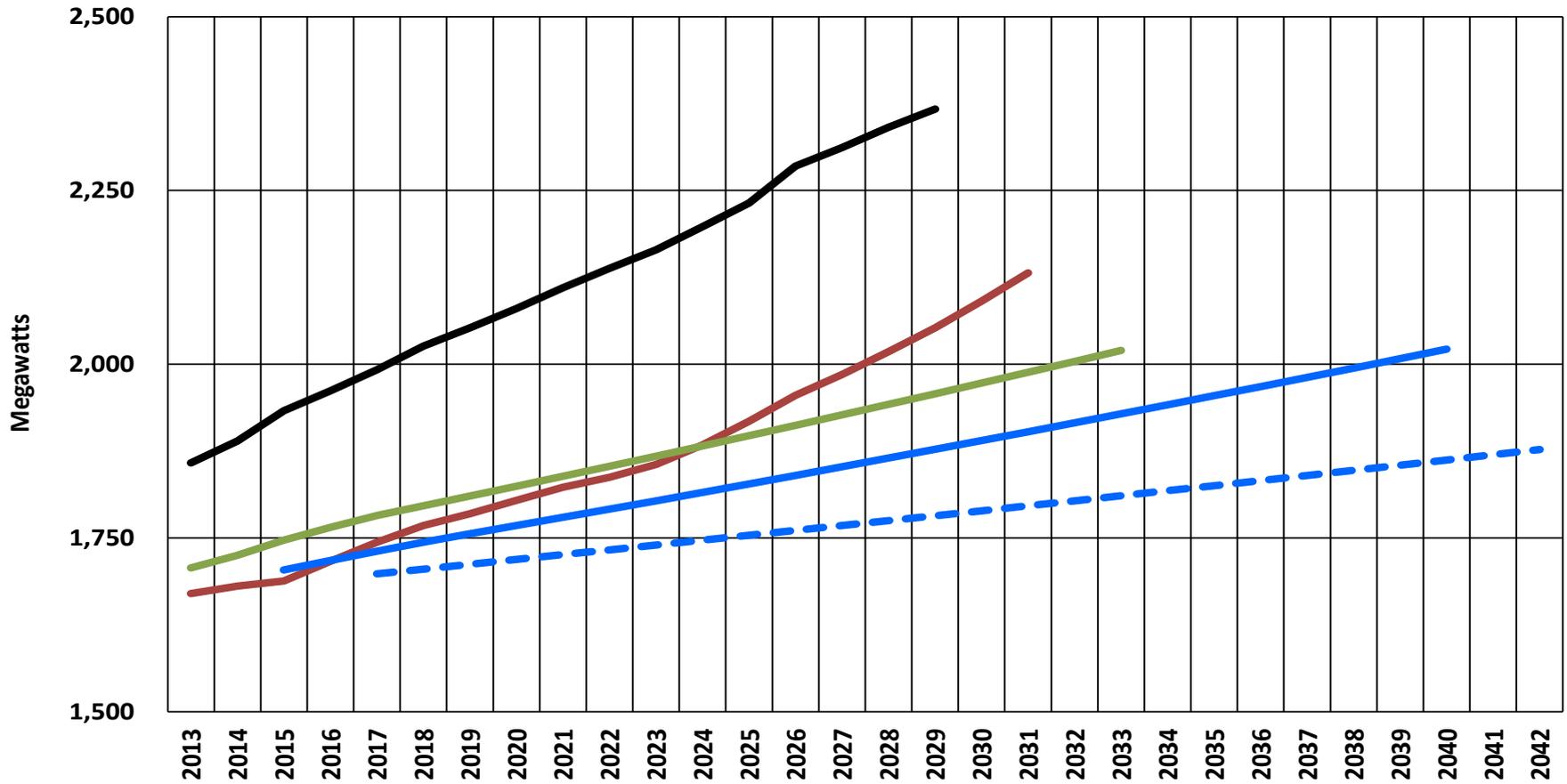
# MW Spread Between Peak Forecasts for Winter and Summer, 2017-2042

Forecast Spread: Winter Peak Less Summer Peak, MW



# Current and Past Peak Load Forecasts for Winter Peak, 2013-2042

Winter Peak Forecast: Current and Past



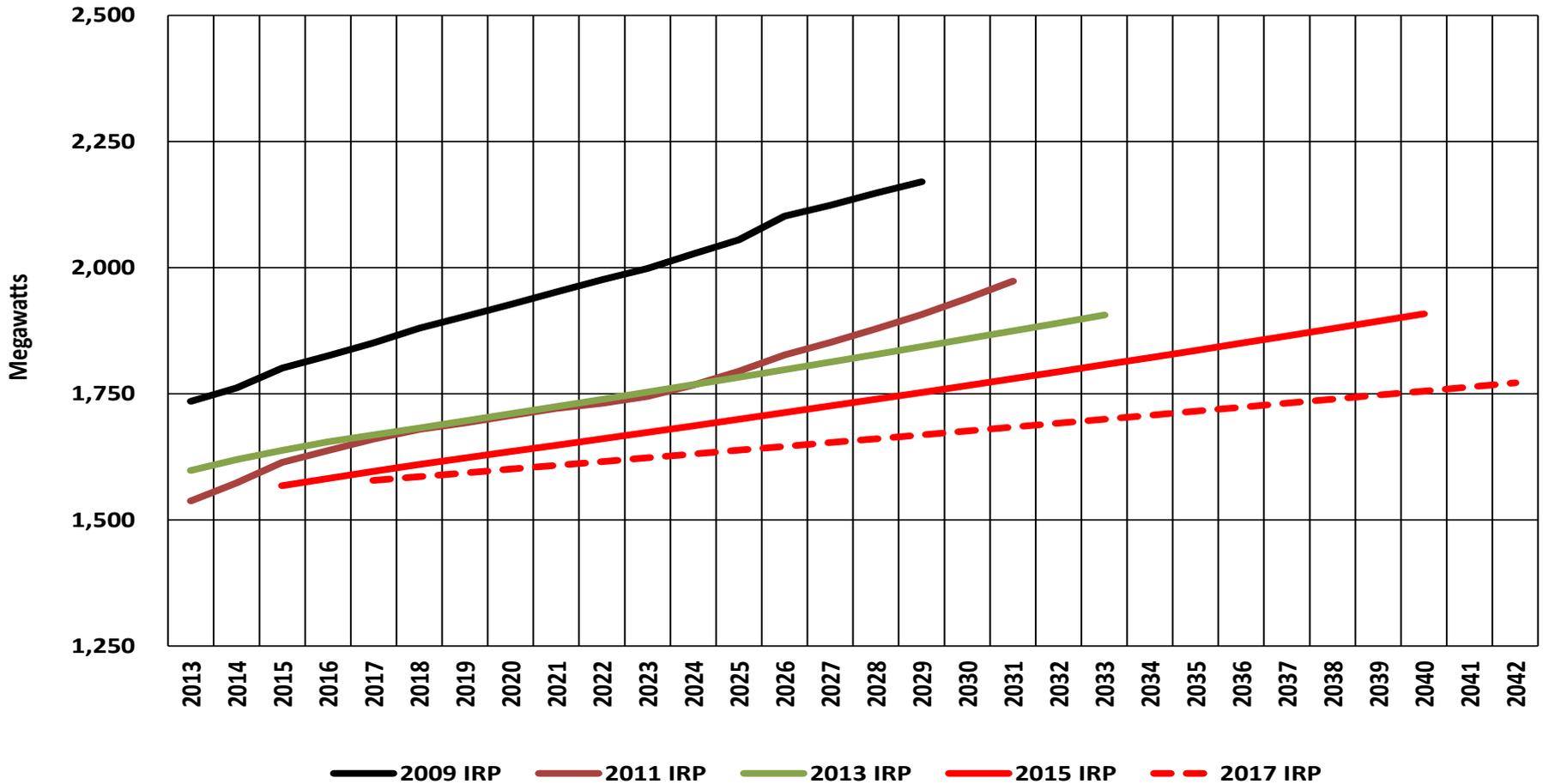
— 2009 IRP    — 2011 IRP    — 2013 IRP    — 2015 IRP    - - - 2017 IRP

2017 Electric IRP Appendix A



# Current and Past Peak Load Forecasts for Summer Peak, 2017-2042

Summer Peak Forecast: Current and Past

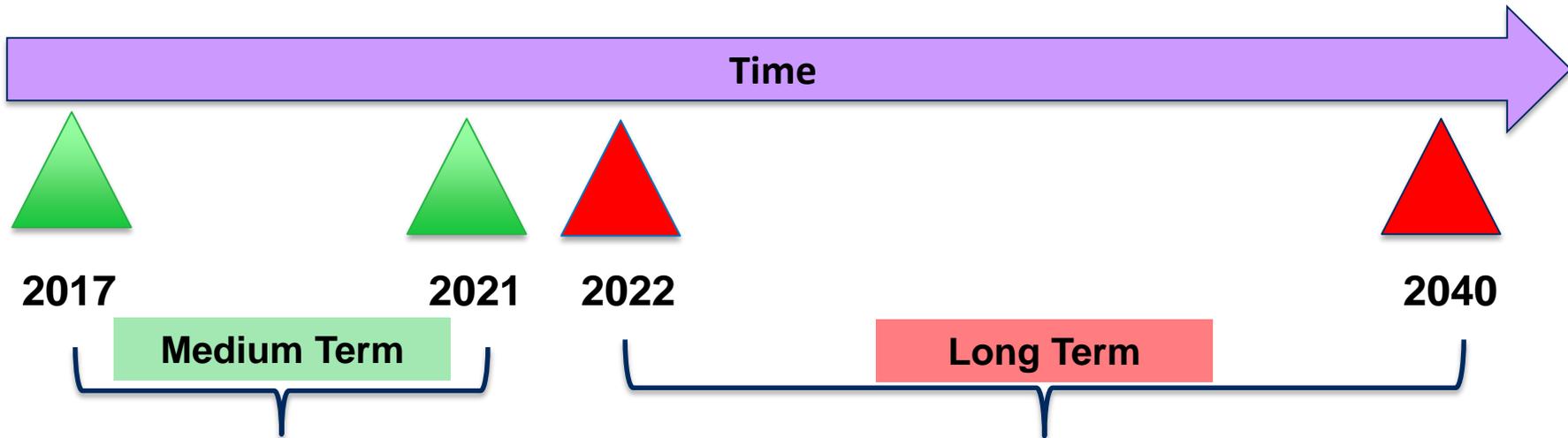




# Long-Term Load Forecast

Grant D. Forsyth, Ph.D.  
Chief Economist  
[Grant.Forsyth@avistacorp.com](mailto:Grant.Forsyth@avistacorp.com)

# Basic Forecast Approach

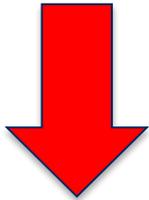


- 1) Monthly econometric model by schedule for each class.
- 2) Customer and UPC forecasts.
- 3) 20-yr MA for "normal weather."
- 4) Economic drivers: GDP, industrial production, employment growth, population, price, and ARIMA error correction.
- 5) Native load (energy) forecast derived from retail load forecast.

- 1) Boot strap off medium term forecast.
- 2) Apply long-run load growth relationships to develop simulation model for high/low scenarios.
- 3) Include different scenarios for renewable penetration with controls for price elasticity and EV/PHEVs.

# The Long-Term Residential Relationship, 2020-2040

Load = Customers X Use Per Customer (UPC)



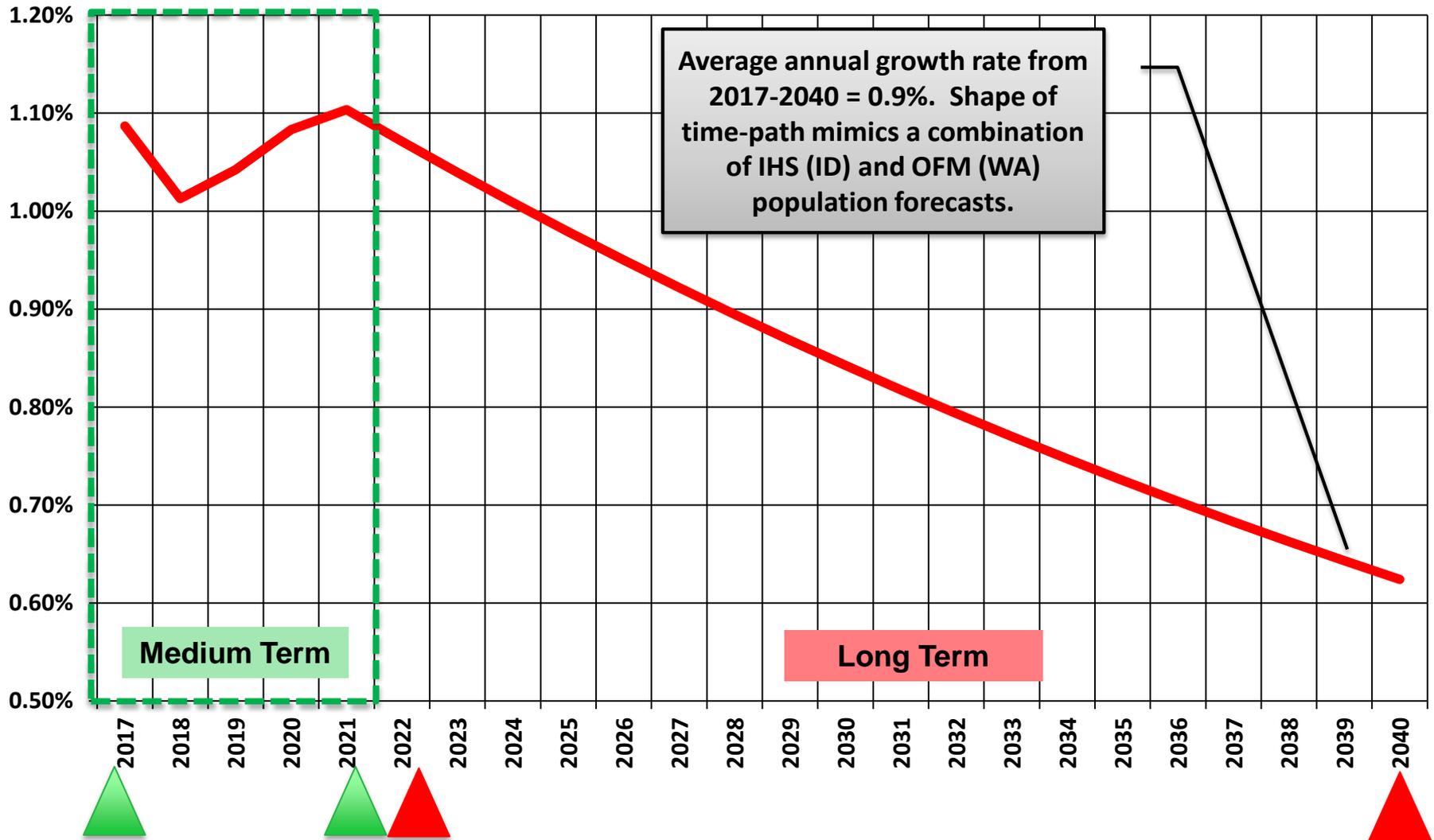
Load Growth  $\approx$  Customer Growth + UPC Growth

Assumed to be same as population growth, commercial growth will follow residential, and no real change in industrial.

Assumed to be a function of multiple factors including renewable penetration and EVs/PHEVs.

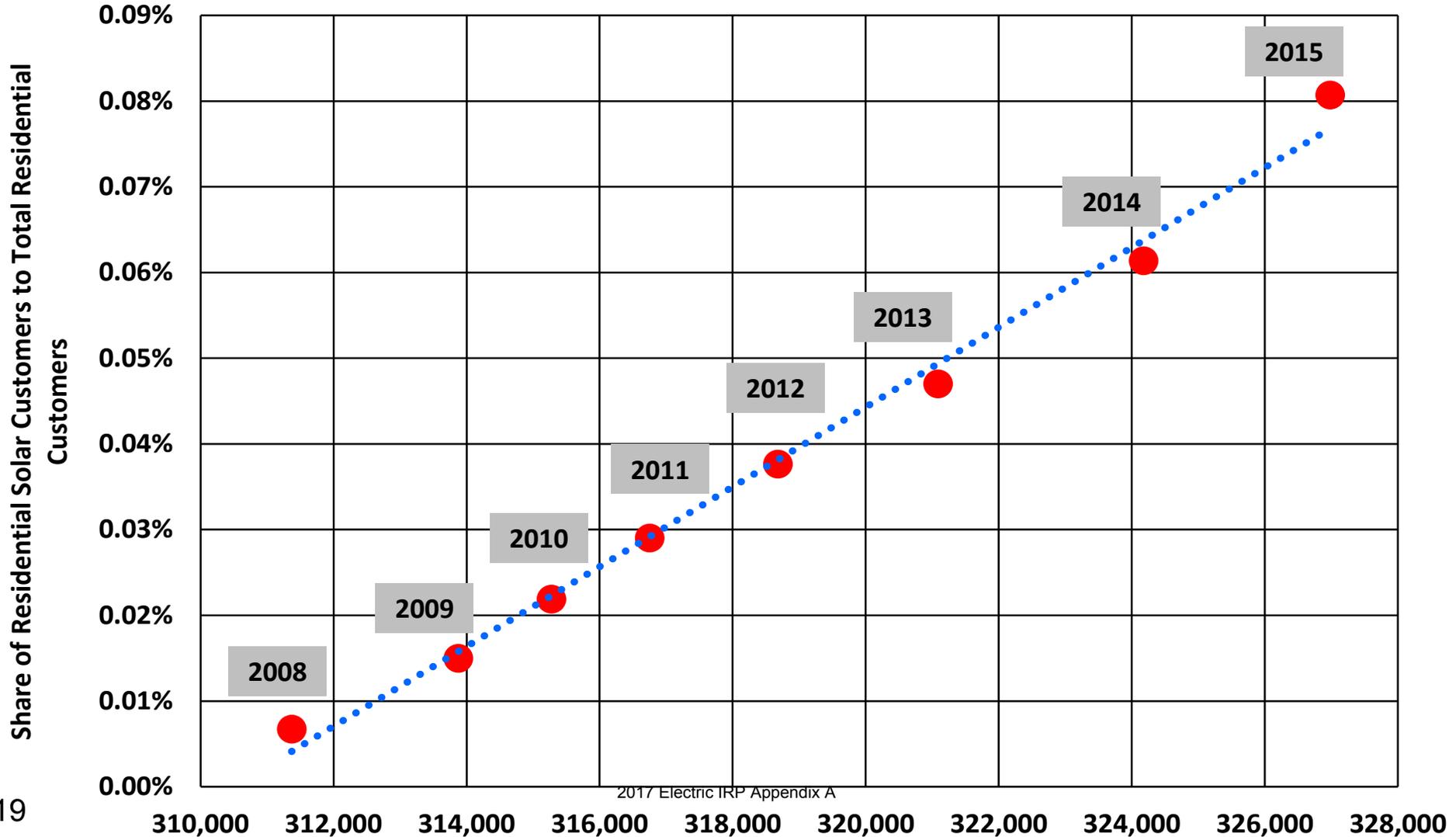
# The Basic Idea: Base-Line Residential Customer Growth Starting in 2017

Annual Residential Customer Growth Rates



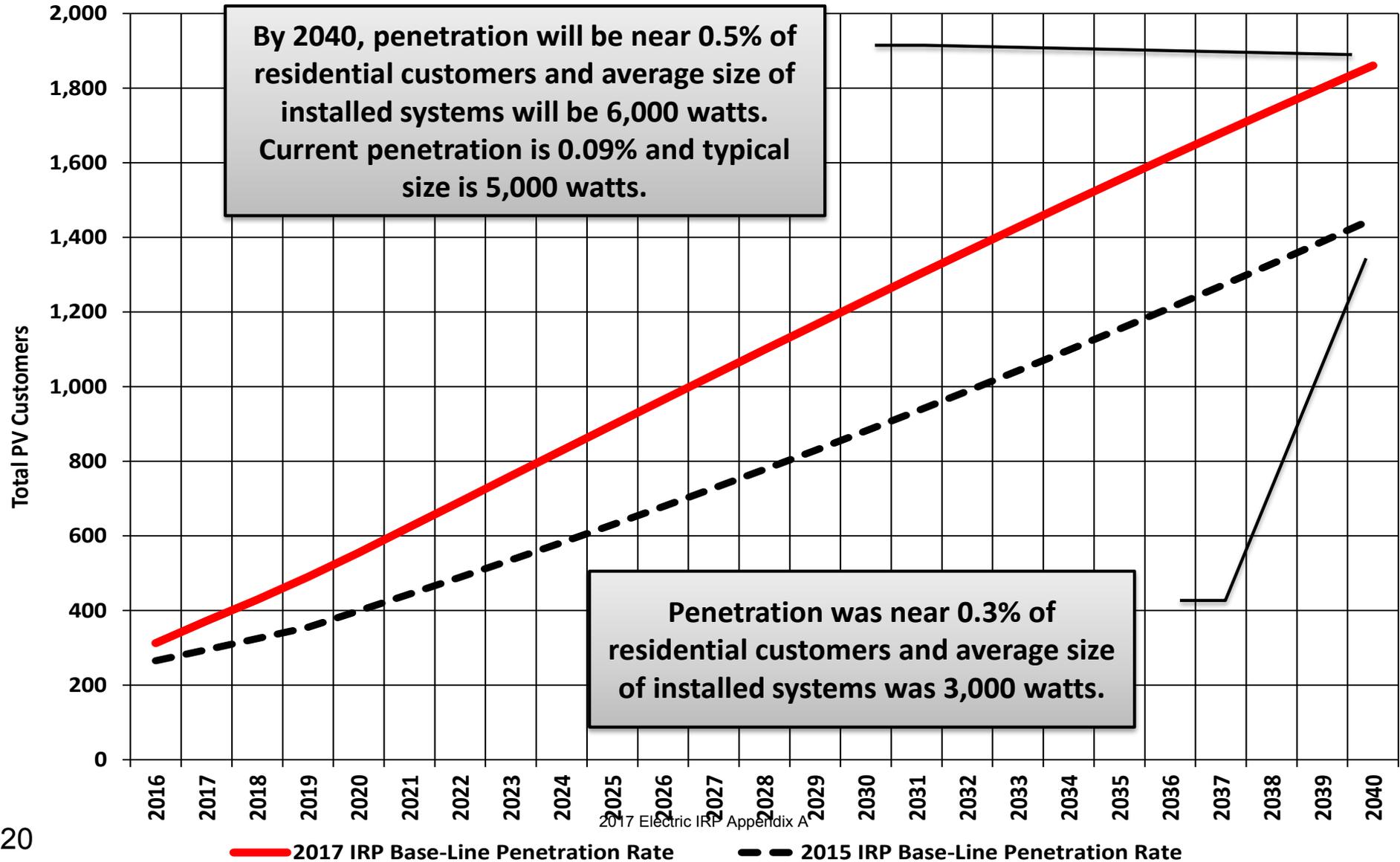
# Avista Residential Solar Penetration, 2008-2015

Customer Penetration vs. Customers Since 2008



# Projected Residential Solar Penetration, 2008-2015

Projected Base-Line Residential PV Customers



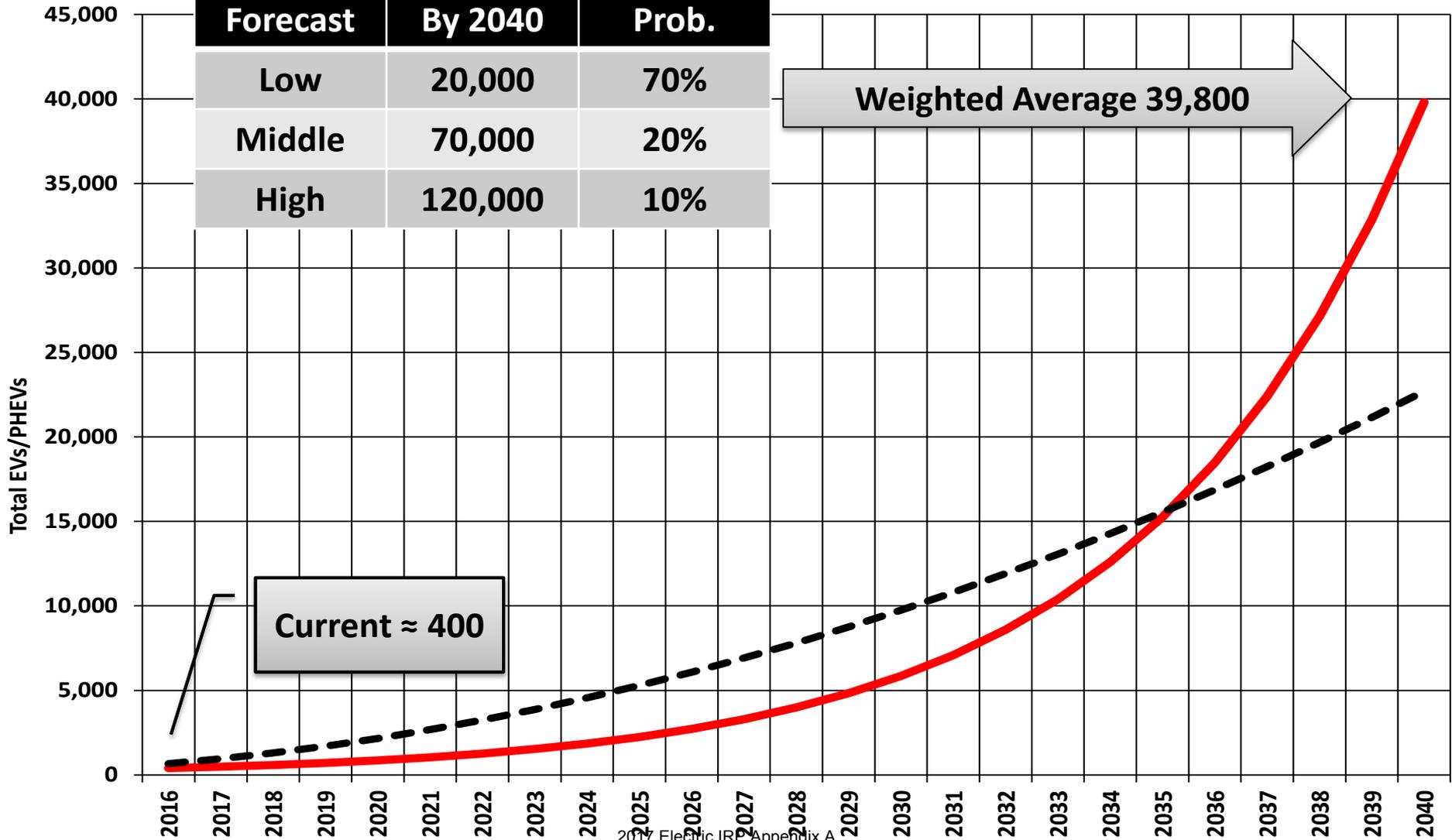
2017 Electric IRP Appendix A

# Residential EVs/PHEVs<sup>118</sup>

Projected Residential EVs/PHEVs

Forecast	By 2040	Prob.
Low	20,000	70%
Middle	70,000	20%
High	120,000	10%

Weighted Average 39,800



— 2017 IRP Projected EVs/PHEVs      - - - 2015 IRP Projected EVs/PHEVs

2017 Electric IRP Appendix A

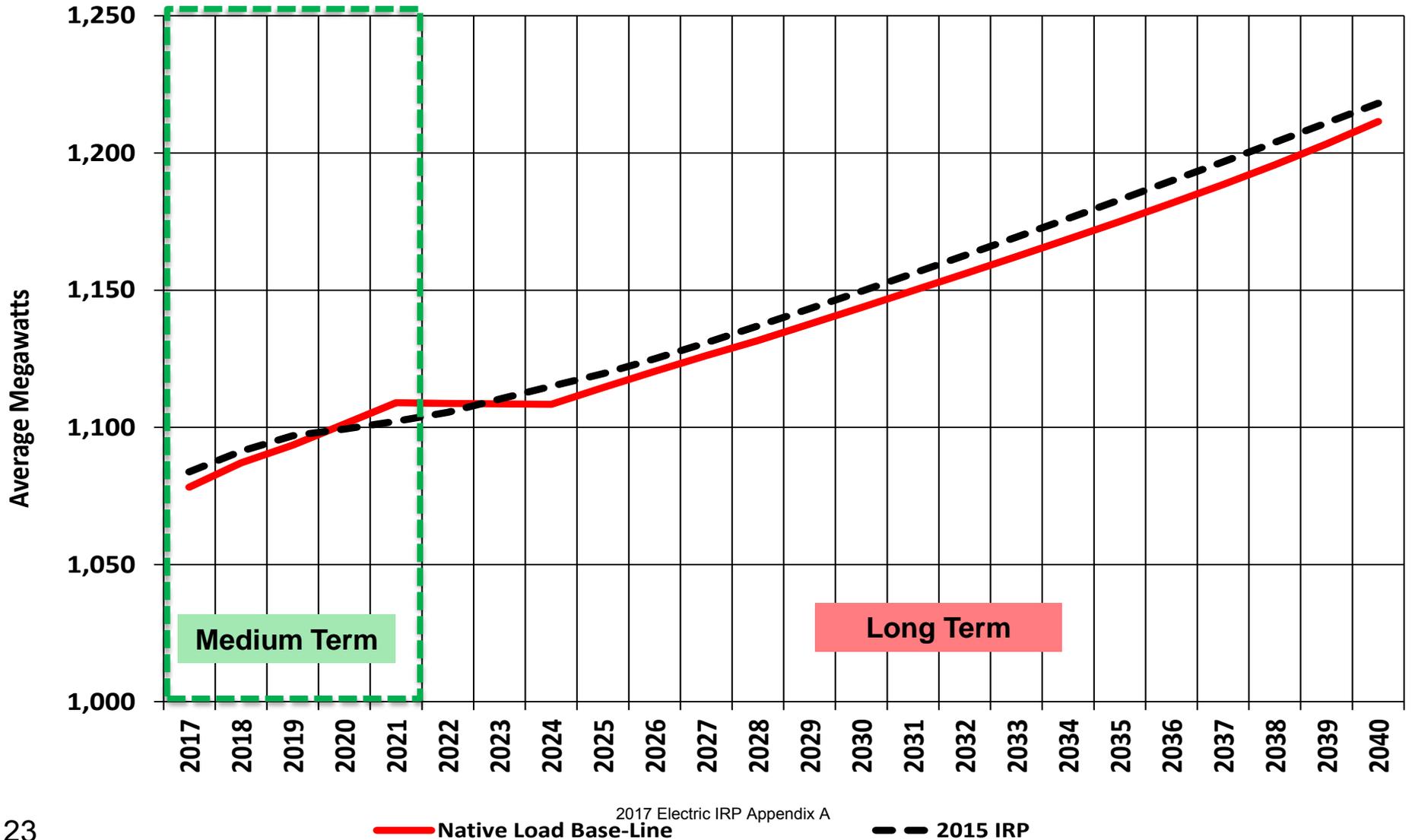
# Final Comment on EV/PHEV Penetration: Large Forecast Variation

<b>Forecast Source</b>	<b>Forecasted Penetration Rate as Share of Vehicles by 2030-2050 Period</b>
<b>U.C. Berkley</b>	<b>65% by 2030 for EVs</b>
<b>EPRI</b>	<b>60% to 65% by 2035 for PHEVs</b>
<b>ORNL</b>	<b>40% by 2035 for PHEVs, 10% by 2050 for EVs</b>
<b>PNNL</b>	<b>30% by 2035-2045 for PHEVs</b>
<b>UMTRI</b>	<b>5% to 25% by 2040 for PHEVs</b>
<b>U.S. DOE</b>	<b>5% to 20% by 2035 for PEVs</b>

Source: From 2013 presentation by Patrick J. Balducci, Pacific Northwest National Laboratory, at the 2013 Pacific Northwest Regional Economic Conference.

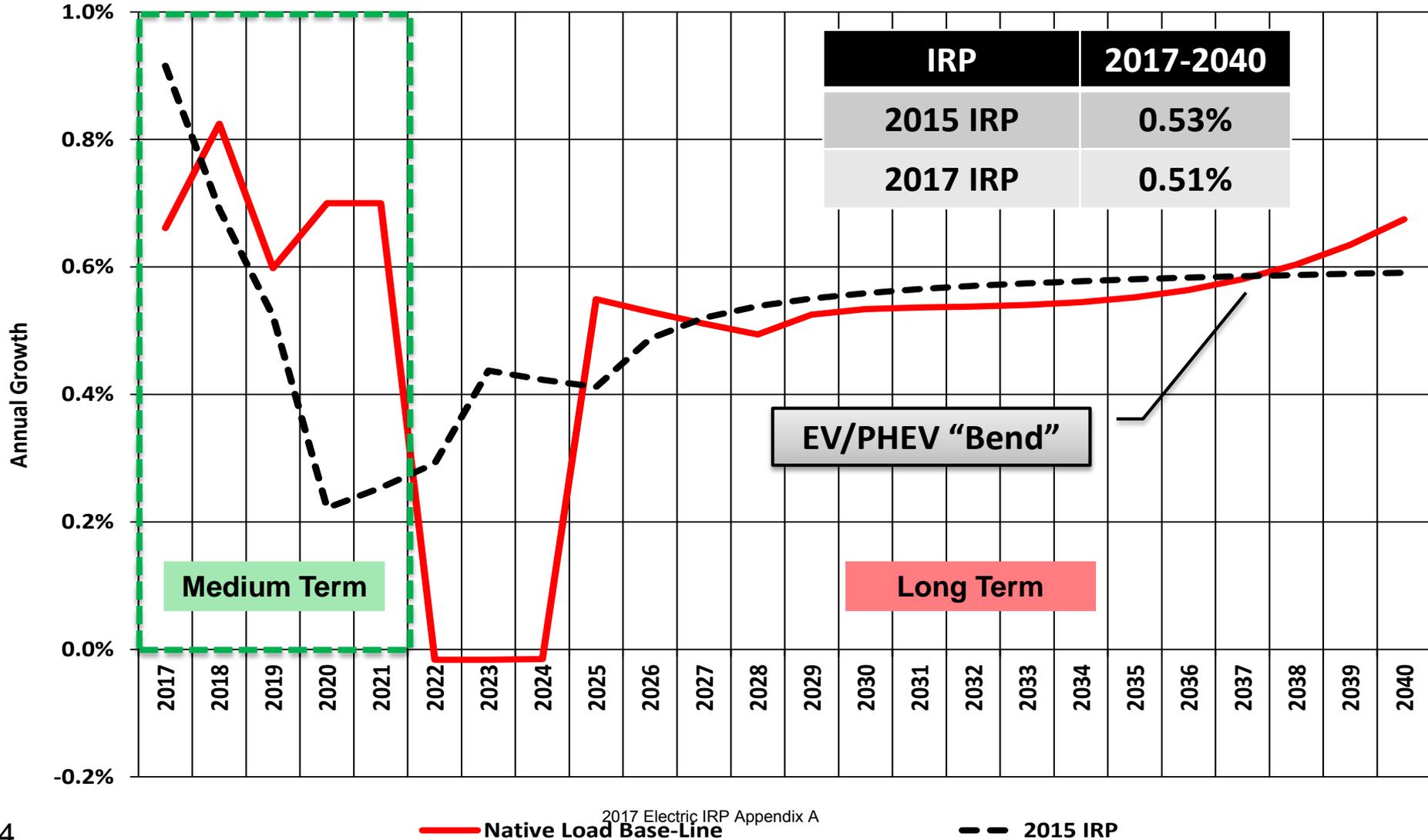
# Native Load Forecast: 2015 IRP vs. 2017 IRP

Native Load Forecast, Average Megawatts



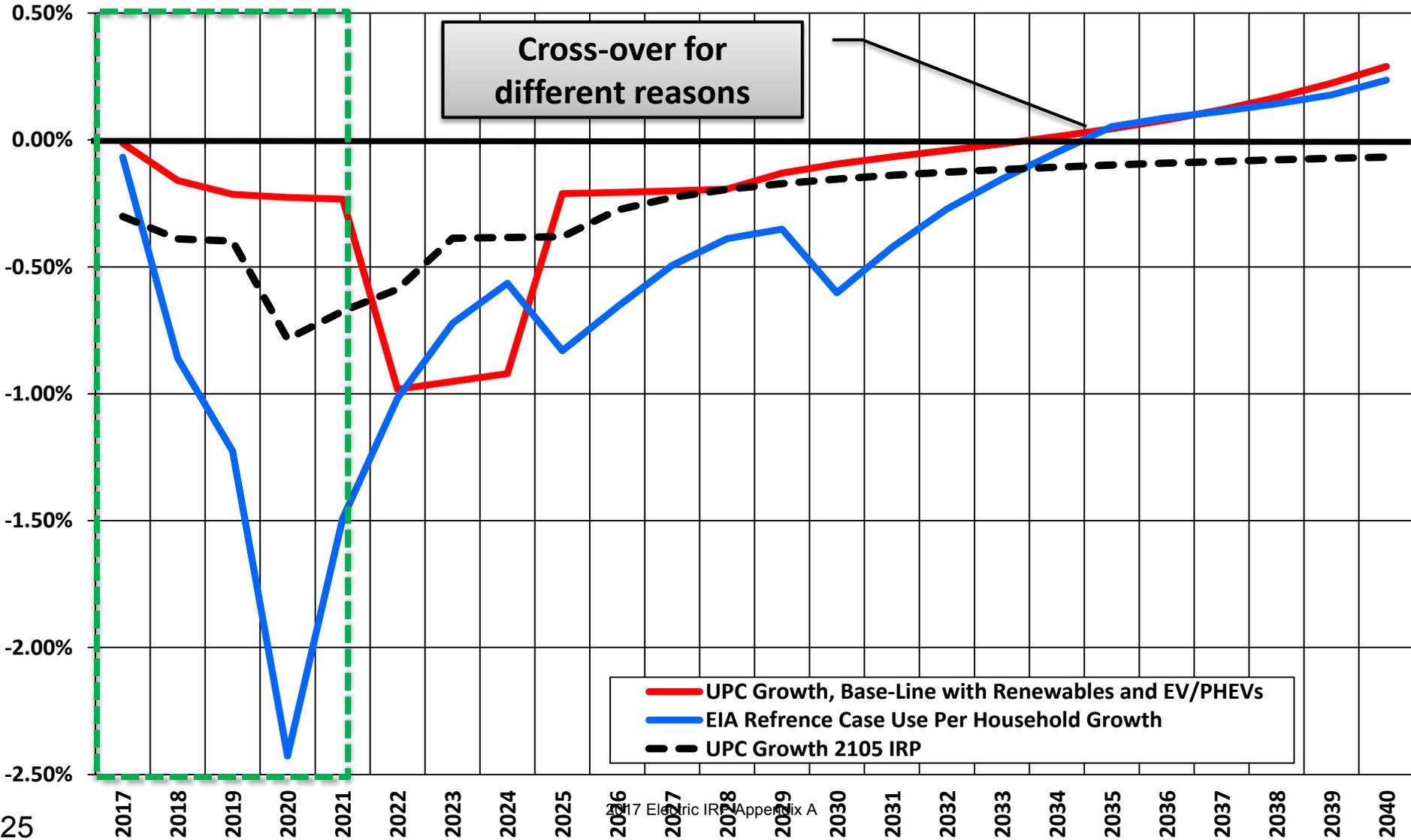
# Native Load Growth Forecast, 2015 IRP vs. 2017 IRP

Native Load Growth



# Residential UPC Growth: 2015 IRP vs. 2017 IRP

### Annual Residential UPC Growth Rate

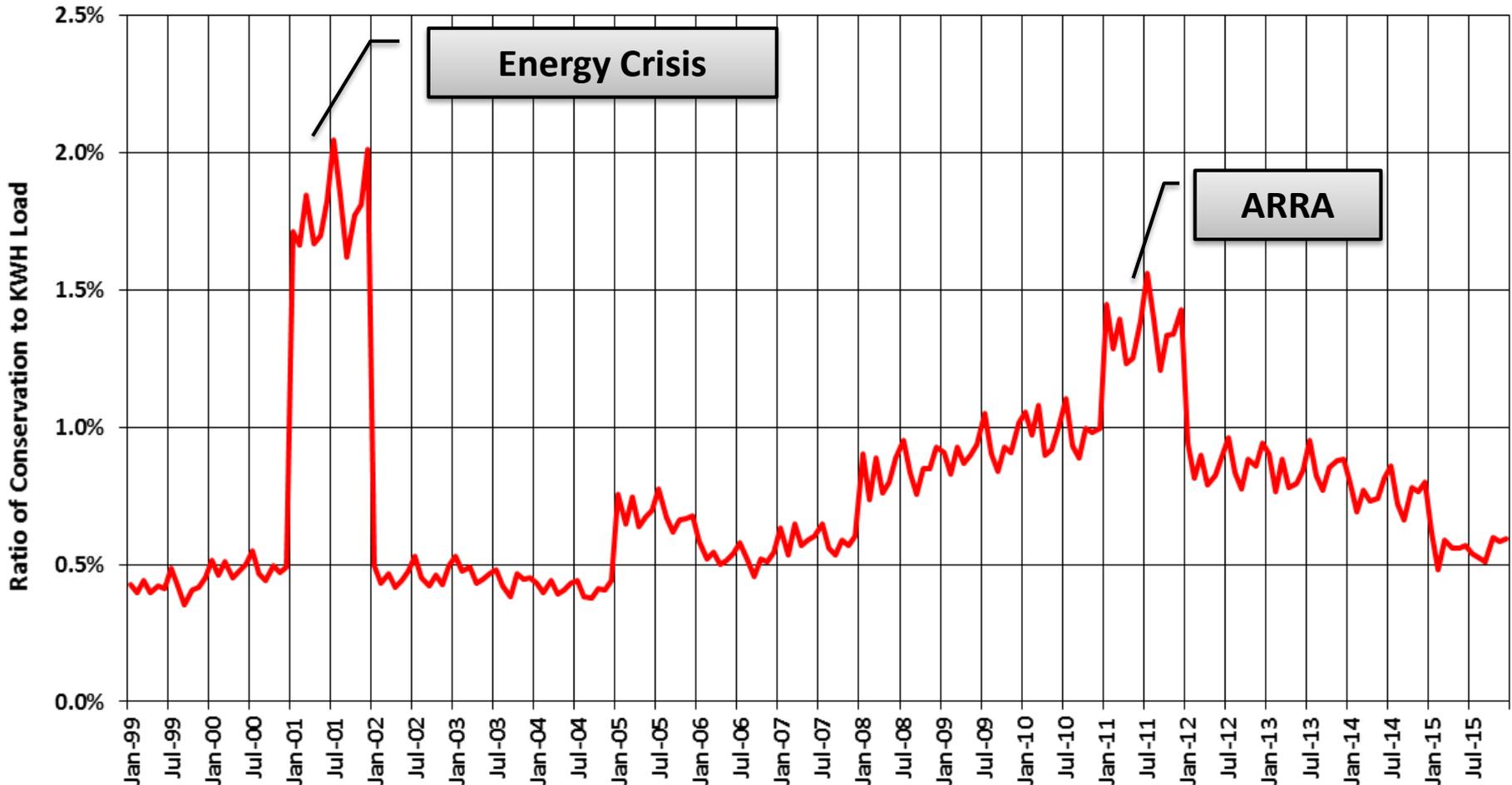




# Long-Term Load Forecast: Conservation Adjustment

Grant D. Forsyth, Ph.D.  
Chief Economist  
[Grant.Forsyth@avistacorp.com](mailto:Grant.Forsyth@avistacorp.com)

# Monthly Conservation as a Share of Total Actual Retail Load: Navigant Estimates



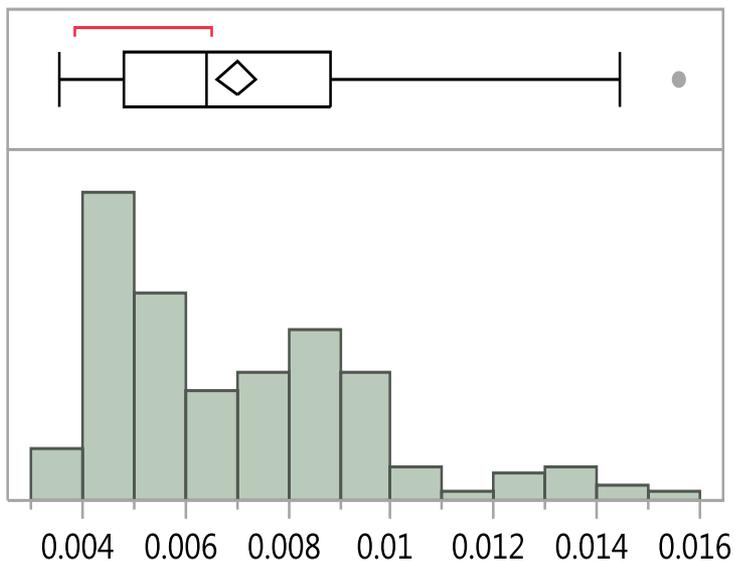
$$\text{Ratio} = \frac{\text{Estimated Conservation Month } t, \text{ Year } y}{\text{Actual KWH Load Month } t, \text{ Year } Y}$$

2017 Electric IRP Appendix A

# Ratio Distribution, Excluding 2001 <sup>125</sup>

## Conservation to Load Ratio, Excluding 2001

### Ratio Distribution



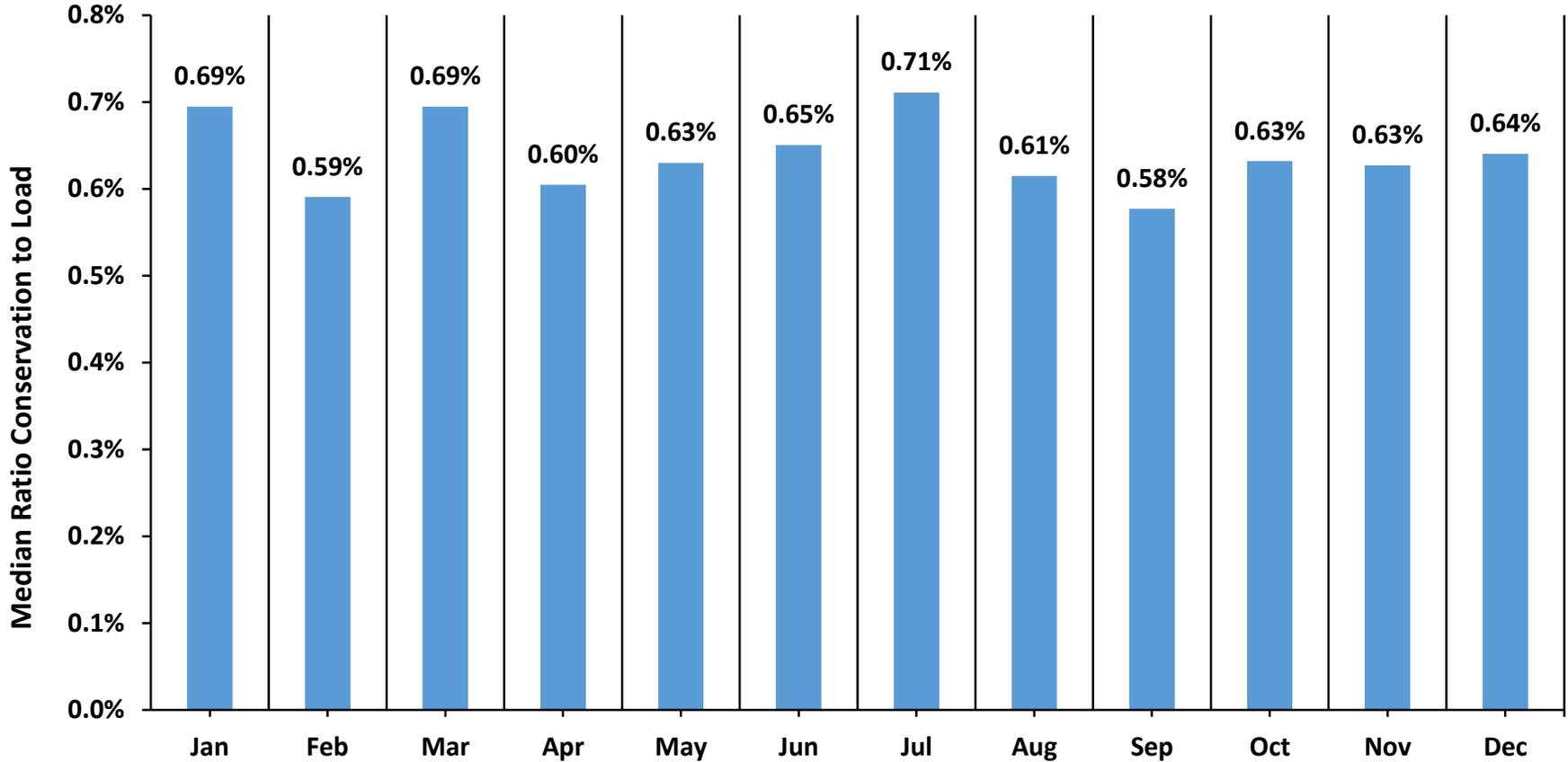
### Quantiles

100.0%	maximum	0.015614257
99.5%		0.015614257
97.5%		0.013944609
90.0%		0.009965937
75.0%	quartile	0.00881093
50.0%	median	0.00642552
25.0%	quartile	0.004764236
10.0%		0.004234255
2.5%		0.003926682
0.5%		0.003534862
0.0%	minimum	0.003534862

### Summary Statistics

Mean	0.0069838
Std Dev	0.0025808
Std Err Mean	0.0001863
Upper 95% Mean	0.0073512
Lower 95% Mean	0.0066164
N	192

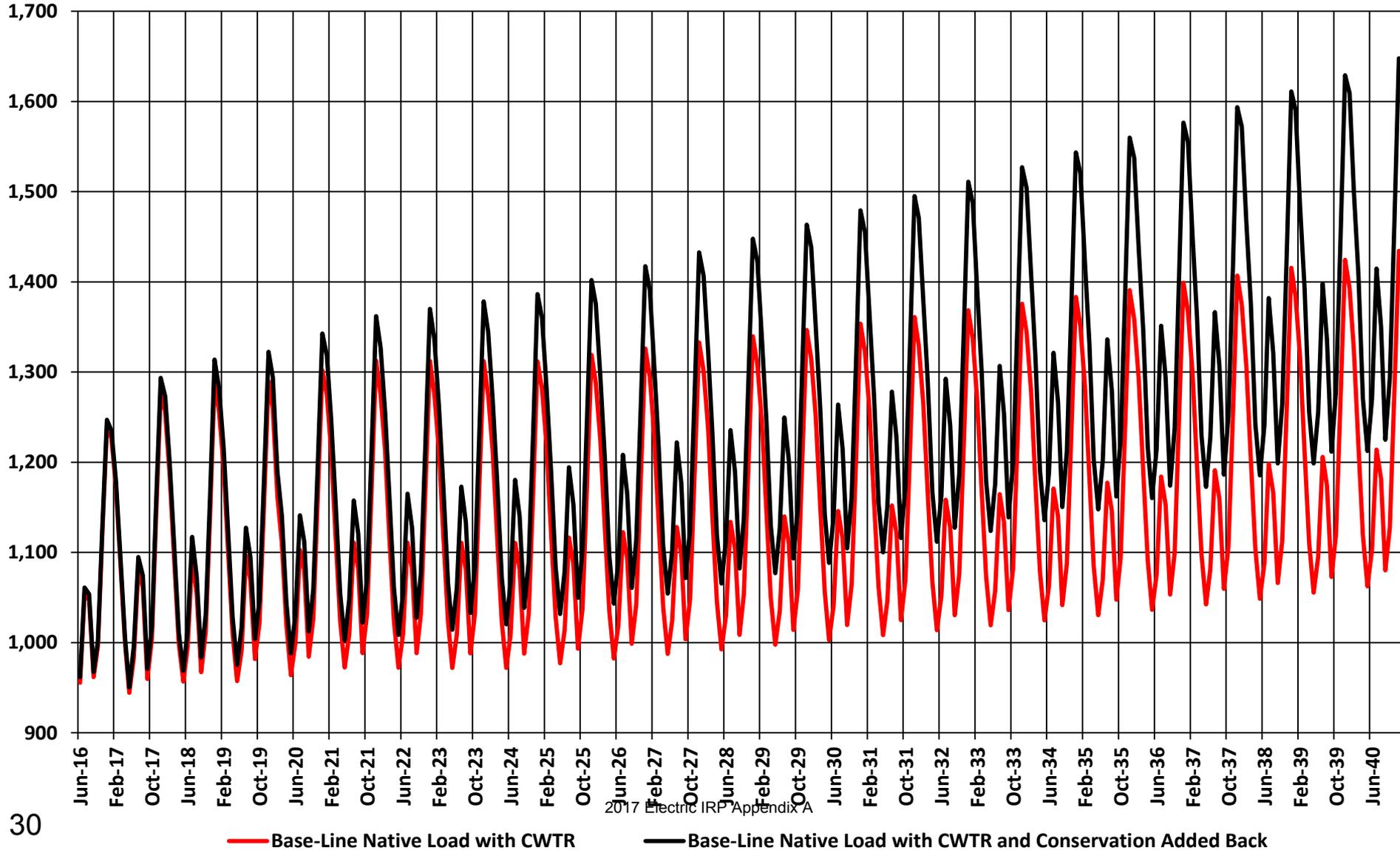
# Median Monthly Conservation as a Share of Total Actual Retail Load: Navigant Estimates



$$\text{Median Ratio Month } t = \text{Median} \left( \frac{\text{Estimated Conservation Month } t}{\text{Actual KWH Load Month } t} \right), \text{ excluding 2001}$$

# Comparison of Native Load Forecasts, 2016-2040<sup>127</sup>

aMW Load Comparison with Conservation





# 2017 Electric IRP Resource Cost Assumptions

John Lyons, Ph. D.  
Second Technical Advisory Committee Meeting  
September 28, 2016

# New Resources Decisions Since 2015 IRP

- Coyote Springs 2 Advanced Hot Gas Path (completed in 2016)
  - 12 MW increase to winter peak capacity
  - 9 MW increase in summer peak capacity
  - Lower Heat Rate 0.8%
- Post Falls Redevelopment (2020-2023)
  - Adds 4.2 aMW and 4.5 MW of winter peak capacity
- Kettle Falls
  - Under further investigation following 2015 IRP

# Natural Gas Generation Options

- Existing site vs. new site (“Brownfield” vs. “Greenfield”)
- Simple cycle combustion turbines (peaking)
- Simple cycle piston engines (peaking/hybrid, operation/load following)
- Combined cycle (base load/load following)
- Simple cycle combustion turbine with subsequent conversion to combined cycle

# Natural Gas Generation Options Considerations

- Efficiency
  - Fuel efficiency
  - Responsible use of resources
  - Environmental impacts
- Flexibility- meets operational requirements
  - Start time
  - Part load efficiency
  - Ability to, and speed of, cycling
- Costs
  - Upfront installation
  - Fuel
  - Ongoing operations & maintenance

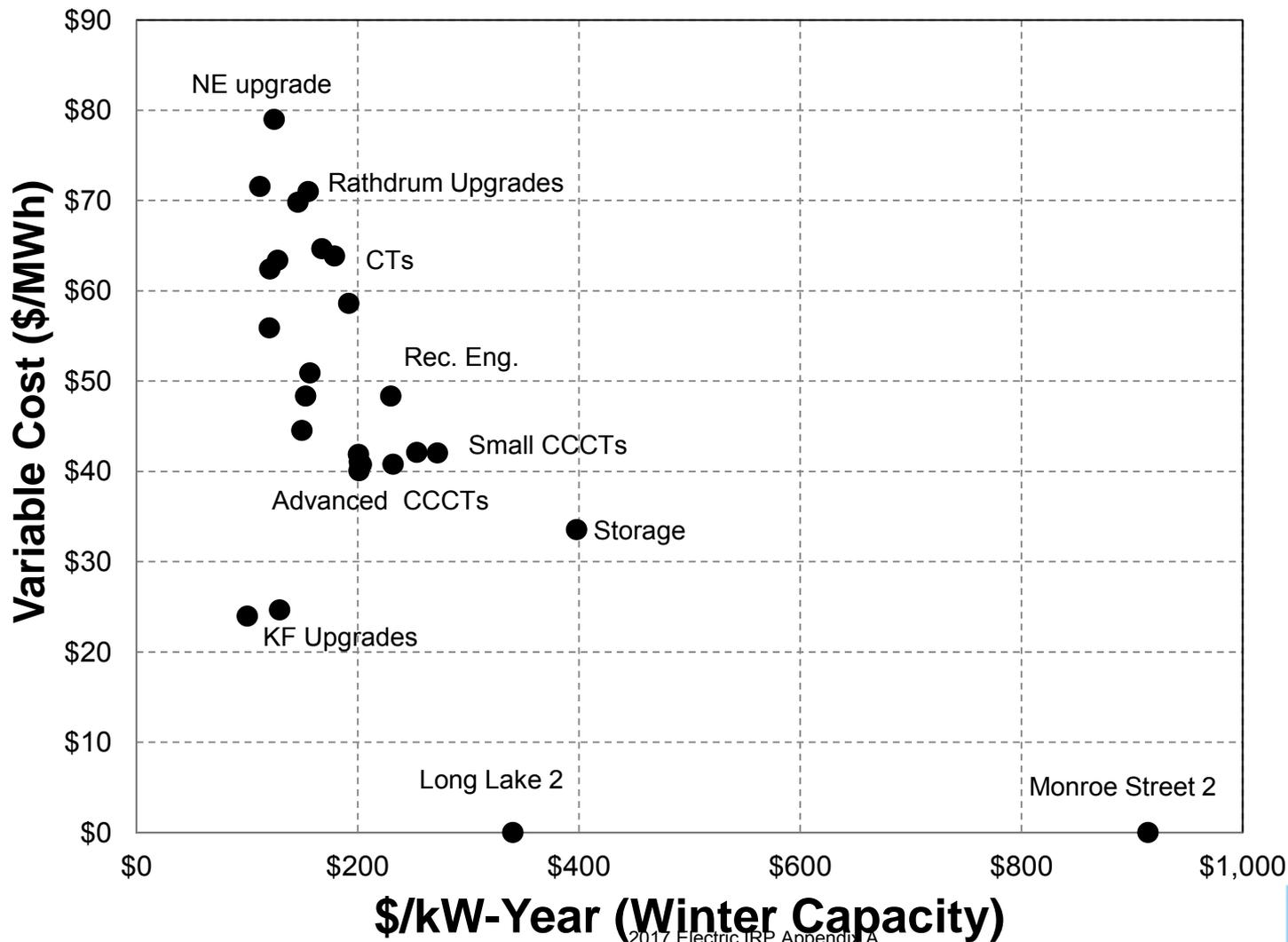
# Avista Plants Upgrade Options

- Rathdrum CT
  - Supplemental Compression- (24 MW)
  - Inlet Evaporation System- (17 MW Summer)
  - High efficiency turbine blades (18.5 MW)
- Northeast
  - Water injected NO<sub>x</sub> control to allow for firing temperature increase (7.5 MW)
- Kettle Falls
  - Fuel stabilization (3 MW)
  - Upgrade while replace depreciated equipment (5-10 MW)
- Long Lake
  - Add 2<sup>nd</sup> Powerhouse (68 MW- 23 aMW)
- Monroe Street
  - Add 2<sup>nd</sup> Powerhouse (80 MW- 27 aMW)
- Cabinet Gorge
  - Add 2<sup>nd</sup> Powerhouse (110 MW- 18 aMW)

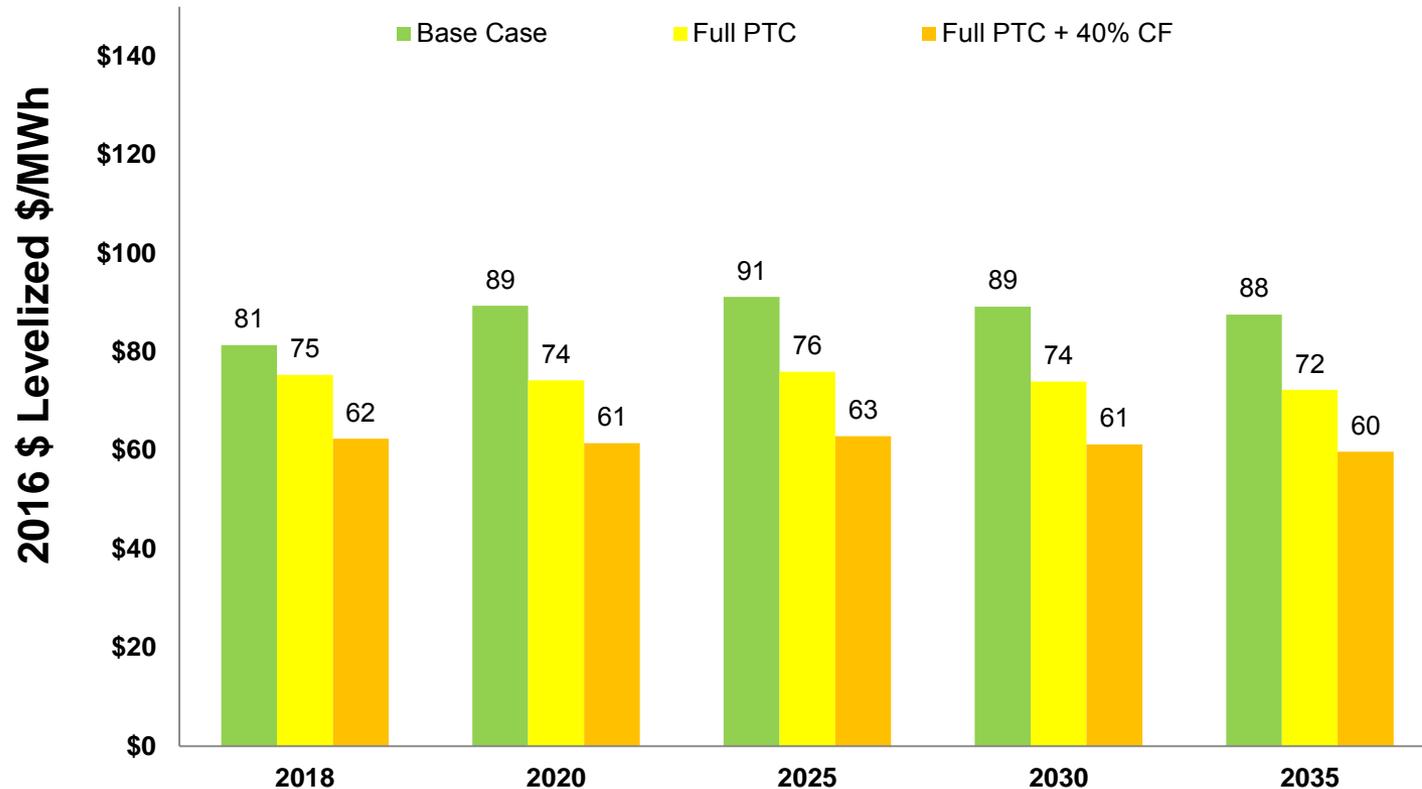
# Natural Gas Turbine Resource Options

Resource Option	Technology	Plant Size (MW) (59F)	Capital Cost (2016\$/kW)	Fixed O&M (2016\$/kW/Yr)	Variable Costs (2016\$/MWh)	Net HHV Heat Rate(s) (Btu/kWh)
Advanced Large Frame CT	Frame SC	203	617	2.05	3.58	9,931
Modern Large Frame CT	Frame SC	171	645	2.05	2.56	10,007
Modern Large Frame CT with HRSG Option	Frame SC	170	661	3.07	2.56	10,009
Advanced Small Frame CT	Frame SC	96	825	3.07	2.56	11,265
Frame/Aero Hybrid CT	Advanced Aero SC	101	983	3.07	3.07	8,916
Large Reciprocating Engine Facility	NG Recip	184	1,105	7.16	3.07	8,427
Small Reciprocating Engine Facility (Option 1)	NG Recip	110	1,738	8.19	3.07	8,427
Small Reciprocating Engine Facility (Option 2)	NG Recip	93	1,056	8.19	3.07	7,700
Modern Small Frame CT	Frame SC	45	1,222	4.09	2.56	10,252
Aero CT option 1	2 on 1 SS	45	1,250	6.14	2.56	10,392
Aero CT option 2	Aero SS	42	1,272	6.14	2.56	9,359
1 on 1 Advanced CCCT option 1	1 on 1 CC	341	1,087	18.42	3.84	6,631
1 on 1 Advanced CCCT option 2	1 on 1 CC	343	1,087	18.42	3.84	6,895
1 on 1 Advanced CCCT option 3	1 on 1 CC	294	1,135	19.44	3.58	6,790
1 on 1 modern CCCT option 3	1 on 1 CC	286	1,137	15.35	3.07	6,720
3 x 2 small CCCT	3 on 2 CC	225	1,657	27.63	3.58	6,980
2 x 1 small CCCT	2 on 1 CC	150	1,703	34.79	3.58	6,968
Add HRSG to Large Frame CT	1 on 1 CC	115	1,560	20.46	3.58	6,720

# Fixed vs. Variable Costs



# Wind Levelized Costs Forecast



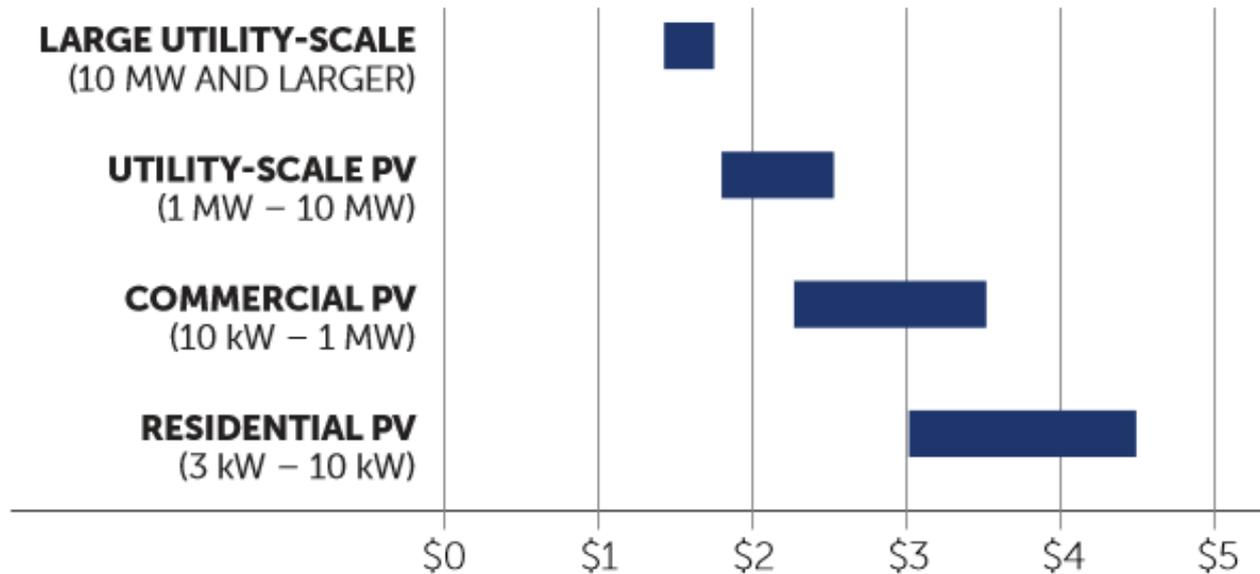
## Assumptions:

- 1) Cost shown are 2016 dollars levelized for first 20 years of asset life
- 2) ITC benefit taken up front, rather than utility amortization method
- 3) Assumes Avista ownership

# Solar Prices

## PRICING THE SOLAR MARKET

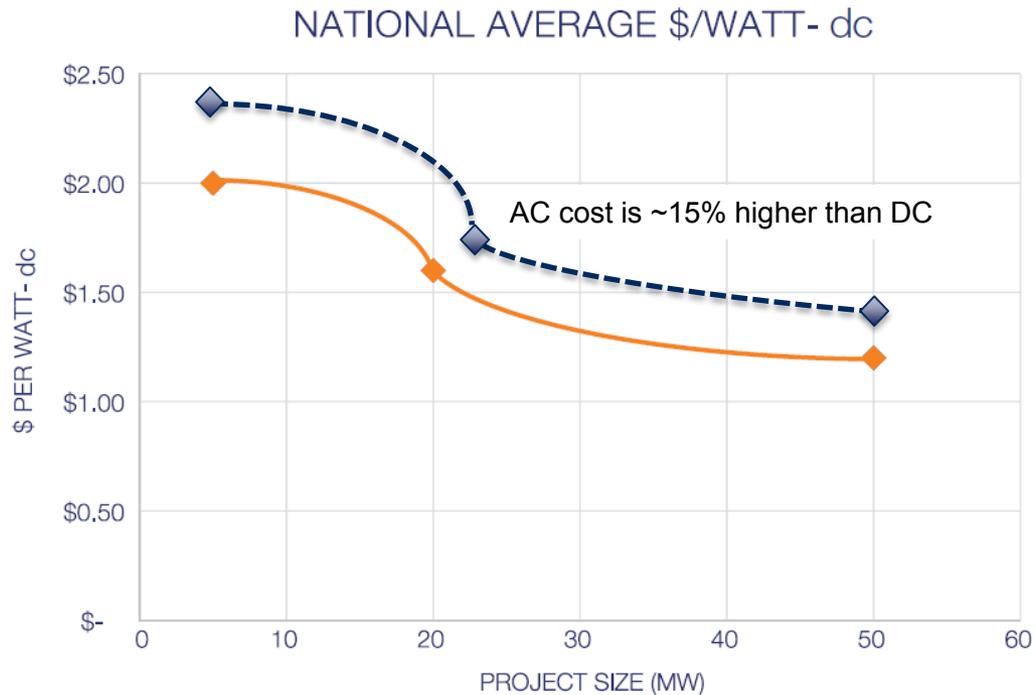
### INSTALLED COST PER WATT (DC)



Source: Smart Electric Power Alliance, Solar Fundamentals: Markets, 2015

# Solar Economies of Scale

FIGURE 4 - REPRESENTATIVE SOLAR ECONOMIES OF SCALE



Source: SEPA, 2016

# Utility Scale Solar Takeaways – SEPA Report

FIGURE 1 - KEY TAKEAWAYS

## Solar Pricing is More Economic than Ever

- Hard and soft costs for solar have declined steadily in recent years and are predicted to decline further through the end of the decade
- Solar levelized cost of energy (LCOE) can achieve less than \$70/MWh in poor solar resource locations, and below \$50/MWh in good-to-strong solar resource locations

## Economies of Scale are Real

- Large scale solar projects can achieve significant economies of scale across soft cost categories compared to small projects, with as much as 40% build cost savings for utility-scale solar

## Location Location Location

- States with strong solar resources can generate significantly more energy than states with sub-optimal solar resources given the same project design
- Factors such as labor rates can impact solar economics on a sub-regional basis

## Financing Matters

- Project riskiness can dictate financing terms, which impacts LCOE
- Efficient monetization of the ITC can drive LCOE down dramatically

## Different Designs Meet Different Needs

- West-facing systems may provide additional capacity at peak hours, creating an added capacity value for the project
- Design strategies that leverage tracking systems can boost capacity factor and lower LCOE, particularly given the decreasing gap in costs between fixed and tracking systems

## Design Flexibility Can Be Reflected in Resource Planning Tools

- Modeling multiple system sizes, orientations, and designs can allow resource planning tools to better identify “best fit” solar projects
- Routinely testing the market for pricing can allow utilities to stay on top of the continually declining costs of solar projects

## Streamlined Procurement Processes Save Time and Money

- Identifying your value proposition in advance and communicating it to bidders can result in more intelligently designed proposals
- Standardizing terms for procurement translates into less review time and less risk of errors

<https://www.solarelectricpower.org/media/466271/utility-scale-solar-the-path-to-high-value-cost-competitive-projects.pdf>

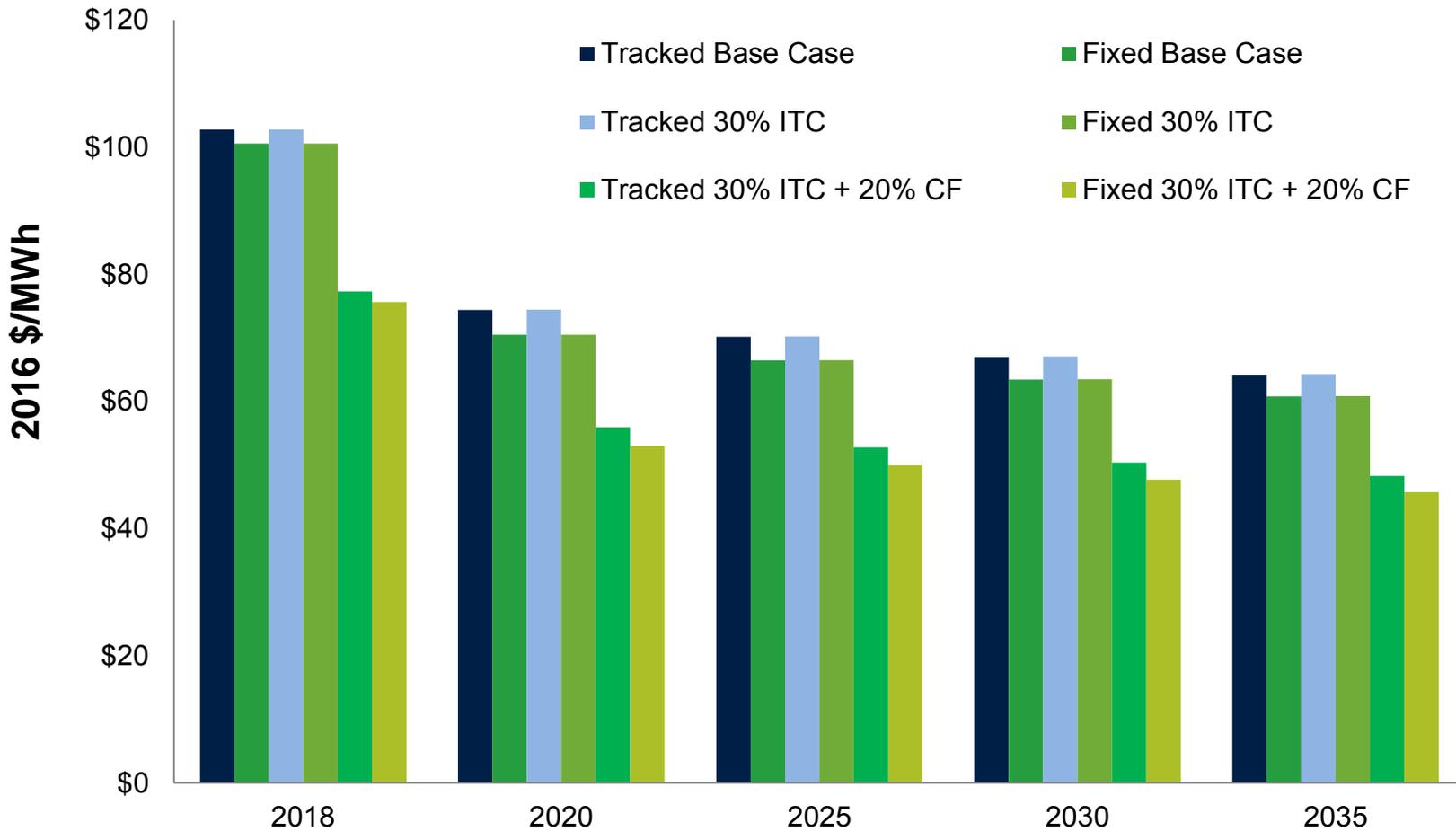
# Utility vs IPP Ownership

TABLE 5 - IMPACT OF PROJECT FINANCING ON LCOE FOR A 20 MW SOLAR PROJECT IN PHOENIX

	BASE CASE FINANCING	NORMALIZED ITC
DEBT	50% @ 6% return	50% @ 6% return
EQUITY	50% @ 10% return	50% @ 10% return
DEPRECIATION	Immediately monetized	Normalized
LCOE (FIXED TILT)	\$63/MWh	\$96/MWh
LCOE (SAT)	\$55/MWh	\$85/MWh

Source: SEPA, 2016

# Solar Levelized Costs Forecast\*



\* Assumes Avista Ownership 2017 Electric IRP Appendix A



# Energy Storage

- Technologies
- Capacity vs Energy
- Miss-information in \$/MWh calculations
- Cycle Life
- Round Trip Efficiency
- Value streams

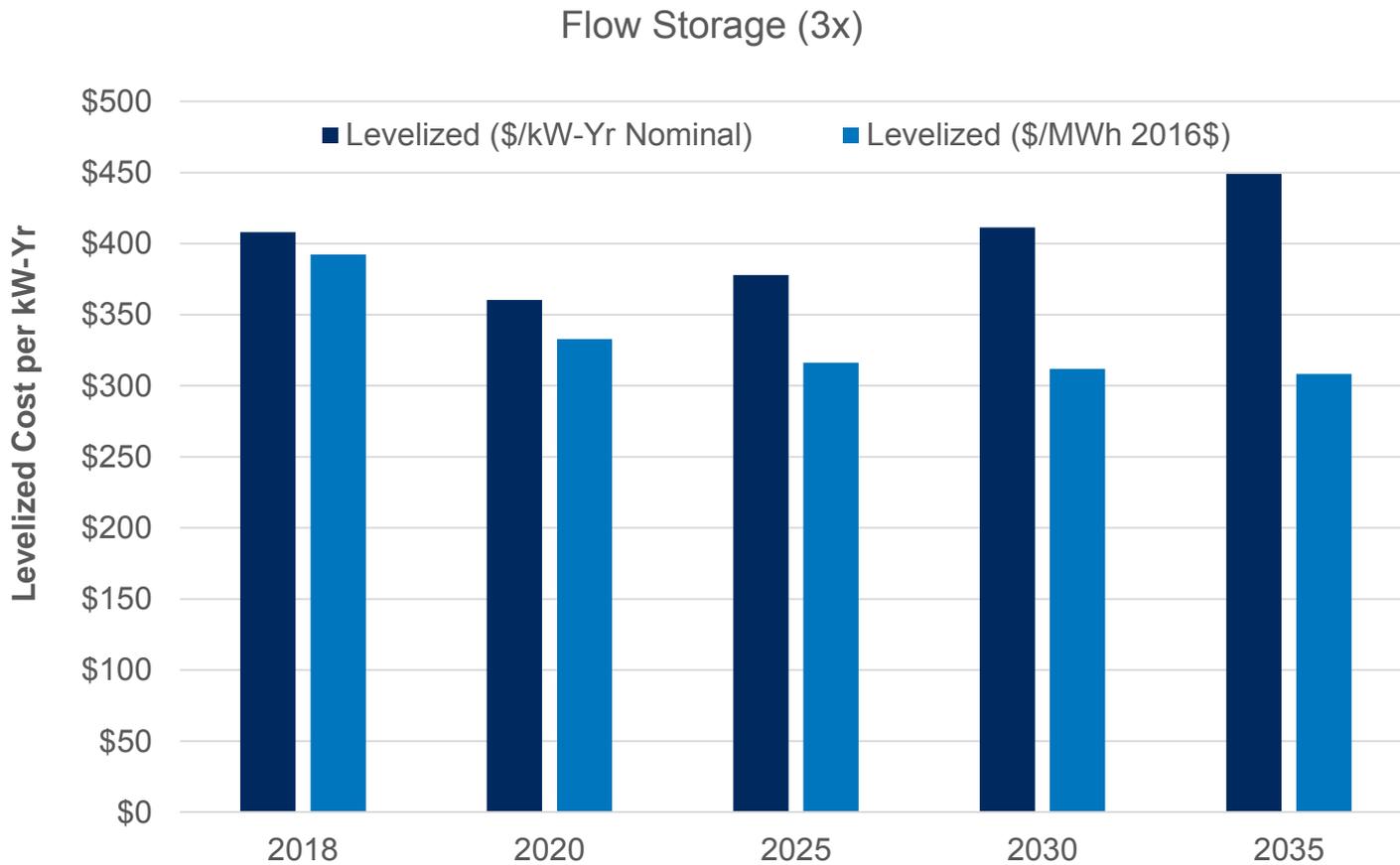
# Energy Storage Technologies Pros & Cons

Removed – chart only available for TAC meeting, not for publication.

# Storage Technology Comparisons

Removed – chart only available for TAC meeting, not for publication.

# Flow Storage Levelized Costs Forecast



## Capital Cost

2018 : \$1,941 kW

2020 : \$1,485 kW

2017 Electric IRP Appendix A



# *Clean Energy Fund 2 Grant Projects*

*John Gibson*

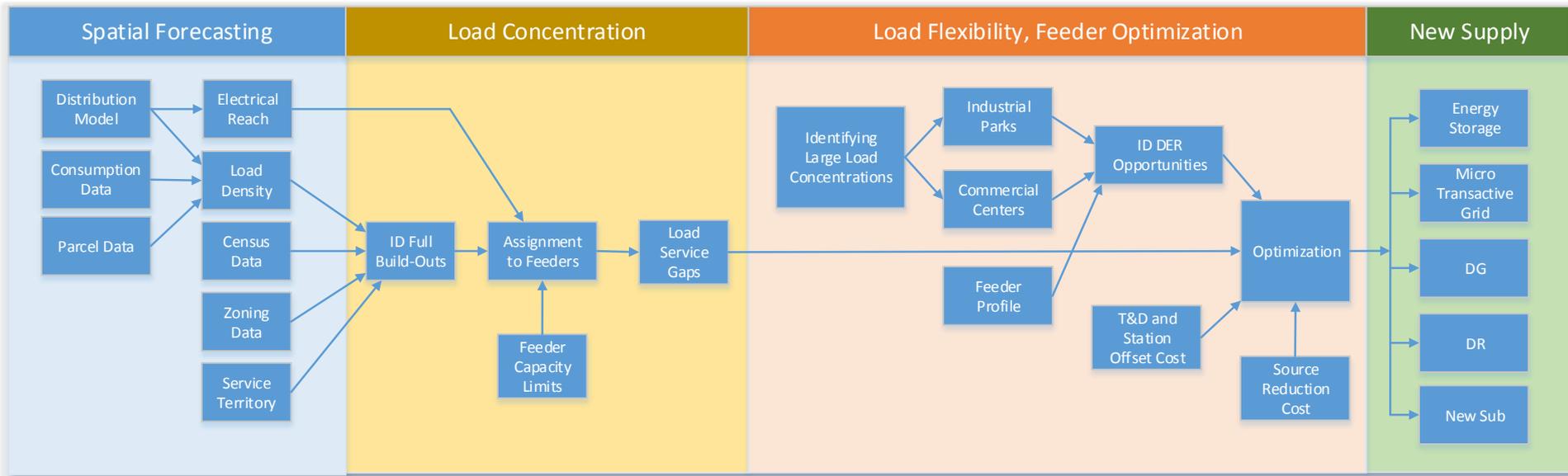
*Second Technical Advisory Committee Meeting*

*September 28, 2016*

- Plan
- Design/Deploy/Learn
- Operate

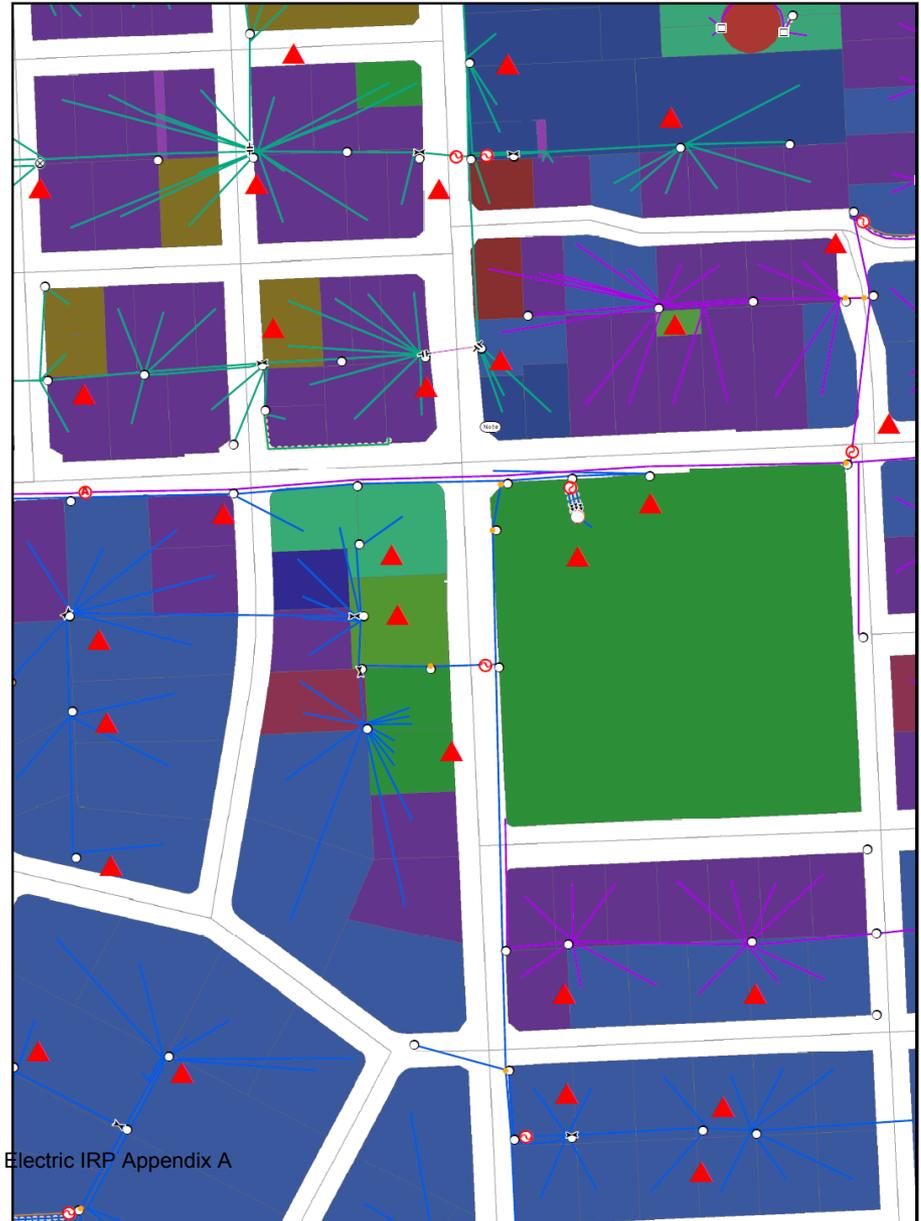
# Plan – Distributed Resource Plan

147

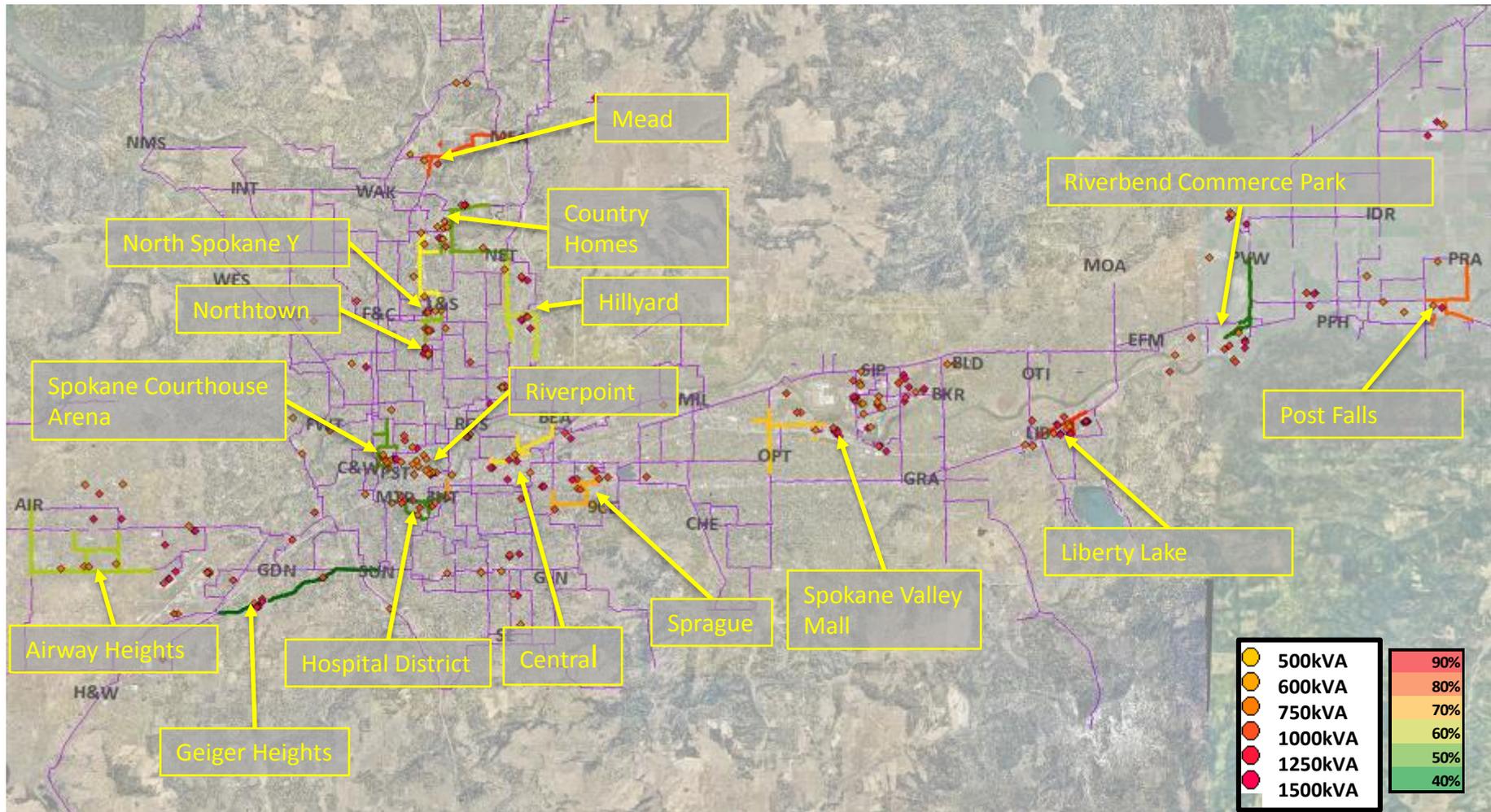


# Plan – Spatial Forecasting<sup>148</sup>

- Parcel/Land use Base Map
- Allocate Existing kWh
- Fully Built Out Zoning



# Plan – Load Concentrations <sup>149</sup>

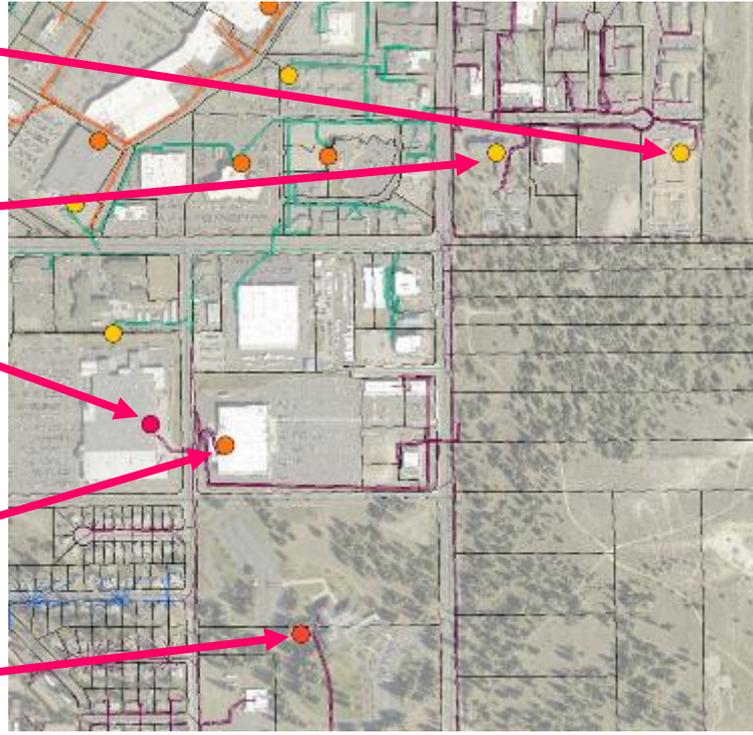


# Plan - Country Homes Load Concentration

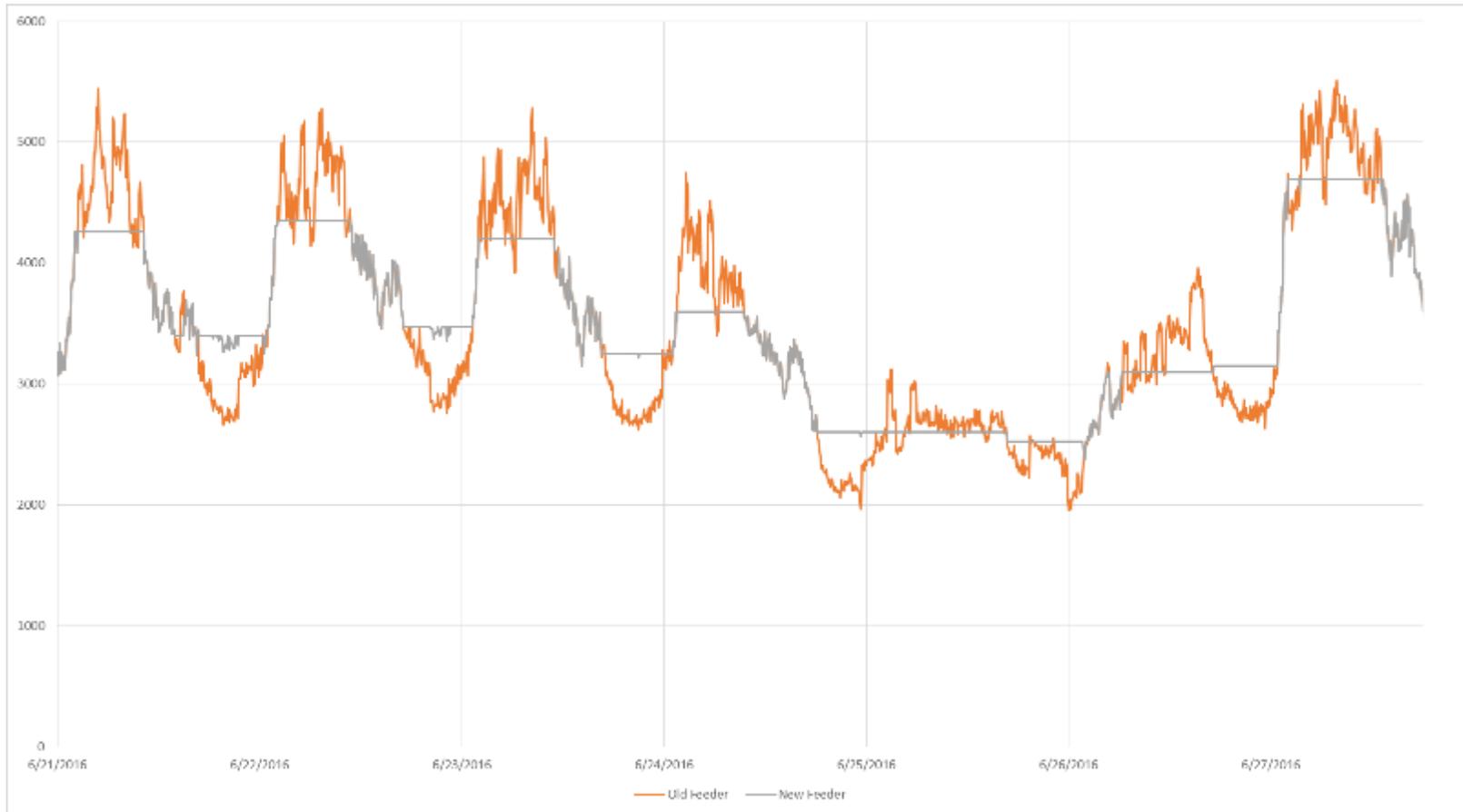
150

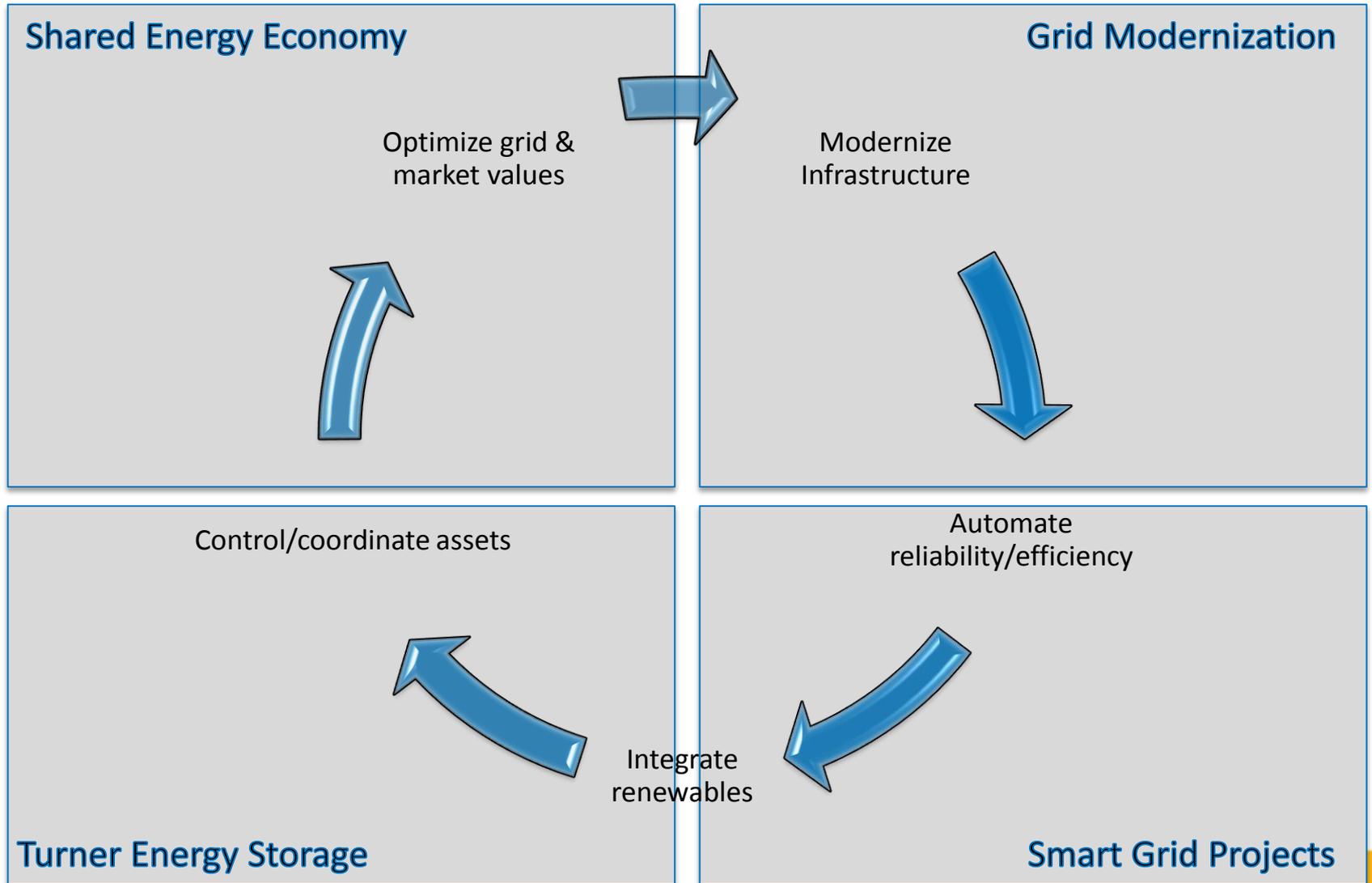
Northeast 12F2

- Regency Care Center - 500kVA
- Northpointe Retirement - 500kVA
- Walmart - 1500kVA
- Winco - 750kVA
- Guardian Insurance - 1000kVA



# Plan – Northeast 12F2 1 MW<sup>15</sup> Energy Storage





## PROGRAM OBJECTIVE

- ❖ **Safety** – Focus on public and employee safety through smart design and work practices;
- ❖ **Increase System Reliability** – Replace aging & failed infrastructure that has a high likelihood of creating a need for unplanned crew call-outs;
- ❖ **Avoided Costs** - Replace equipment that has high energy losses with new equipment that is more energy efficient and improve the overall feeder performance;
- ❖ **Operational Ability** – Replace conductor and equipment that hinders outage detection and install automation devices that enable isolation of outages;
- ❖ **Capital Offset of Future O&M** - Avoid future equipment O&M costs with programmatic rebuild of failing system;

Safety

Reliability

Avoided  
Costs

Operational  
Ability

Reduced  
O&M

## Smart Grid Demonstration Project

- Regional Demonstration Project – Signal
- Smart Line Devices and Distribution Management System
- Customer Experience

## Smart Grid Demonstration Project



## Smart Grid Investment Project

- Smart Line Devices and Distribution Management System
- Fault Detection, Isolation and Restoration – Reliability
- Integrated Volt/Var Control - Energy Efficiency

## Smart Grid Investment Grant



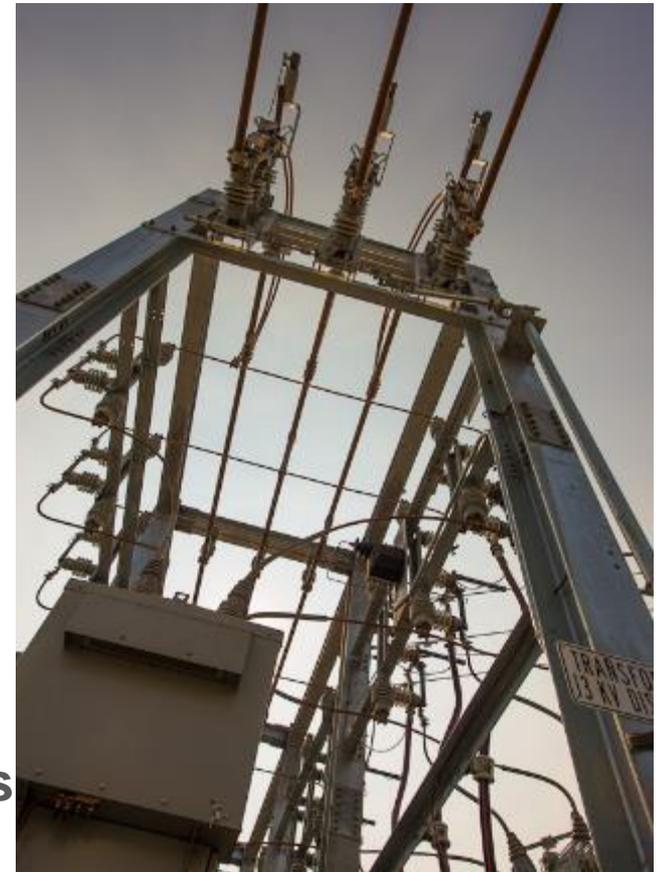
# Learn – Fault Detection Isolation and Restoration<sup>155</sup>

## More visibility & information about our system increases reliability & resiliency

- New sensors, switches & software detect & isolate outages more quickly
- What used to take hours, can now be done in minutes
- Avoid rolling a truck to send a person onsite to assess the problem
- Software automatically identifies & isolates fault
- Safely restores power to surrounding customers

**Approx. 1.5 Million Avoided Outage Minutes**

***Customers experience fewer & shorter outages***



# Learn – Conservation Voltage Reduction<sup>156</sup>

## Conservation Voltage Reduction technology on 72 feeders

- Sensors constantly monitor voltage levels
- New technology at substations automatically adjusts voltage levels
- More efficiently provides energy to customers
- Improves energy efficiency of Avista's entire system



## Energy Conservation

Avista's estimated energy savings during a typical 12 month period =

**42,000 MWh**

## Turner Energy Storage Project

- 1MW – 3.5 MWhr Vanadium Flow Battery
- Located Adjacent to SEL Manufacturing
- Economics of Scope Valuation
- Battery Operational Curves



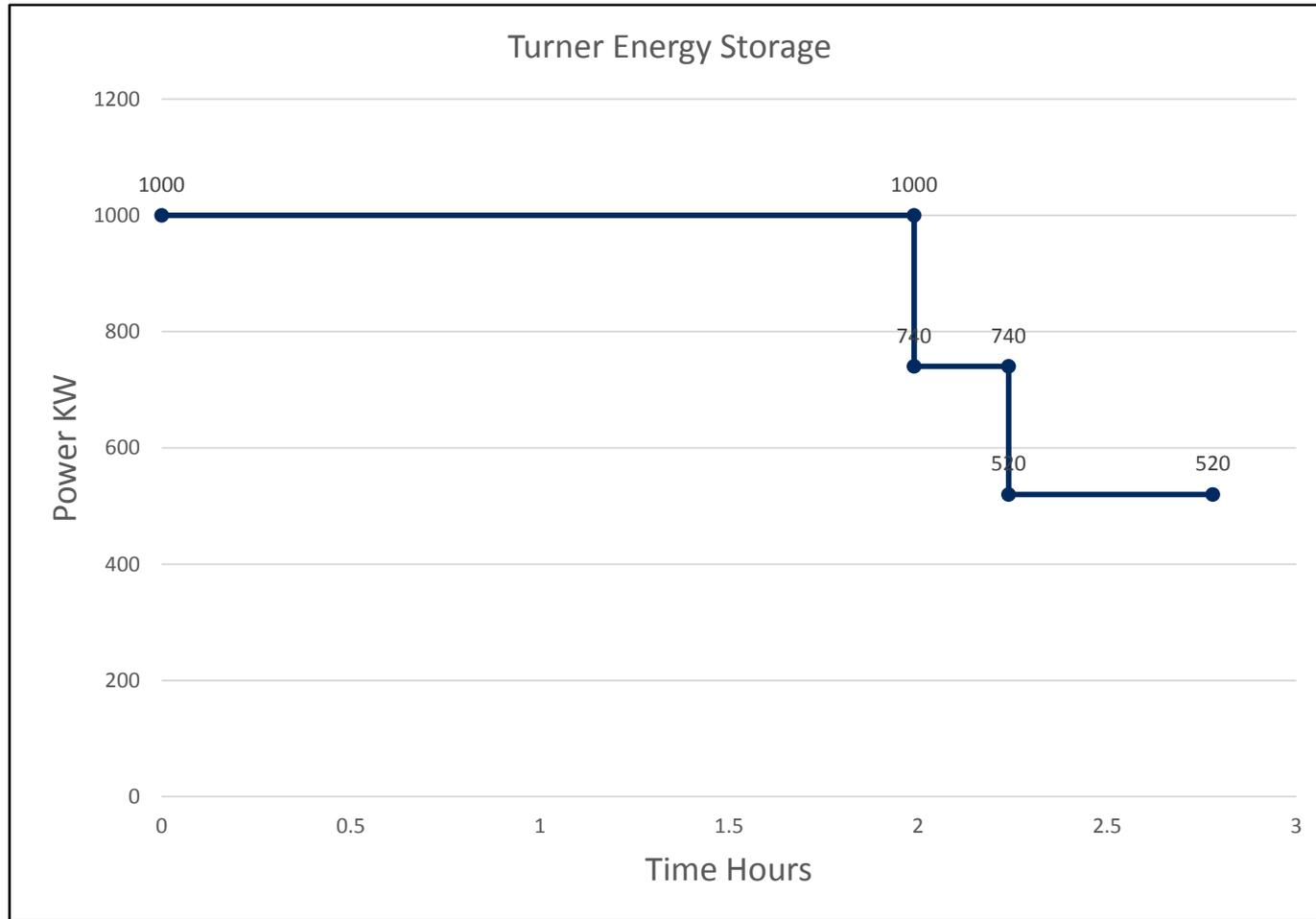
# Deploy – Turner Energy Storage <sup>158</sup>

Use Case and application as described in PNNL Catalog	Avista	PSE	Sno – MESA1	Sno – MESA2	Sno - Controls Integration
<b>UC1: Energy Shifting</b>					
Energy shifting from peak to off-peak on a daily basis	Y	Y	Y	Y	
System capacity to meet adequacy requirements	Y	Y	Y	Y	
<b>UC2: Provide Grid Flexibility</b>					
Regulation services	Y	Y		Y*	
Load following services	Y	Y		Y*	
Real-world flexibility operation	Y	Y		Y*	
<b>UC3: Improving Distribution Systems Efficiency</b>					
Volt/Var control with local and/or remote information	Y		Y	Y	
Load-shaping service	Y	Y	Y	Y	
Deferment of distribution system upgrade	Y	Y			
<b>UC4: Outage Management of Critical Loads</b>		Y			
<b>UC5: Enhanced Voltage Control</b>					
Volt/Var control with local and/or remote information and during enhanced CVR events	Y				
<b>UC6: Grid-connected and islanded micro-grid operations</b>					
Black Start operation	Y				
Micro-grid operation while grid-connected	Y				
Micro-grid operation in islanded mode	Y				
<b>UC7: Optimal Utilization of Energy Storage</b>	Y	Y			Y

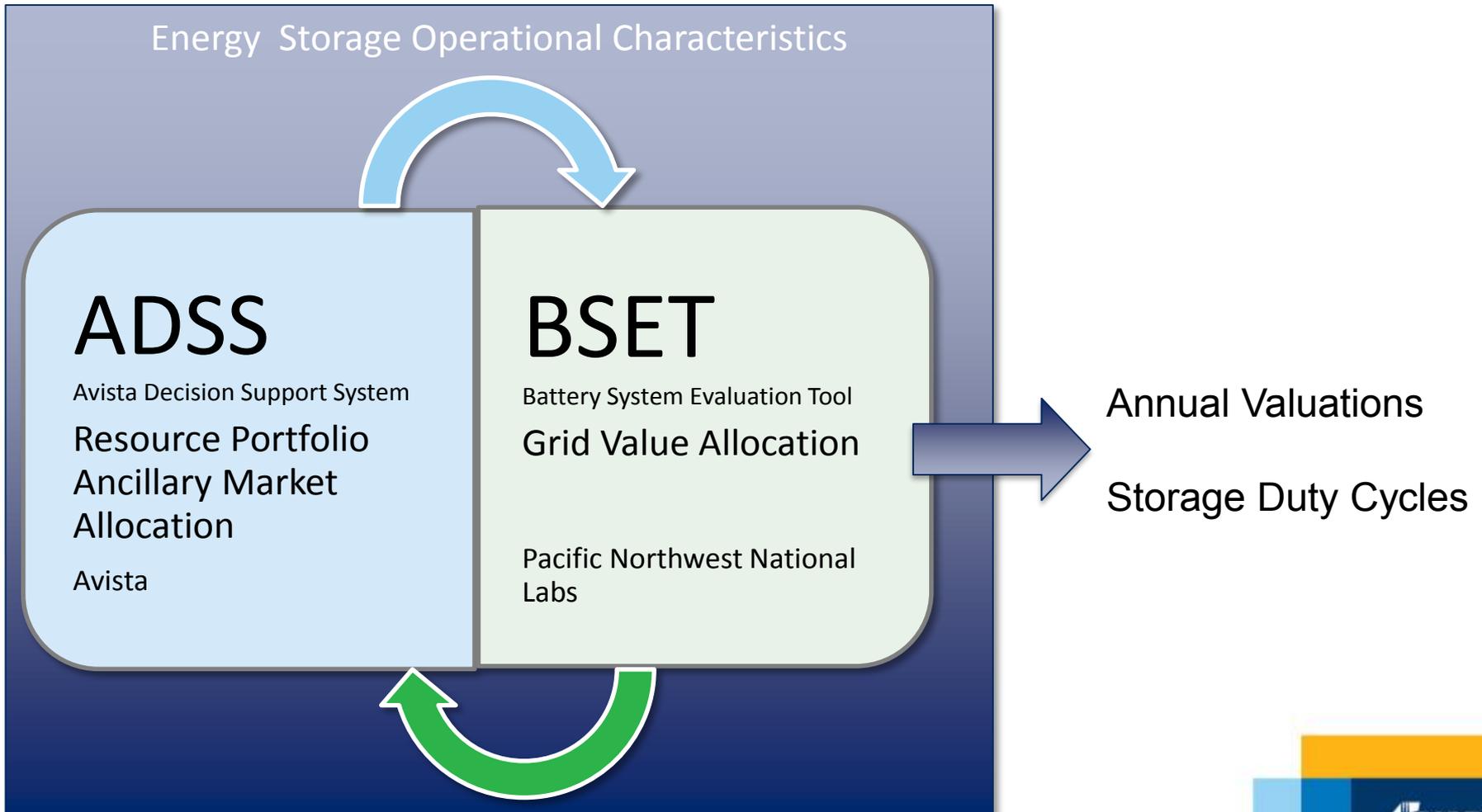
# Learn - Turner Energy Storage Project<sup>159</sup>

- Flow Battery Energy Storage Systems (FBESS) performance depends on various factors
  - Operating mode – charge or discharge
  - Power
  - State of charge (SOC)
  - State of health
  - Operating temperature
- FBESS rating can be confusing
  - 1MW, 3.2 MWh is Uni Energy FBESS rating
  - However, at 1 MW, the energy obtained is ~ 2 MWh
  - To obtain the rated 3.2 MWh energy, the discharge power is 520 kW.
- Need to predict battery performance at various SOC's under different operating conditions
  - Battery SOC calculated by accounting for efficiency losses during charge and discharge

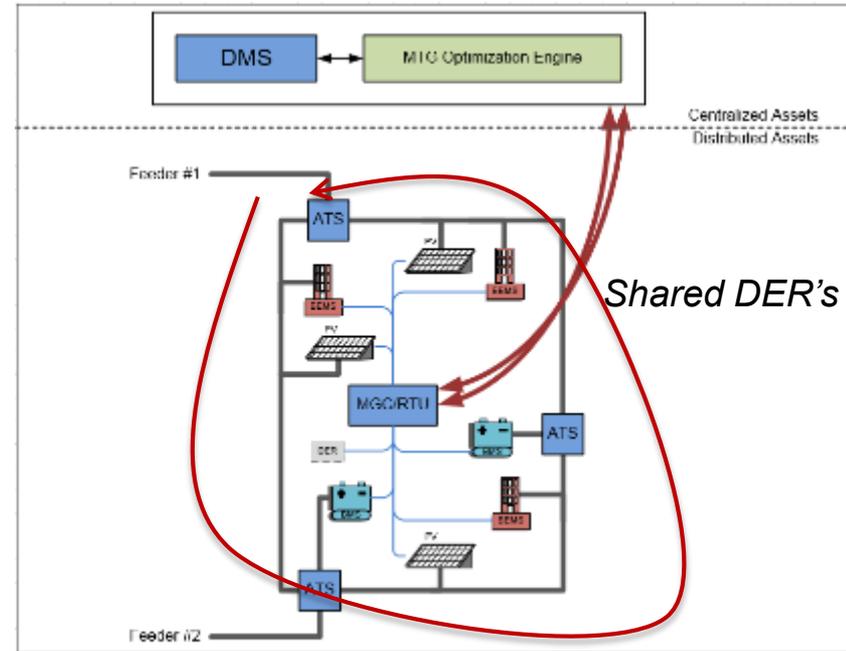
# Learn - Battery Operational Cycle <sup>160</sup>



# Learn - Energy Storage Valuation

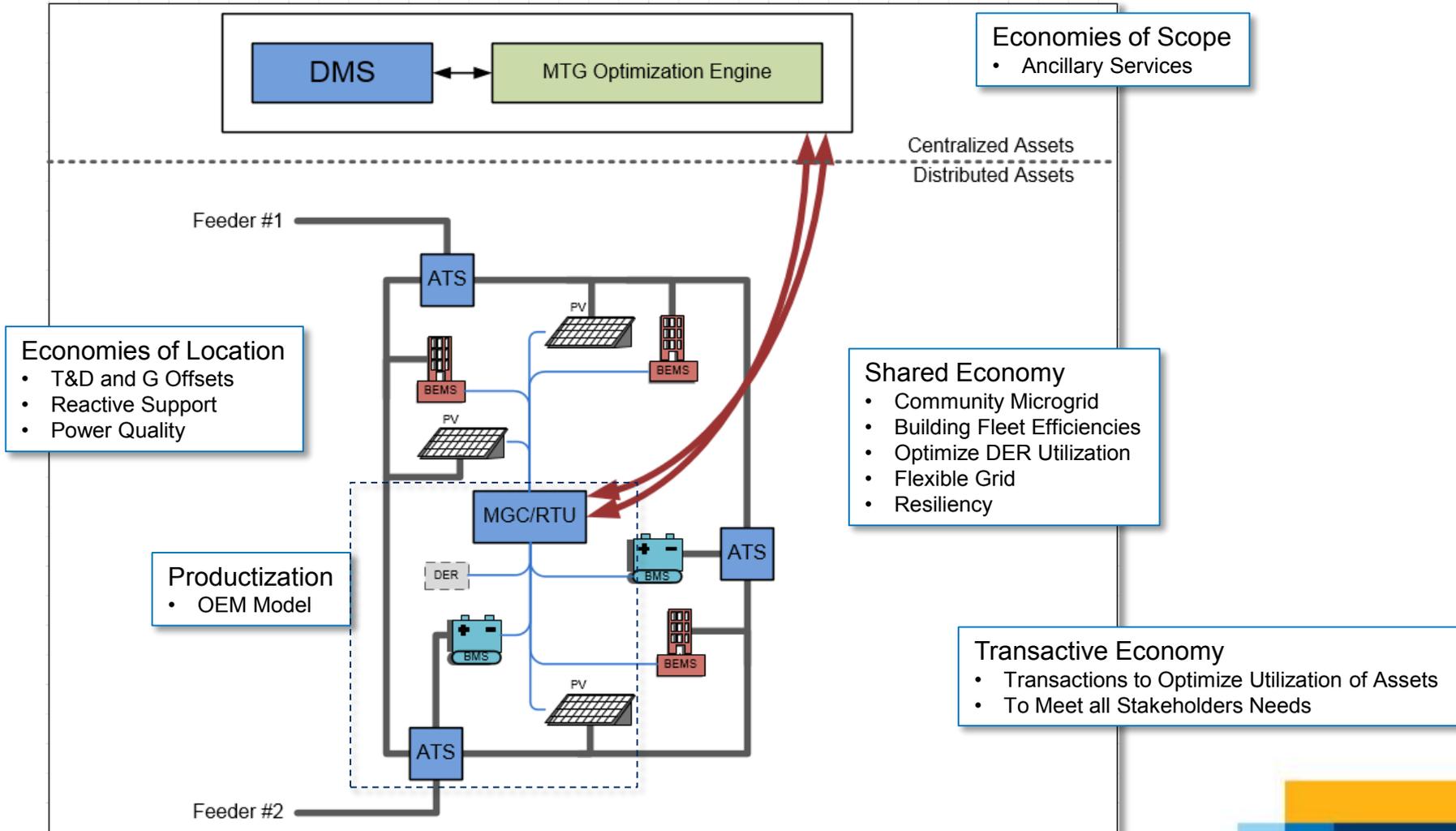


# Design - Micro Grid for the Shared Economy <sup>162</sup>



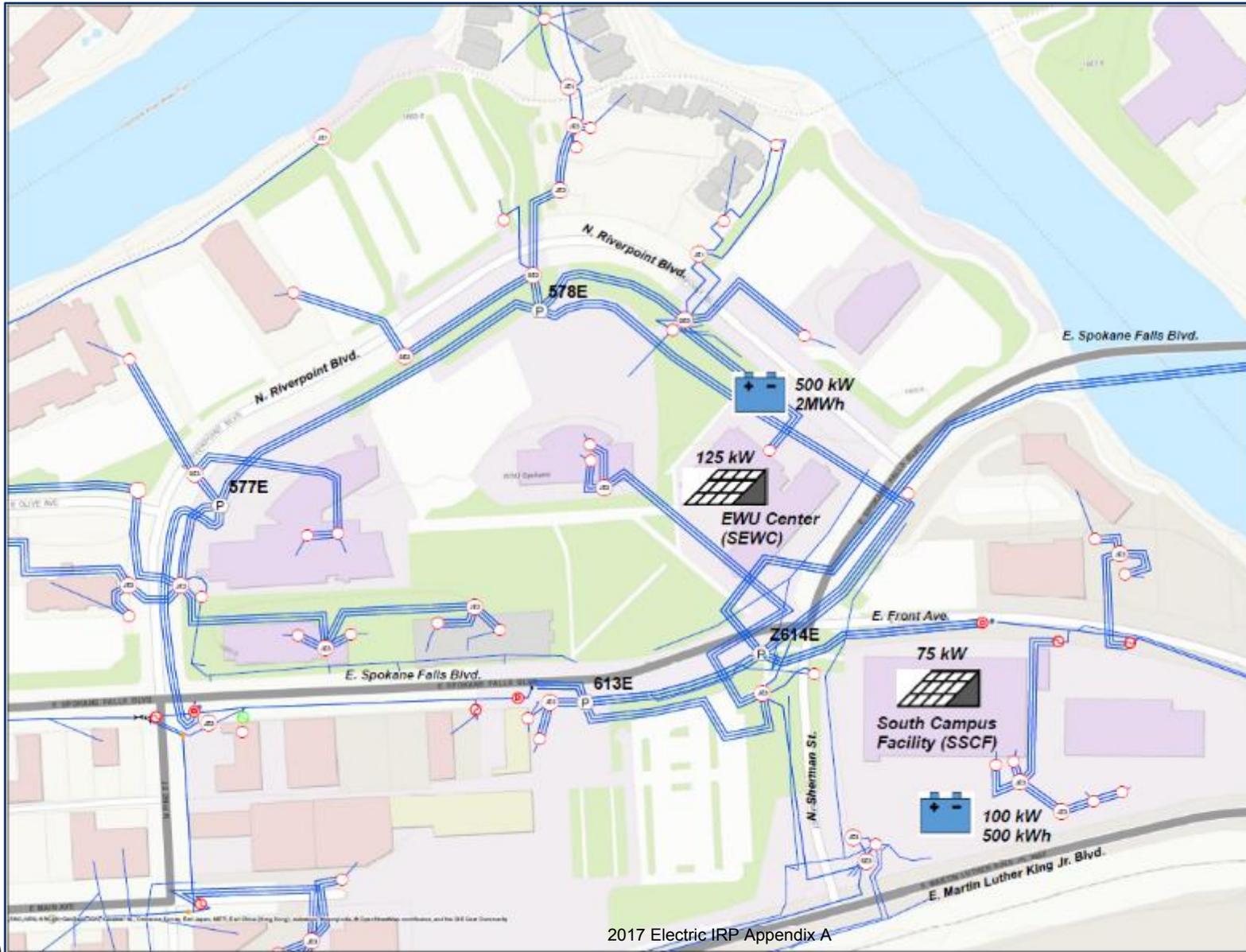
		
Valuation: <b>\$25 Billion</b>	Valuation: <b>\$21 Billion</b>	Valuation: <b>\$12 Billion</b>
Founded In: <b>2008</b>	Founded In: <b>1927</b>	Founded In: <b>1996</b>
<b>1 MM Locations</b>	<b>4,100 Hotels</b>	<b>260,000 Listings</b>
<b>190 Countries</b>	<b>79 Countries</b>	<b>200+ Countries</b>
<b>\$0.9B Revenue</b>	<b>\$13.8B Revenue</b>	<b>\$5.8B Revenue</b>

# Design – Micro Transactive Grid Valuation

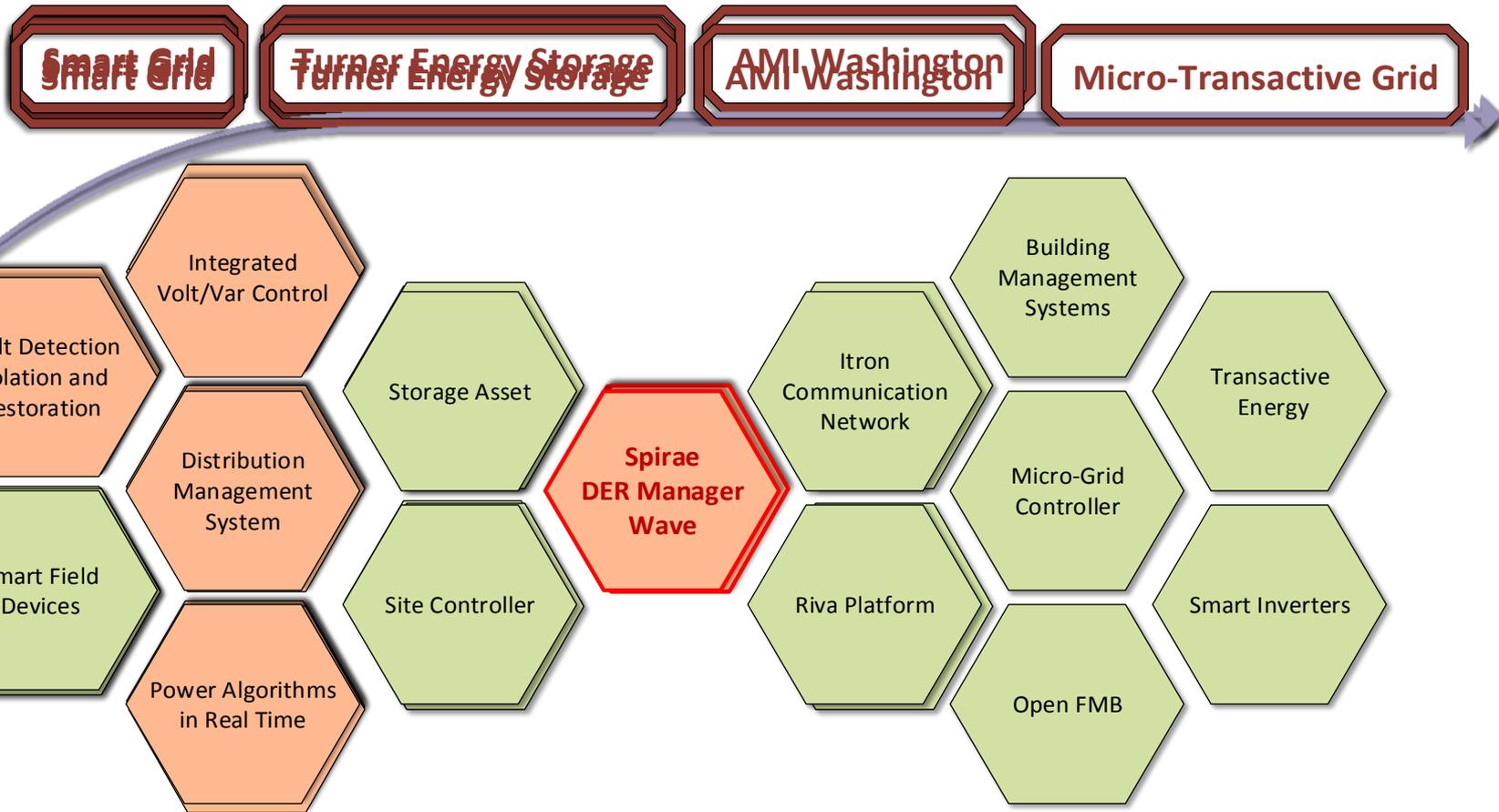


# Design – Micro Transactive Grid

164

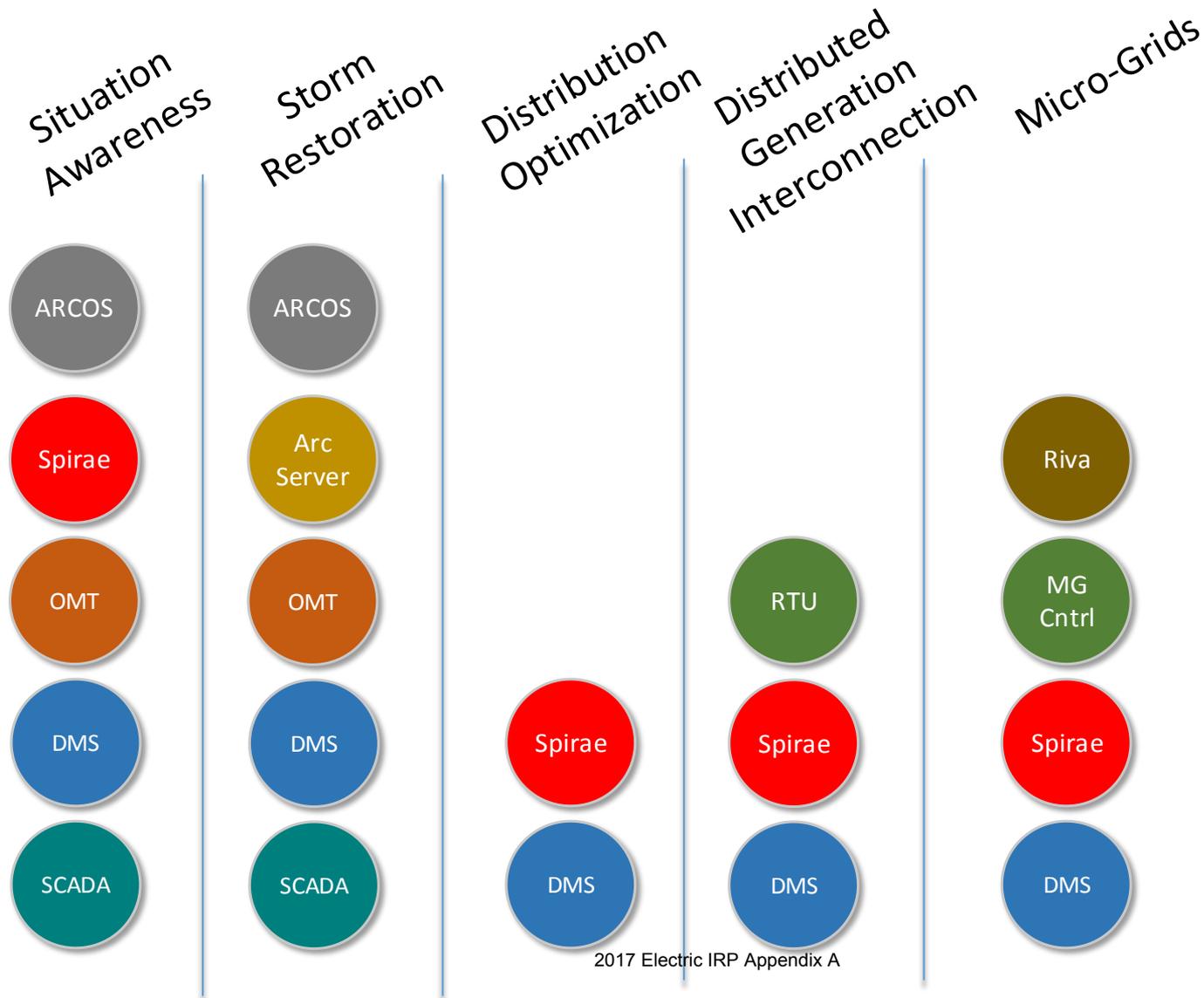


# Deploy - Building the Distribution System Platform



# Operate – Evolving Technology Platform

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# Operate - Distributed Energy Resource Capability Matrix <sup>167</sup>

	Wave Status	Wave Optimization	Distributed Resource Integration	Wave Configuration	Wave Alarm Notifications	Wave Reporting
System Operators						
Dispatcher						
Distribution System Operations Engineers						
Area Engineer						
Customer/Producer						
Automation						



*2017 Electric Integrated Resource Plan*  
**Technical Advisory Committee Meeting No. 3 Agenda**  
 Tuesday, November 8, 2016  
 Red Lion River Inn Shoreline A Conference Room

<b>Topic</b>	<b>Time</b>	<b>Staff</b>
Introduction and TAC 2 Recap	9:00	Lyons
Colstrip Discussion	9:10	Lyons
Break	10:45	
Clean Power Plan & Clean Air Rule	11:00	Lyons
Lunch	12:00	
IRP Modeling Overview	1:00	Gall
Break	2:00	
Cost of Carbon	2:10	Gall
Break	2:40	
Avista's Power Planner Simulator	2:50	Kalich
Adjourn	3:30	

TAC meeting location: Red Lion River Inn Spokane  
 Shoreline Ballroom A  
 700 N. Division  
 Spokane, WA 99202

Directions: <http://www.redlion.com/river-inn-spokane/map-directions>



# 2017 Electric IRP TAC Meeting Expectations and TAC 2 Recap

John Lyons, Ph.D.

Third Technical Advisory Committee Meeting

November 8, 2016

# Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington every other year
- Guides resource strategy over the next two years
- Resource procurements over the next 20 years – Preferred Resource Strategy (PRS)
- Snapshot of current and projected load & resource position

# Integrated Resource Planning (Cont)

- Based on significant modeling and many assumptions
  - Fuel prices
  - Economic activity
  - Policy considerations
  - Resource costs
  - Energy efficiency
- Action Items – areas for more research in the next IRP
- This is not an advocacy forum
- Not a forum on a particular resource or resource type
- Supports rate recovery, but not a preapproval process

# Technical Advisory Committee

- The public process piece of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants in all or some of the process
- Open forum, but we need to stay on topic to get through the agenda
- Welcome requests for studies or different assumptions.
  - Time or resources may limit the amount of studies we can do
  - The earlier study requests are made, the more accommodating we can be
  - January 13, 2017 is the final date for study requests
- Planning team is also available by email or phone for questions or comments between the TAC meetings

# TAC #2 Recap

- Introductions and meeting expectations
- TAC 1 Action Item update concerning:
  - Conservation selection methodology
  - Demand response
  - Planning margin
  - Look back to 2007 IRP results
- Electrification update
- Load and economic forecast
- Supply side resource options
- Clean Energy Fund 2 grant project

# Today's Agenda

- 9:00 – Introduction and TAC 2 Recap, Lyons
- 9:10 – Colstrip Discussion, Lyons
- 10:45 – Break
- 11:00 – Clean Power Plan and Clean Air Rule, Lyons
- 12:00 – Lunch
- 1:00 – IRP Modeling Overview, Gall
- 2:00 – Break
- 2:10 – Cost of Carbon, Gall
- 2:40 – Break
- 2:50 – Avista's Power Planner Simulator, Kalich
- 3:30 – Adjourn



# Colstrip Discussion

John Lyons, Ph.D.  
Third Technical Advisory Committee Meeting  
November 8, 2016

# 2015 IRP Idaho Commission

## Acknowledgement

“Staff recommends that, for the 2017 IRP, the Company should address and quantify the effects of the EPA’s Clean Power Plan rule on scenarios involving Colstrip Units 3 and 4. Staff suggested this evaluation should consider the operating permit, emissions compliance, plant operating life, and power supply cost.” ... “With respect to Staff and SRA’s recommendations about the Clean Power Plan, we expect the Company has been analyzing how the EPA’s final rule may impact the Company’s resource planning, and we find it reasonable for the Company to discuss the potential impacts with the TAC and stakeholders to ensure the 2017 IRP appropriately addresses them.” (Case No. AVU-E-15-08, Order No. 33463)

# 2015 IRP Washington Commission Acknowledgement

“Colstrip Units 3 and 4 – For the 2017 IRP, the Commission requests that Avista:

1. Incorporate new prospective carbon pricing policies into the expected case stochastic modeling, Avista may consult with its Advisory Group regarding assigning probabilities to these policies; and
2. Work toward developing a more complete suite of potential costs to include in a revised “high-cost” scenario.”

(Docket UE-143214)

# Colstrip Ownership Information

Colstrip Basic Data			Colstrip Ownership Percentages					
Colstrip Unit #	Size (MW)	Year Online	Avista	NorthWestern Energy, LLC	PacifiCorp	Portland General Electric	Talen Energy, LLC	Puget Sound Energy
Unit #1	307	1975	0%	0%	0%	0%	50%	50%
Unit #2	307	1976	0%	0%	0%	0%	50%	50%
Unit #3	740	1984	15%	0%	10%	20%	30%	25%
Unit #4	740	1986	15%	30%	10%	20%	0%	25%
Total	2,094		11%	11%	7%	14%	25%	32%

# Colstrip Updates Since Last IRP

- Settlement of the lawsuit with the Sierra Club and the MEIC.
- PSE and Talen Energy have agreed to shut down Units 1 and 2 by July 2022.
- Talen Energy announced it will cease being the plant operator by May 23, 2018.
- Riverstone Holdings June 2016 announcement to purchase remainder of Talen Energy.
- Oregon passed SB 1547 increasing the RPS to 50% by 2040 and for IOUs to no longer serve Oregon customers with coal-fired resources by 2030.
- Final Clean Power Plan and subsequent lawsuits.

# Issues Related to Colstrip in this IRP<sup>181</sup>

## Coal Related Issues to Model:

- Greenhouse gas regulations:
  - Clean Power Plan
  - Possible I-732 compliance
- National Ambient Air Quality Standards
- Mercury and Air Toxics Rule (HAPs)
- Regional Haze
- Coal combustion residuals
- Decommissioning and site options

# Colstrip Modeling in the 2017 IRP

## Expected Case Assumptions:

- Assumes compliance with known environmental regulations (discussed in the previous slide)
- Expected Case assumptions do not speculate – alternatives considered under futures/scenarios studies
- Colstrip Units #3 – 4 in service through IRP modeling period
- Cost of carbon (next presentation)

## Alternative Colstrip Scenarios:

- Shut down units 3 and 4?
- High cost scenario discussion



# Clean Power Plan and Clean Air Rule Discussion

John Lyons, Ph.D.  
Third Technical Advisory Committee Meeting  
November 8, 2016

# Introduction

- Clean Power Plan (CPP) Overview and Current State
- Clean Air Rule
- I-732

# Clean Power Plan Timeline

- June 2, 2014 proposal covered certain existing fossil-fueled resources under 111(d) of the Clean Air Act with a 32% reduction in CO<sub>2</sub> emissions intensity from 2005 by 2030 based on 2012 base year data
- August 3, 2015 final CPP released and published in the Federal Register on October 23, 2015
  - States originally required to submit final plan or initial submittal with request for an extension by September 6, 2016. Final plans with extensions due by September 6, 2018.
  - Original compliance period interim goals 2022-2029 broken into three interim periods (2022 – 2024, 2025 – 2027, 2028 – 2029)
  - Demonstrate final compliance every two years beginning July 1, 2032
- US Supreme Court issues stay on the CPP in February 2016
- DC Circuit Court hears case September 27, 2016
  - Ruling not expected until spring 2017

# Clean Power Plan Building Blocks

- EPA sets interim and final CO<sub>2</sub> emission performance rates for fossil fuel-fired electric generating units (EGUs):
  - Coal- and oil-fired power plants
  - Natural gas-fired combined cycle generating units
- Building Block 1: Heat rate improvement for existing coal plants
- Building Block 2: Re-dispatch coal-fired generation to existing natural gas-fired generation
- Building Block 3: Increased new zero-emitting renewable resources
  - *Block 4, end-use energy efficiency was removed in the final plan, although individual states could increase efficiency as part of their compliance plan*

# State Level Decisions to Be Made

- EPA interim and final statewide goals are in three forms:
  1. Rate-based in pounds per megawatt hour (lbs/MWh);
  2. Mass-based in total short tons of CO<sub>2</sub>; and
  3. Mass-based with new sources in total short tons of CO<sub>2</sub>.
- States can develop their own plans or work together using a mix of the building blocks to develop a plan to comply with one of EPA's goals.
- Can also pursue the Clean Energy Incentive Plan (CEIP)

# CPP Modeling

- Avista developed model that is available and ready to be used or updated depending on the results of the DC Circuit Court decision and likely appeal to the Supreme Court
- Other regional models have been developed to aid states in determining how they will comply with the CPP and if it will be rate or mass based

# Clean Air Rule Background

- In 2015, Governor Inslee directed the Department of Ecology to develop the Clean Air Rule (CAR) to cap and reduce carbon emissions under Washington's Clean Air Act authority.
- Includes entities with 100,000 metric tons of CO<sub>2</sub>e emissions annually and lowers the threshold to 70,000 metric tons by 2035.
- Covered entities can reduce emissions through their own measures or can utilize other compliance options.
- Covers natural gas distributors and power plants, as well as other facilities – baseline will be set by Ecology using five years of data due on March 31, 2017.
- Covered entities are required to show 1.7% emissions reductions per year beginning in 2017.
- The CAR went into effect on October 17, 2016.

# More CAR Basics

- Annual emission reductions will equal:
  - 1.7% of baseline CO<sub>2</sub>e emissions
  - 5% over the three year compliance period
  - Reductions are shown by banking emissions reduction units (ERUs) in the registry
- ERU represents one metric ton of CO<sub>2</sub>e emission reduction
- ERU must originate from reductions in Washington unless derived from allowances and must be retired when used for compliance
- Generate ERUs by:
  - Actual emissions reductions beyond annual compliance requirements
  - Emission reduction projects, programs or activities
  - GHG emissions markets from outside the state of Washington covering up to 100% for first two compliance periods, then tapering off per period by 50%, 25%, 15%, 10% and 5%
  - Convert 2.25 RECs to 1 ERU
- ERU banking
  - Ten year banking provision
- Exchange ERUs through established registry

# Initiative 732

Economy wide carbon tax proposal:

1. Decrease sales tax 1%
2. Fund Working Families Rebate for up to \$1,500 per year for 400,000 low-income families
3. Eliminate most of the Business & Occupation tax for manufacturing
4. Carbon tax starting at \$15/metric ton in year 1, \$25 in year 2, and escalating 3.5% plus inflation annually until \$100 in real 2016 dollars

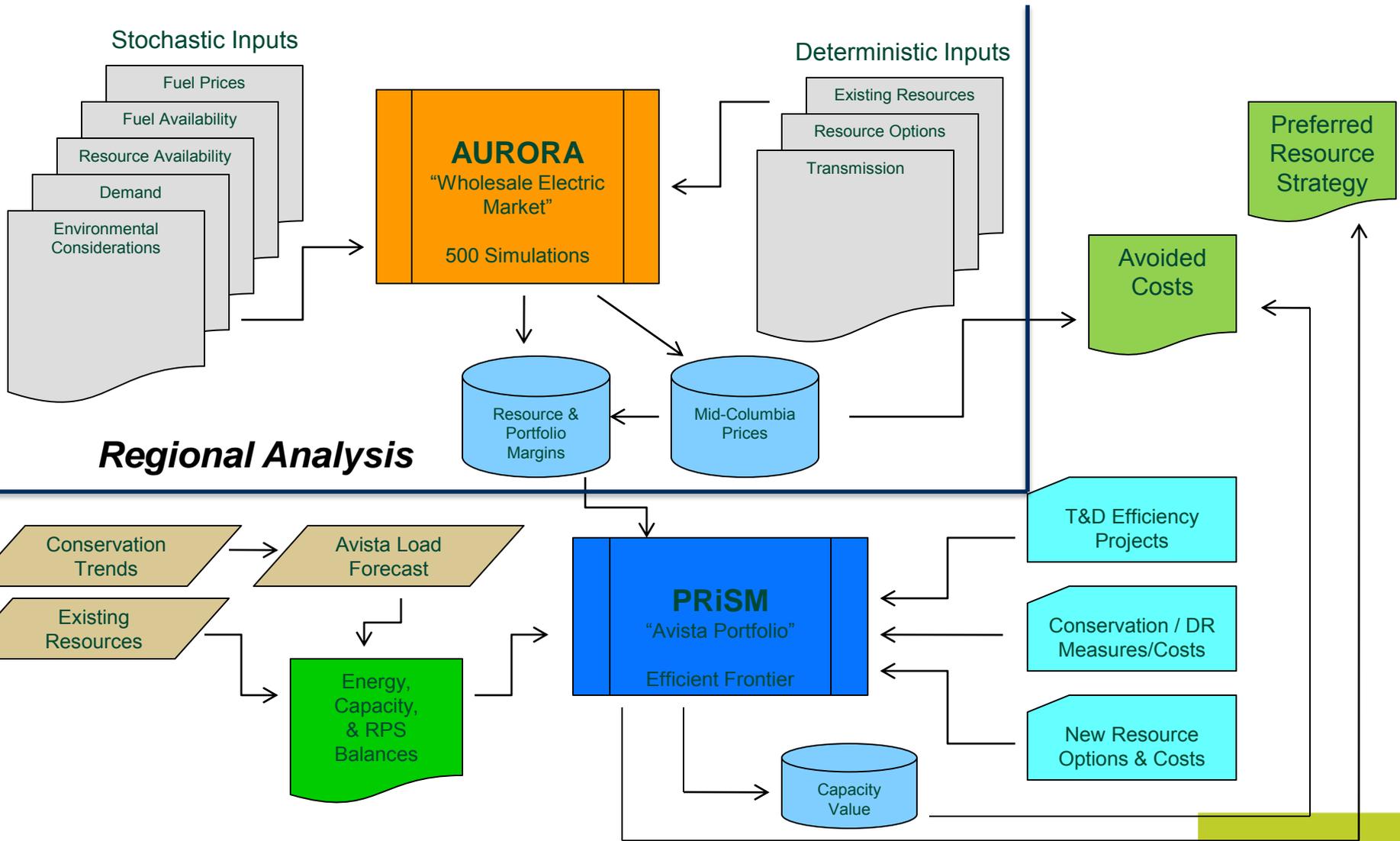


# IRP Modeling Overview

James Gall  
Third Technical Advisory Committee Meeting  
November 8, 2016

# 2017 IRP Modeling Process

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## Avista Analysis

# Electric Market Modeling



- 3<sup>rd</sup> party software- EPIS, Inc.
- Electric market fundamentals- production cost model
- Simulates generation dispatch to meet load and allows for system constraints
- Outputs:
  - Market prices
  - Regional energy mix
  - Transmission usage
  - Greenhouse gas emissions
  - Power plant margins, generation levels, fuel costs
  - Avista's variable power supply costs

# AURORA Inputs

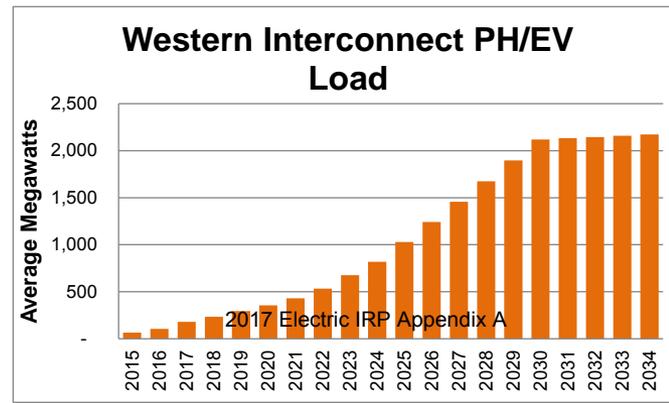
- Regional loads
- Fuel prices
- Hydro levels
- Wind variation
- Environmental constraints
- Resource availability
- Transmission

# Regional Loads

- Forecast load growth for all regions in the Western Interconnect
- Consider both peak and energy
- Use Epis' latest load forecast
  - Data sources PNUCC, AESO, BC Hydro, NERC
- Stochastic modeling simulates load changes due to weather and considers regional correlation of weather patterns
- Load changes due to economic reasons are difficult to quantify and are usually picked up as IRP's are published every two years
- Peak load is becoming more difficult to quantify as "Demand Response" programs may cause data integrity issues
- Energy demand forecasts need to be net of conservation

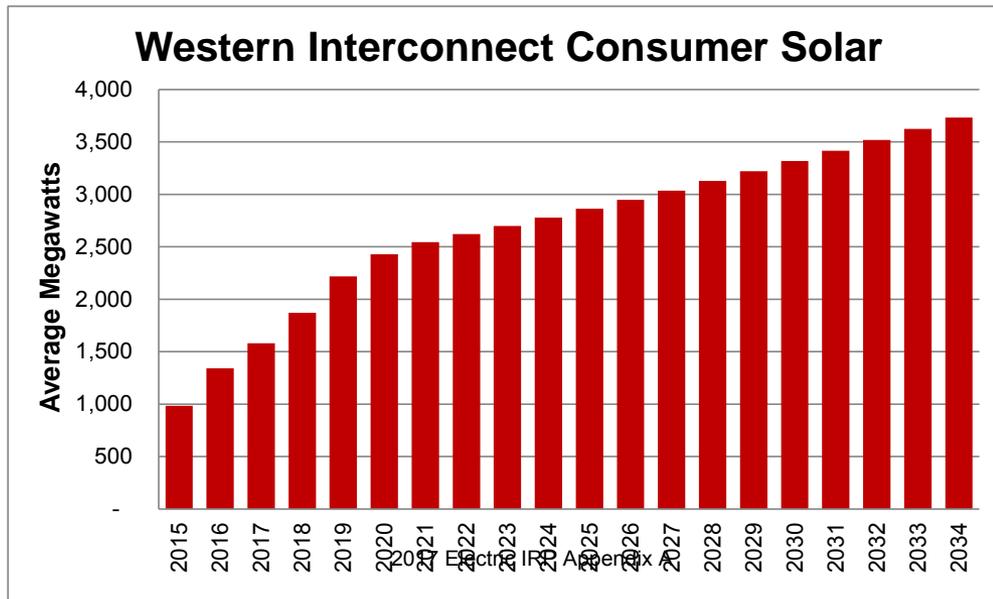
# Electric Vehicles (EV)

- New customer load shapes will be a result of EV penetration
- To address this- a load adder will be applied to reflect new demand with a majority of load added in off peak hours
- By 2030 the following are the percent of vehicle sales,
  - 25%: CA
  - 15%: AZ, CO, OR, WA
  - 10%: NM, NV, UT
  - 5%: WY, MT, ID
- Beyond 2030 growth is equal to traditional vehicle growth (1/2 of population growth)

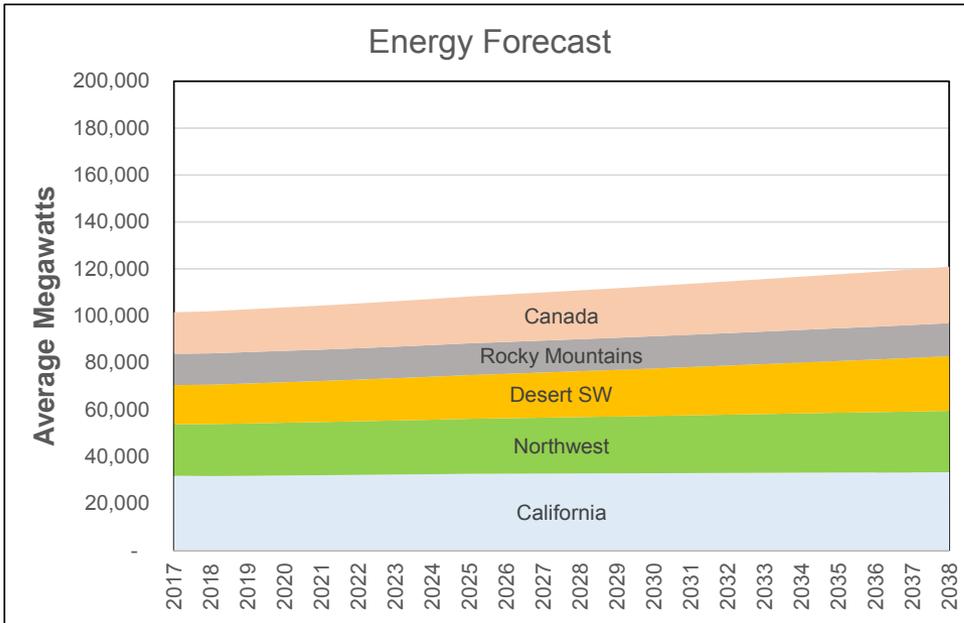


# Rooftop Solar

- As with EV, rooftop solar will impact future load growth and its hourly profile
- Future growth will be dependent upon policy choices
- Assumes 20-30% growth, before leveling off to long run growth 3% in 2020's

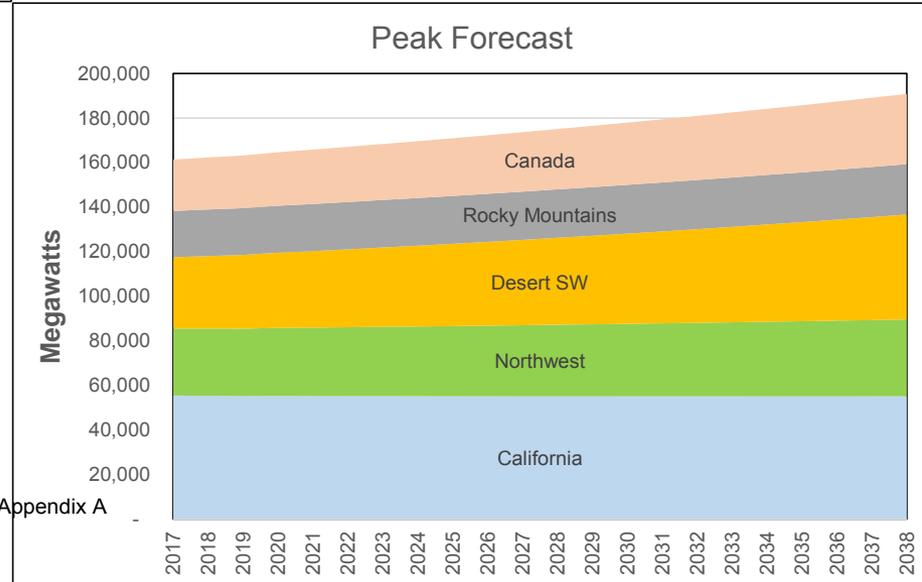


# Energy & Peak Forecast (draft)



Energy	AAGR
Canada	1.47%
Rocky Mtns.	0.26%
Desert SW	1.61%
California	0.22%
Northwest	0.83%

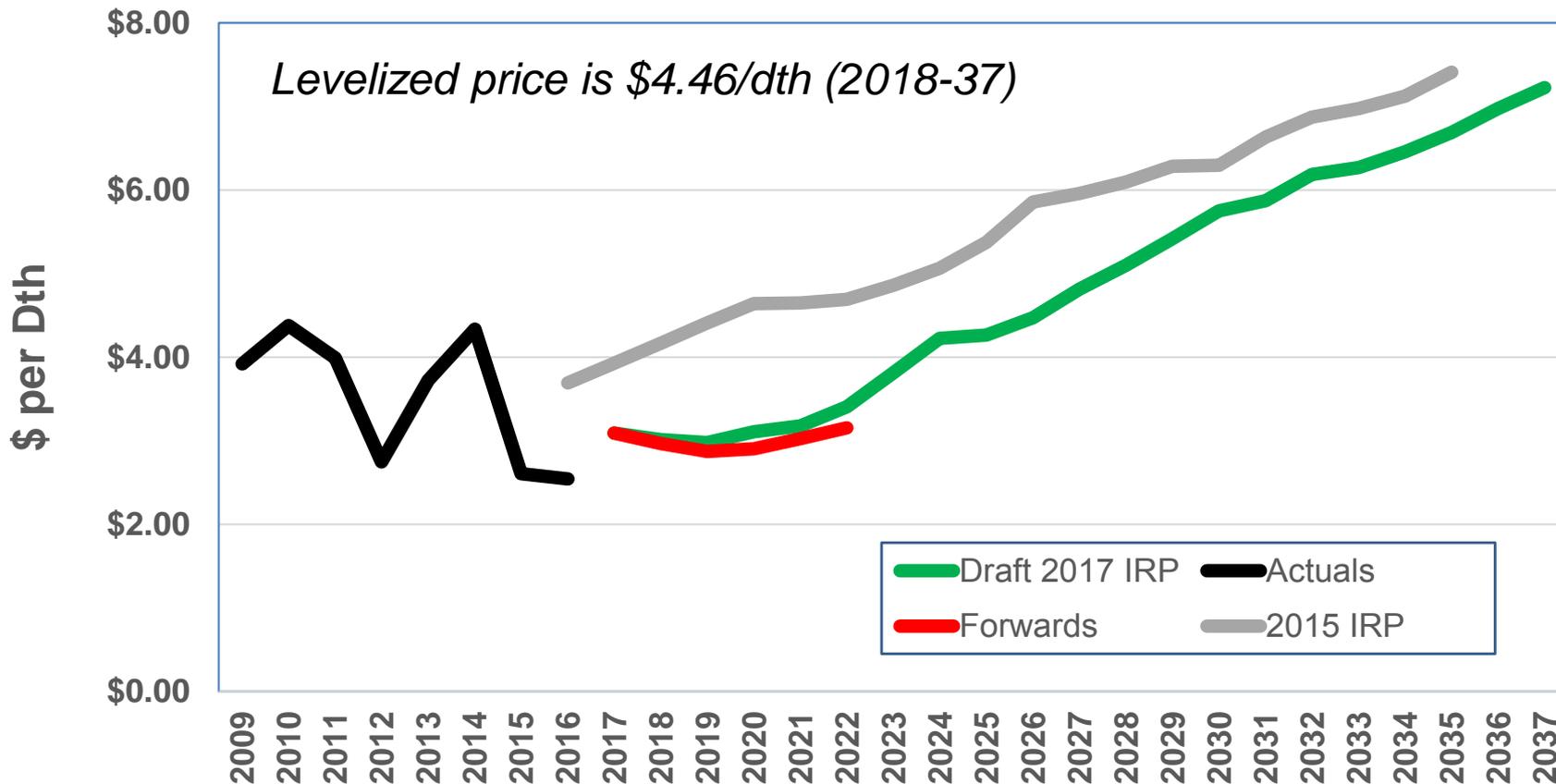
Peak	AAGR
Canada	1.50%
Rocky Mtns.	0.40%
Desert SW	1.85%
California	-0.03%
Northwest	0.66%



# Natural Gas Prices

- Natural gas prices are one of the most difficult inputs to quantify
- A combination of forward prices and consultant studies will be used as the “Expected Case” for this IRP. This work should be complete by December 2016
- 500 different prices using an auto regressive technique will be modeled, the mean value of the 500 simulations will be equal to the “Expected Case” forecast
- A controversial input for these prices is the amount of variance within the 500 simulation.
  - Historically prices were highly volatile, recent history is more stable
  - Final variance estimates will look at current market volatility and implied variance from options contracts

# Henry Hub Natural Gas Prices \*



\* Based on methodology described above, to be updated

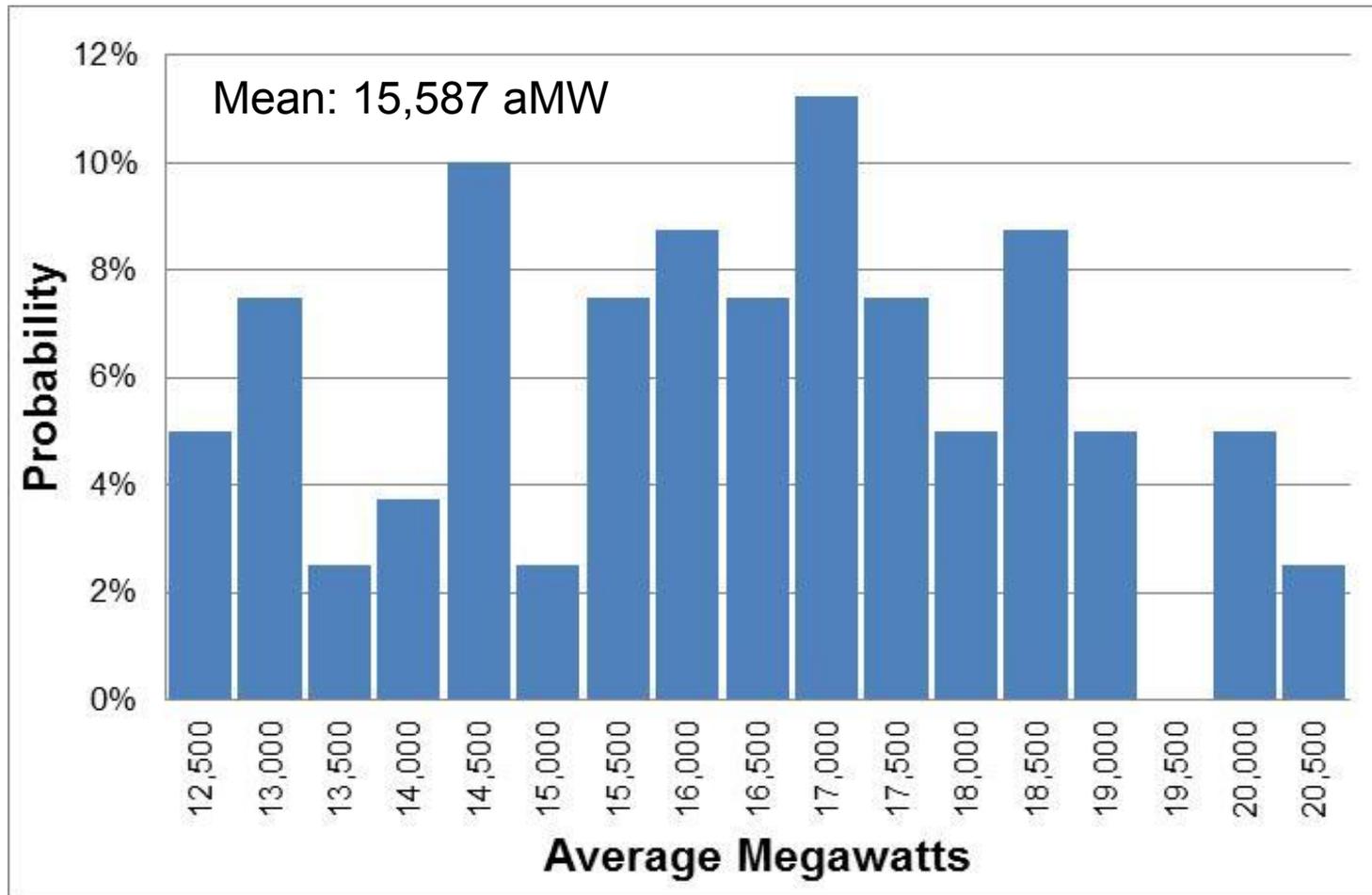
# Coal Prices

- With lower natural gas prices and EPA regulations the demand for US based coal is lower, but potential exports may stabilize the industry
- Western US coal plants typically have long-term contracts and many are mine mouth
- Rail coal projects are subject to diesel price risk
- Prices will be based on review of coal plant publically available prices and EIA mine mouth and rail forecasts, currently the price escalator is ~2.5%

# Hydro

- 80 years of hydro conditions are used for the Northwest states, British Columbia and California provided by BPA
  - Hydro levels change monthly
  - AURORA dispatches the monthly hydro based on whether its run-of-river or storage.
- For stochastic studies the hydro levels will be randomly drawn from the 80-year record
- A new Columbia River Treaty could change regional hydro patterns, but until there is resolution, no changes will be included

# Northwest State Hydro Volatility

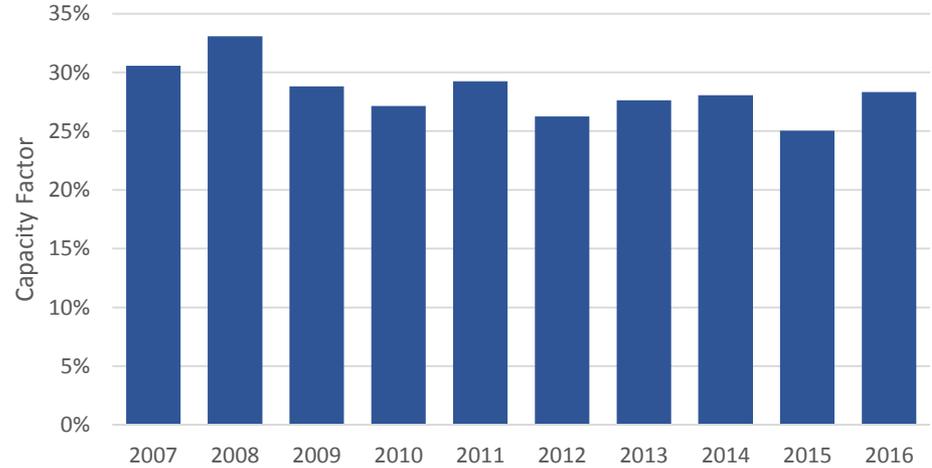


# Wind

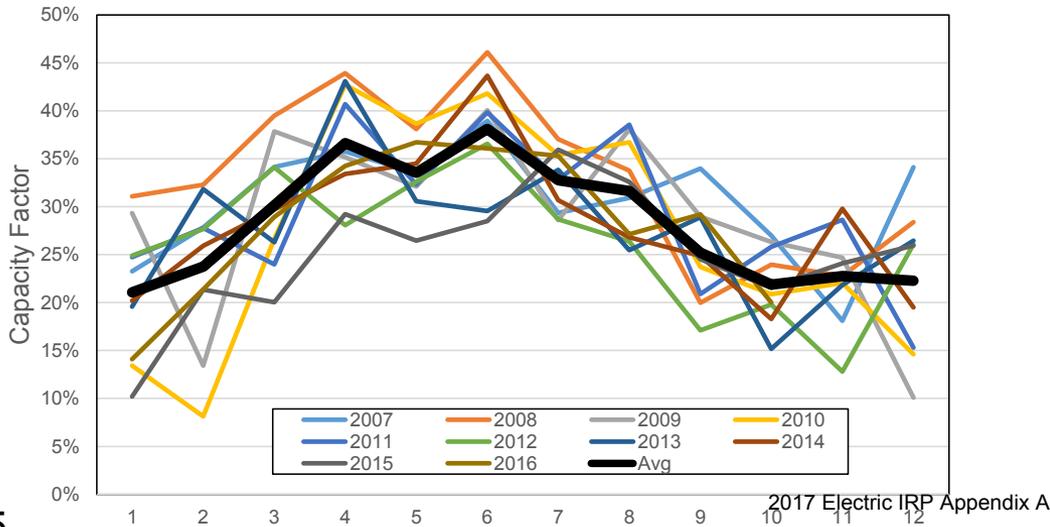
- Wind is modeled using an autoregressive technique to simulate output in similar to reported data available from BPA, CAISO, and other publically available data sources- also considers correlation between regions
- RECs and PTC's have caused wind facilities to economically generate in oversupply periods in the Northwest- particularly in the spring months
  - This is modeled in AURORA as a negative marginal cost, allowing for the model to simulate negative prices
- For stochastic studies several wind curves, will be drawn from to simulate variation in wind output each year

# NW Wind Capacity Factor History

Annual Capacity Factor

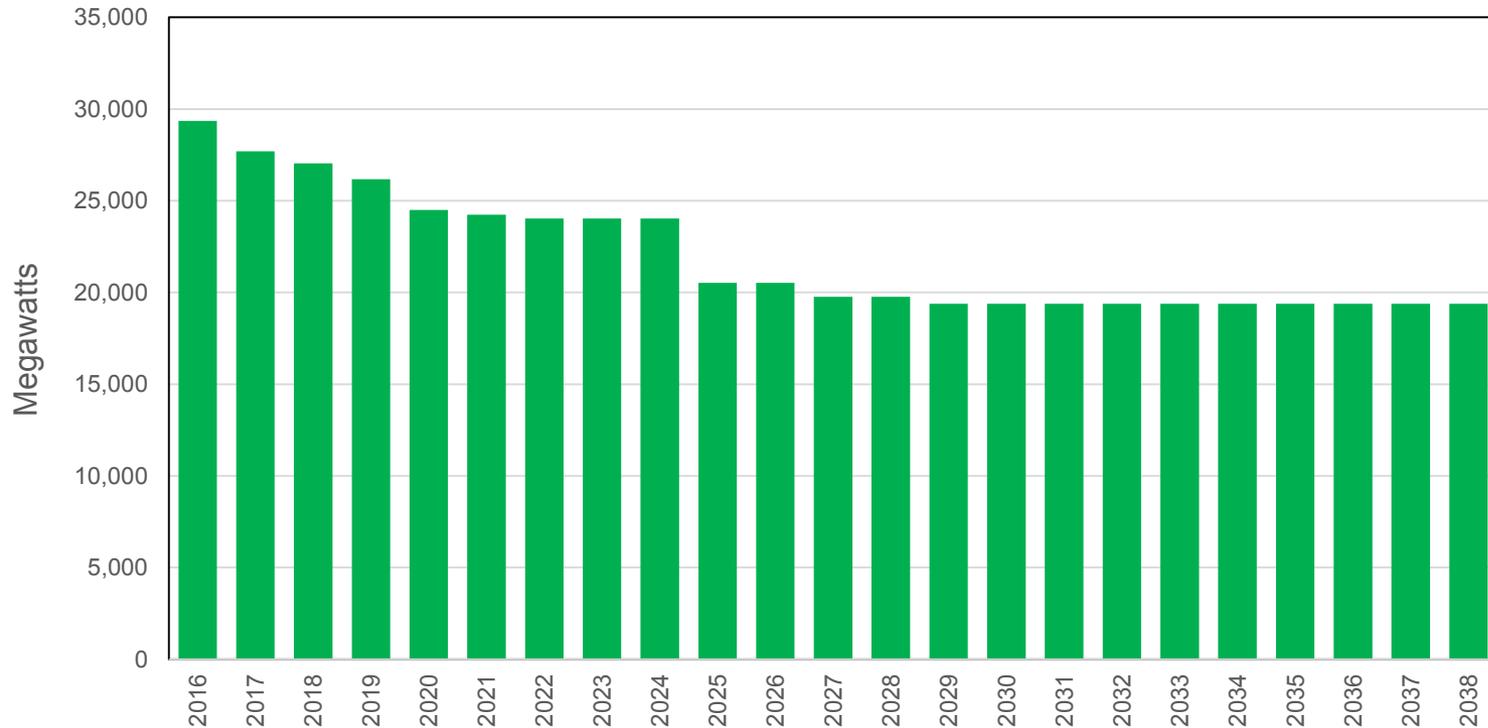


Monthly Capacity Factor



# Western Interconnect- US Coal Capacity Forecast

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- Announced retirements are 34% of coal plant capacity in the west between 2016 and 2038
- The price forecast simulation will likely find additional coal retirements in the later half of the study period

# PRiSM- Preferred Resource Strategy Model

- Internally developed using Excel based linear/mixed integer program model (What's Best & Gurobi)
- Selects new resources to meet Avista's capacity, energy, and renewable energy requirements
- Outputs:
  - Power supply costs (variable and fixed)
  - Power supply costs variation
  - New resource selection (generation/conservation)
  - Emissions
  - Capital requirements

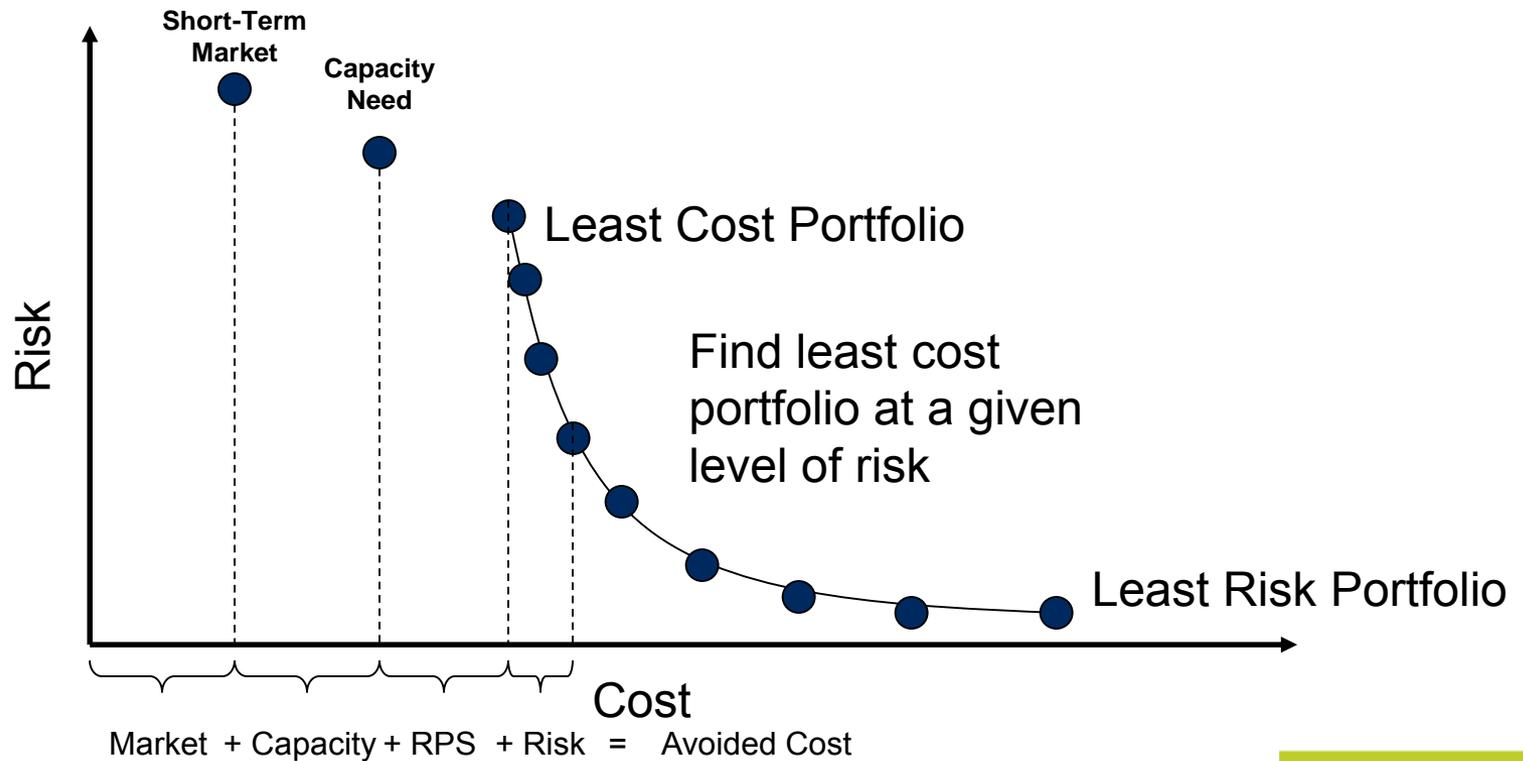


# PRiSM

- Find optimal resource strategy to meet resource deficits over planning horizon
- Model selects its resources to reduce cost, risk, or both.
- Objective Function:
  - Minimize: Total Power Supply Cost on NPV basis (2018-2056)-  
Focus on first 20 years of the plan
  - Subject to:
    - Risk level
    - Capacity need +/- deviation
    - Energy need +/- deviation
    - Renewable portfolio standards
    - Resource limitations, sizes, and timing

# Efficient Frontier

- Demonstrates the trade off of cost and risk
- Avoided Cost Calculation



# Planning Margin

- Avista is continuing its review of the level of planning margin it will use for the 2017 IRP
  - Avista is considering using the following margins in addition to reserves and flexibility requirements
    - Winter: 14%
    - Summer: 7%
  - Analysis continues to determine whether or not these are the appropriate metrics
  - Avista will continue to check in with the TAC regarding any additional analysis



# Carbon Prices in the 2017 Electric IRP

James Gall  
Third Technical Advisory Committee Meeting  
November 8, 2016

# Forms of Carbon Regulation

- Indirect: Renewable resource additions
- Carbon tax: British Columbia or I-732
- Direct regulation: Clean Power Plan or Clean Air Rule
- Cap and trade: such as AB 32 in California
- State mandates: such as Oregon SB 1547 and emissions performance standards

# Renewables

- Renewables will drive emissions lower, but may be indirect to location of the renewable's location
- RPS standards in each state (large utility goals shown below)
  - WA: 15% by 2020
  - OR: 50% goal by 2040
  - CA: 50% goal by end of 2030
  - NV: 25% by 2025
  - AZ: 15% by 2025
  - NM: 20% by 2020
  - CO: 30% by 2020
  - MT: 15%
- Consumer Driven Renewables
  - Washington Clear Air Rule (non-power entities may drive construction to create ERUs)
  - Rooftop solar
  - Large commercial direct investment
  - Green tariff

# Carbon Taxes

- Canadian Carbon Taxes
  - British Columbia: \$30/metric ton (Can\$)
  - Alberta: \$30/metric ton (Can\$)
- I-732:
  - 2017: \$15/metric ton
  - 2018: \$25/metric ton
  - After: 3.5% plus inflation
  - Will be modeled if Washington state voters approve

# Direct Regulation

- Washington SB 6001- Emissions performance standard
  - Limits “baseload” generation to 970 lbs of CO<sub>2</sub> per MWh for new resources
- Washington Clean Air Rule
  - Large emitters must reduce emissions by 30% by 2030
  - Allowance for offsets, such as 2.25 RECs per metric ton of reduction
- Clean Power Plan
  - 30 percent reduction in covered resources
  - Each state has reduction goals
  - New plants, emissions performance standard
  - Currently stayed by Supreme Court, ruling by DC Circuit Court expected spring 2017

# Cap & Trade

- AB 32 in California
  - 1990 levels by 2020
  - Typically modeled as a “price” adder due to economy-wide trading system, using minimum price
- Washington Clean Air Rule
  - Power plants subject to Clean Power Plan after implementation, but economy-wide trading system could impact power plants
- Clean Power Plan
  - States could join together and develop a trading system for the mass-based compliance option

# Avista's Proposed Modeling

- Due to uncertainties in future regulations, this is Avista's proposal for regional market modeling, but could change depending on political dynamics and is subject to change
- Model current RPS standards
- Include Canadian CO<sub>2</sub> taxes
- Meet up to 1% of load with customer driven renewables by 2040
- No new coal plants
- Include either I-732 tax or Clean Air Rule impacts to Washington system
- Create two regional mass-based trading systems for 2020 and beyond
  - WA, OR, CA: 30% reduction in power related emissions from 1990 emissions by 2035 and 35% by 2040 for plants covered by the Clean Power Plan (excluding CA, and includes Colstrip 1-4)
  - Remaining western states: regional cap & trade meeting the Clean Power Plan mass based + new source complement goal beginning in 2022
  - Pricing will be a result of market modeling

*2017 Electric Integrated Resource Plan*  
**Technical Advisory Committee Meeting No. 4 Agenda**  
 Wednesday, February 15, 2017  
 Conference Room 130

<b>Topic</b>	<b>Time</b>	<b>Staff</b>
Introduction and TAC 3 Recap	9:00	Lyons
Resource Needs Assessment	9:15	Gall
Natural Gas Price Forecast	9:45	Pardee
Break	10:45	
Electric Price Forecast	11:00	Gall
Lunch	12:00	
Transmission Planning	1:00	Maguire
Break	2:00	
Market and Portfolio Scenario Development	2:15	Lyons
Adjourn	3:00	



# 2017 Electric IRP TAC Meeting Expectations and TAC 3 Recap

John Lyons, Ph.D.

Fourth Technical Advisory Committee Meeting

February 15, 2017

# Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington every other year
- Guides resource strategy over the next two years
- Resource procurements over the next 20 years – Preferred Resource Strategy (PRS)
- Snapshot of current and projected load & resource position

# Integrated Resource Planning (Cont)

- Based on significant modeling and many assumptions
  - Fuel prices
  - Economic activity
  - Policy considerations
  - Resource costs
  - Energy efficiency
- Action Items – areas for more research in the next IRP
- This is not an advocacy forum
- Not a forum on a particular resource or resource type
- Supports rate recovery, but not a preapproval process

# Technical Advisory Committee

- The public process piece of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants in all or some of the process
- Open forum, but we need to stay on topic to get through the agenda
- Welcome requests for studies or different assumptions.
  - Time or resources may limit the amount of studies we can do
  - The earlier study requests are made, the more accommodating we can be
  - January 13, 2017 was the final date for study requests
- Planning team is also available by email or phone for questions or comments between the TAC meetings

# TAC #3 Recap

- Introductions and meeting expectations
- Colstrip Discussion
- Clean Power Plan and Clean Air Rule
- IRP Modeling Overview
- Cost of Carbon
- Avista's Power Planner Simulator

# Today's Agenda

- 9:00 – Introduction and TAC 3 Recap, Lyons
- 9:15 – Resource Needs Assessment, Gall
- 9:45 – Natural Gas Price Forecast, Pardee
- 10:45 – Break
- 11:00 – Electric Price Forecast, Gall
- 12:00 – Lunch
- 1:00 – Transmission Planning, Maguire
- 2:00 – Break
- 2:15 – Market and Portfolio Scenario Development, Lyons
- 3:00 – Adjourn



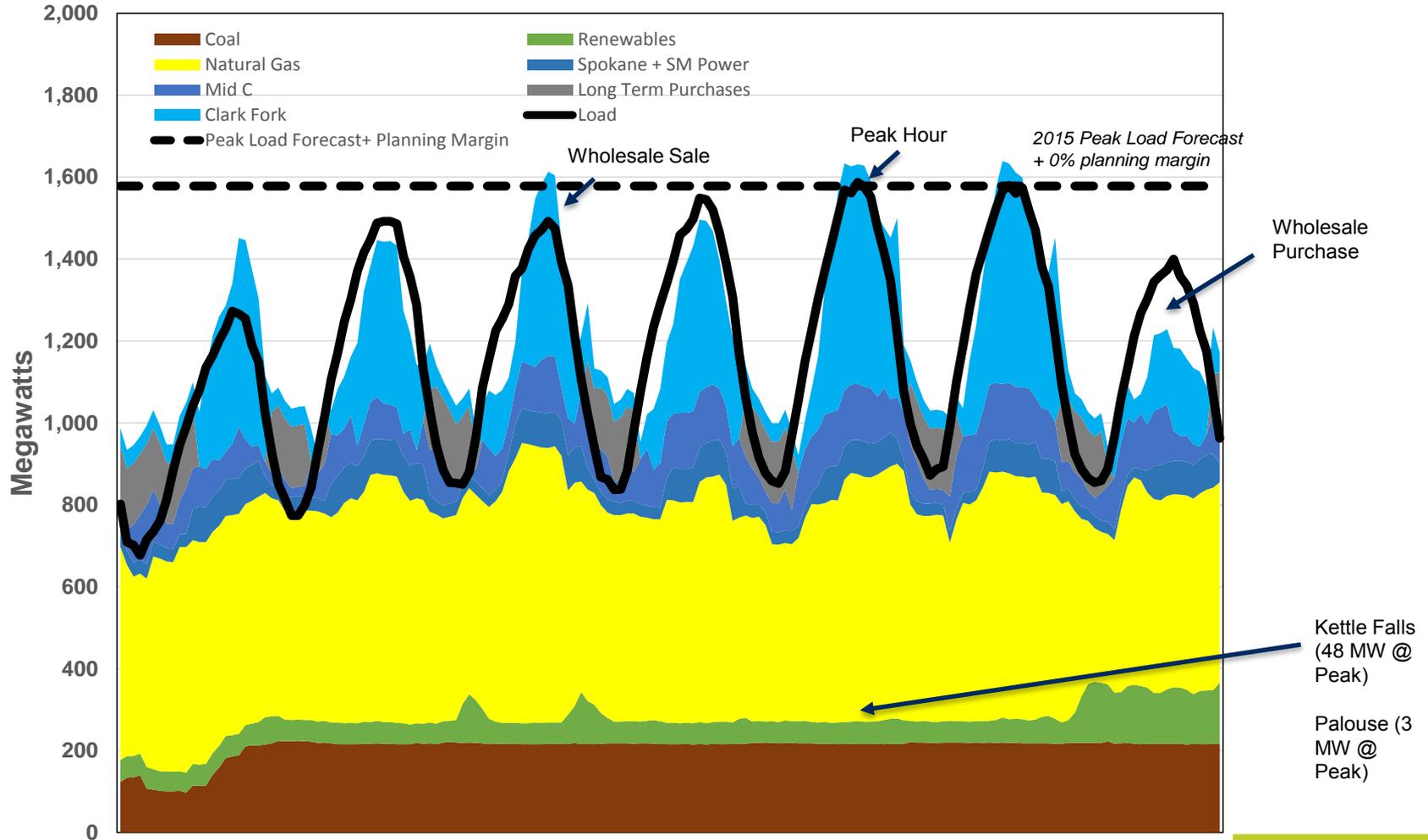
# Resource Need Assessment

James Gall  
Fourth Technical Advisory Committee Meeting  
February 15, 2017

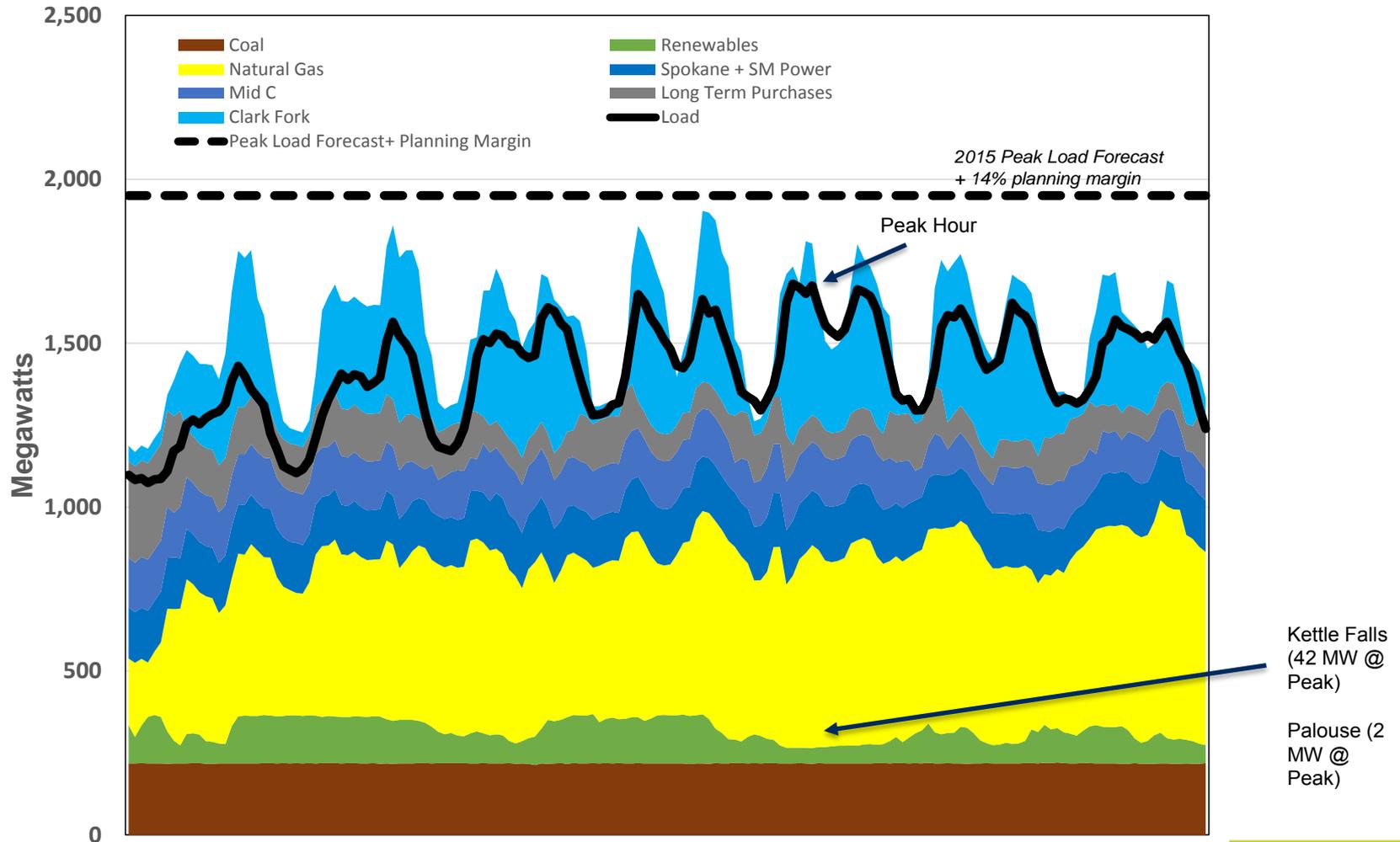
# Agenda

- Review of 2016/17 Peak Days
- Latest NW Power Council Adequacy Study
- Peak Load Forecast Update
- 2017 IRP Load & Resource Balance
- WA State Energy Independence Act Renewable Requirement Forecast

# July 24-31, 2016



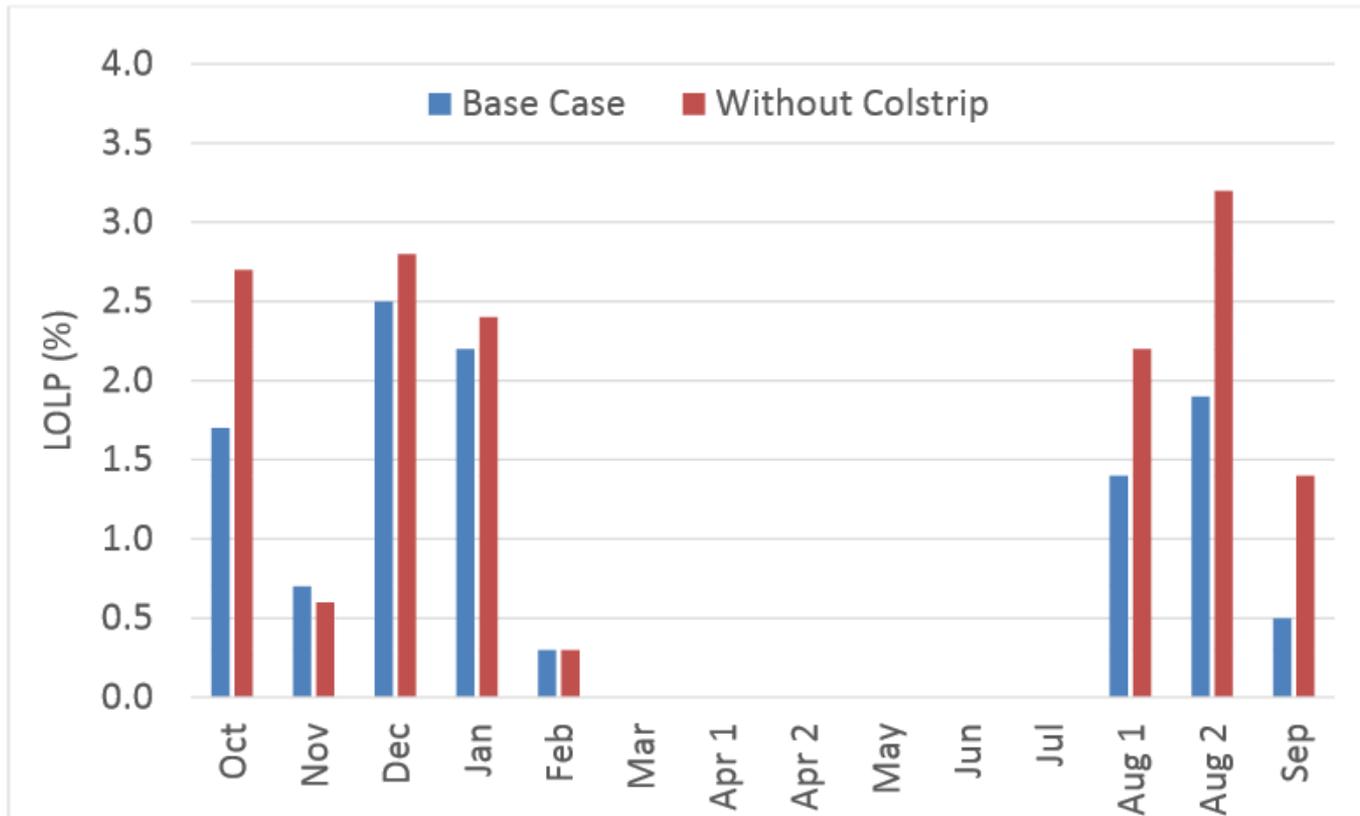
# January 1-7, 2017



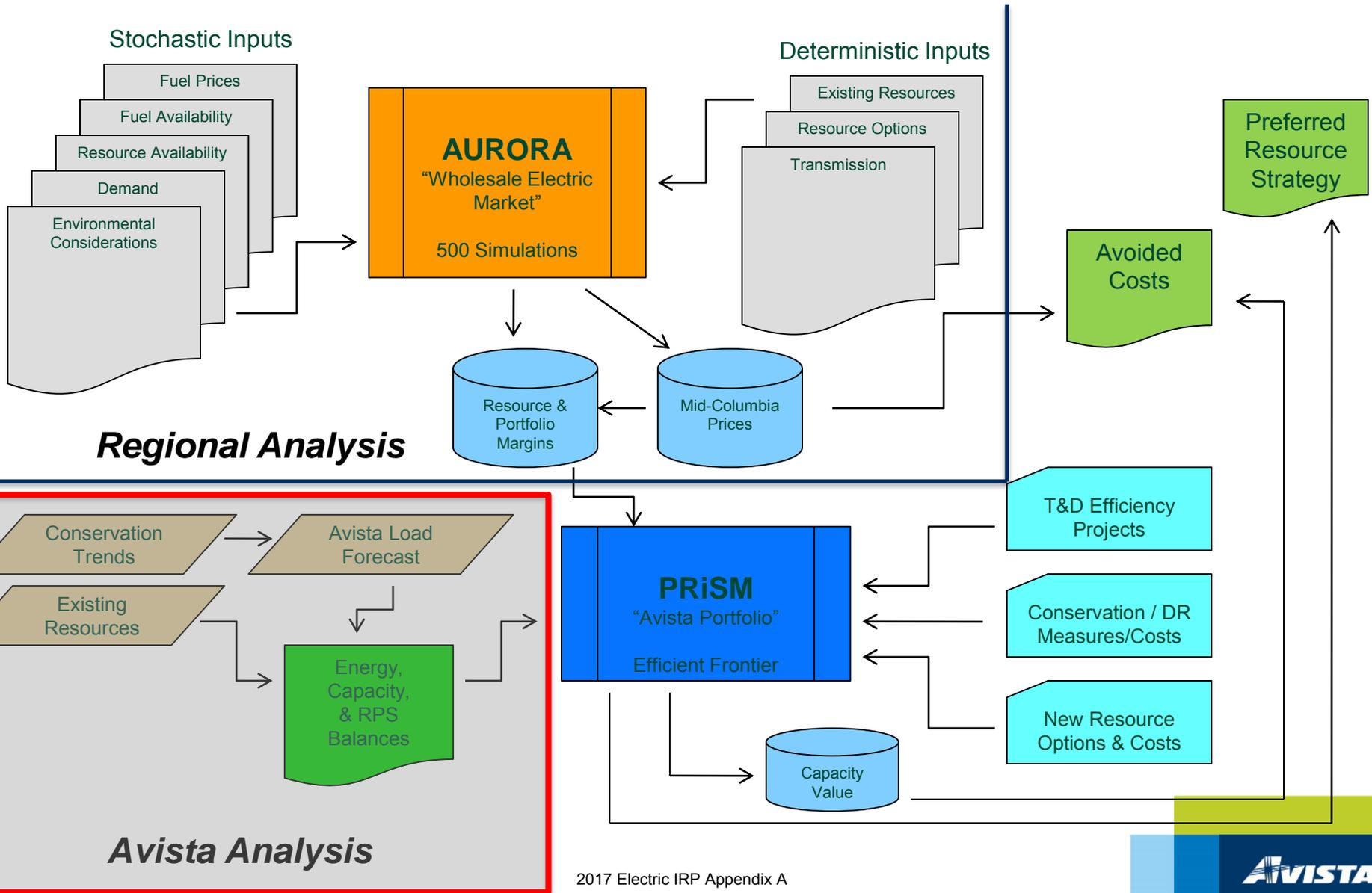
# Latest Regional Analysis From NPCC (2021)

230

Figure 1: LOLP by Month



# 2017 IRP Modeling Process



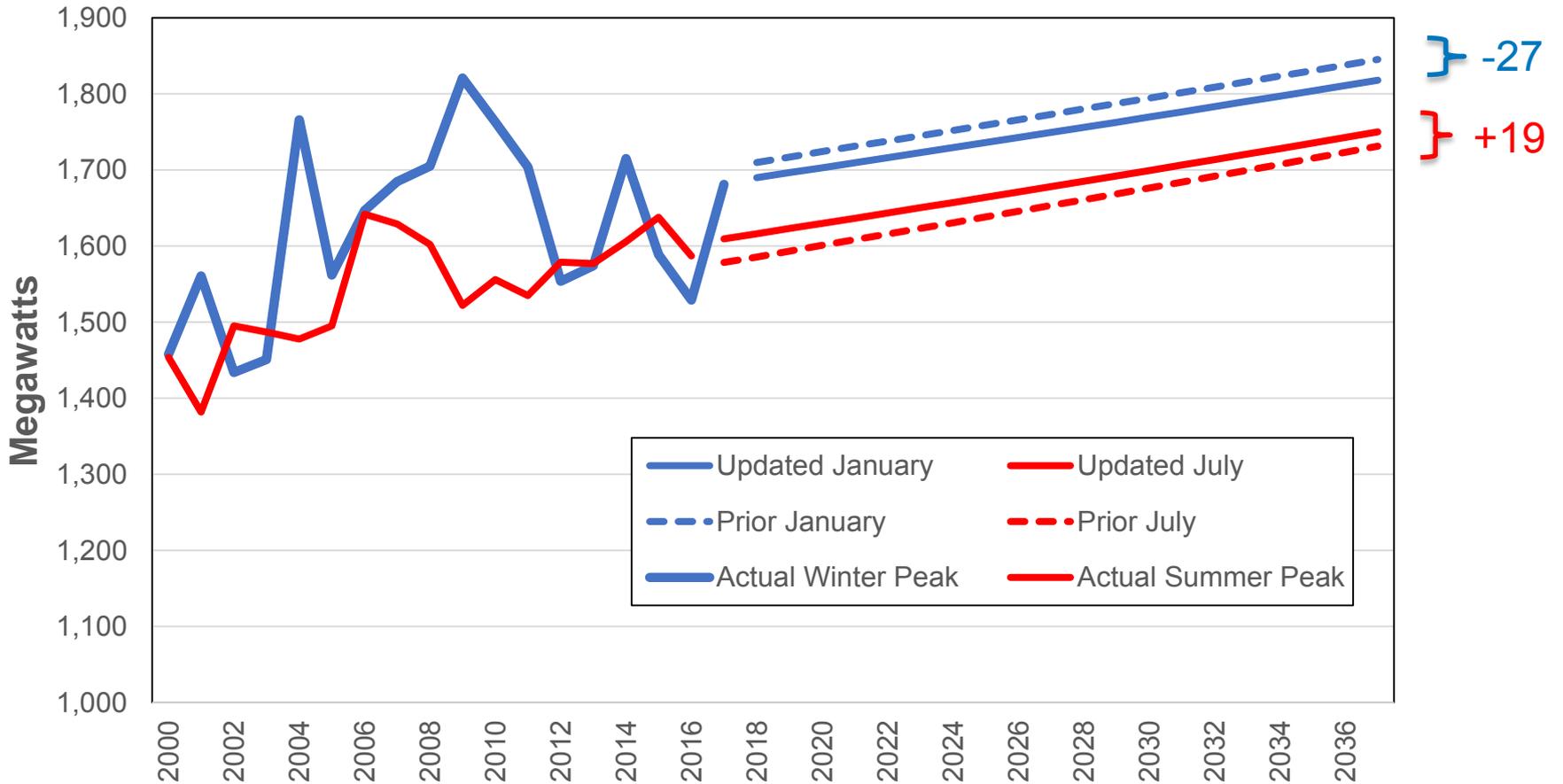
# Load & Resource Methodology Review

- Sum resource capabilities against loads
- Capacity
  - Planning Margin (14% Winter, 7% Summer)
  - Operating Reserves and Regulation (~8%)
  - Reduced by planned outages for maintenance
  - Plant to largest deficit months between 1- and 18-hour analyses
- Energy
  - Reduced by planned and forced outages
  - Maximum *potential* thermal generation over the year
  - 80-year hydro average, adjusted down to 10<sup>th</sup> percentile

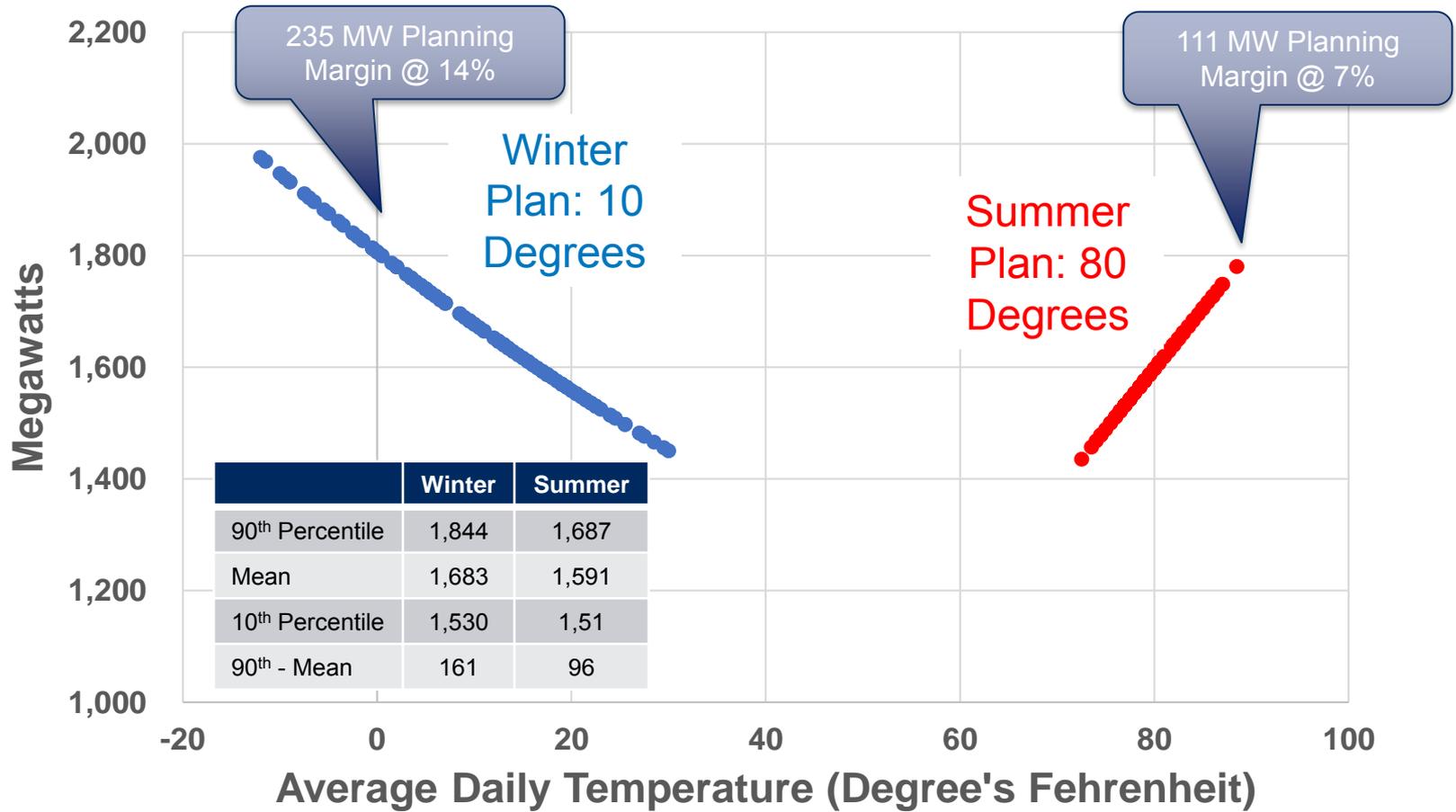
# Peak Load Forecast Update

- 2016/2017 Winter
  - Peak load forecast updated to include this winter's peak load data
  - 2016/17 peak load was lower than previous forecast
    - Given the lack of cold events in 2015-16, the 2016/17 forecast assumed higher loads than actual results
- Growth rates
  - Given the additional load data points to the econometric model, the new forecast expects lower peak in the winter and slightly higher peak loads in summer
  - Peak forecast will be revised next IRP to see if these trends continue

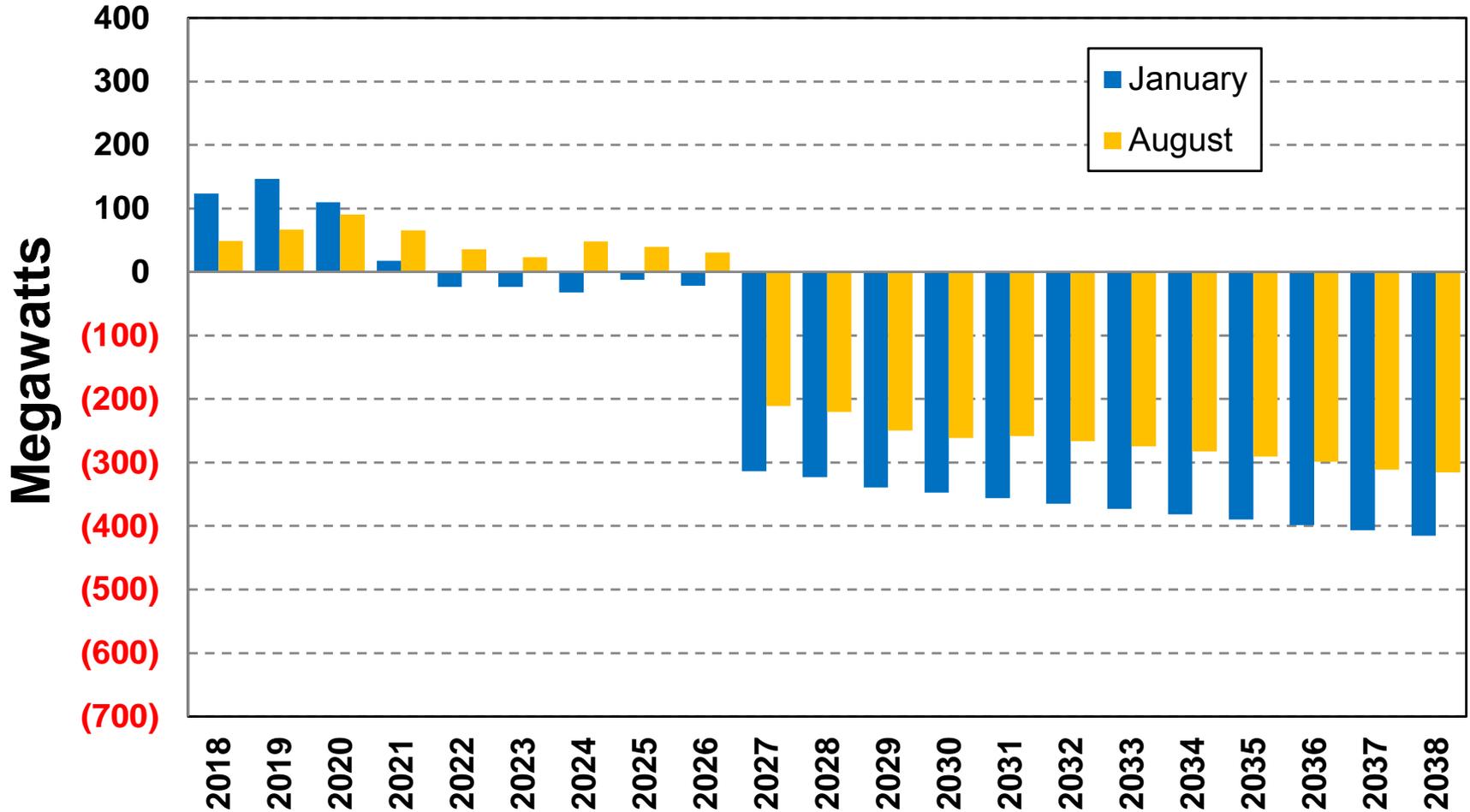
# Peak Load Forecast Change



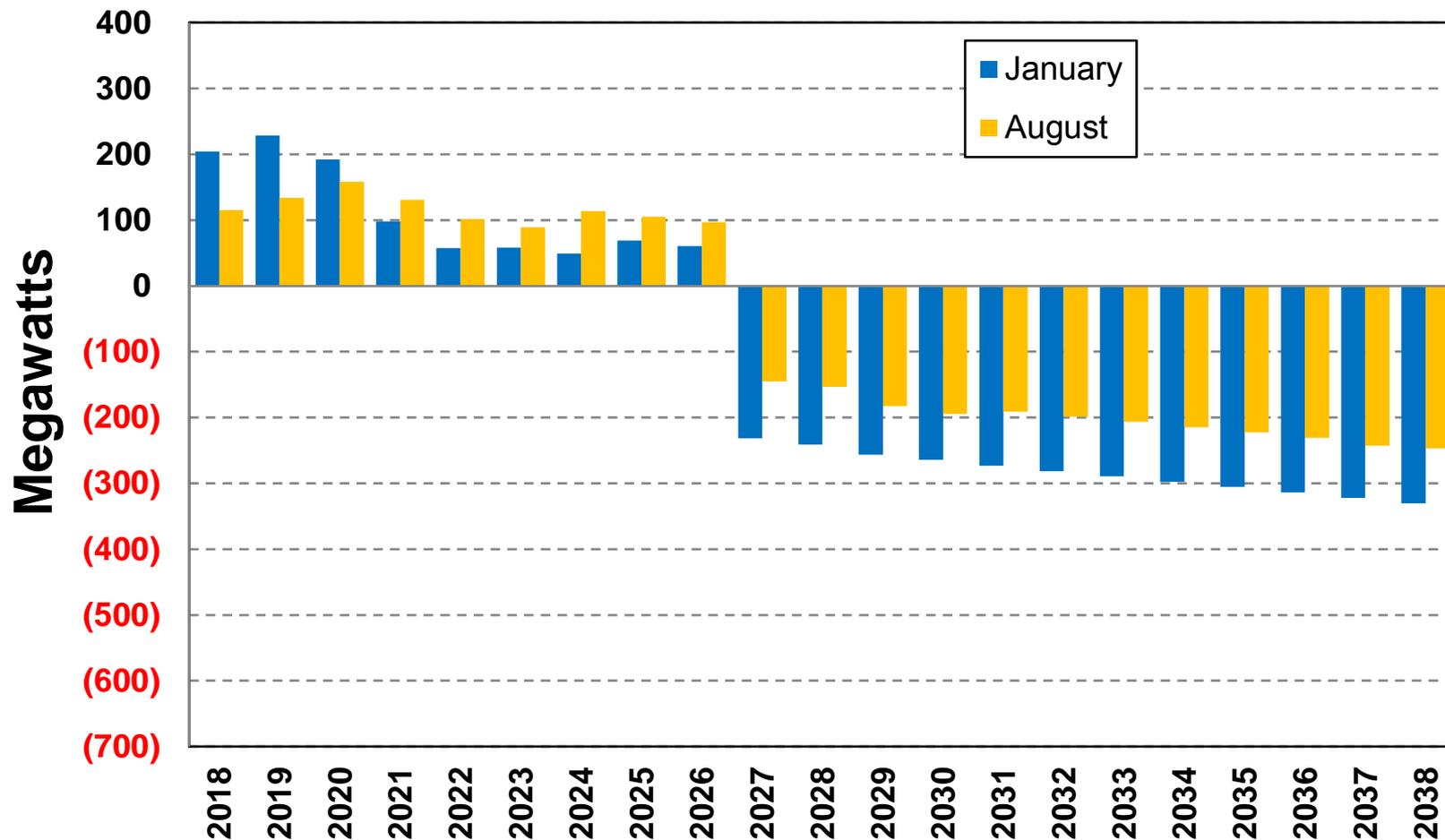
# Load Variability (Temperature Variation)



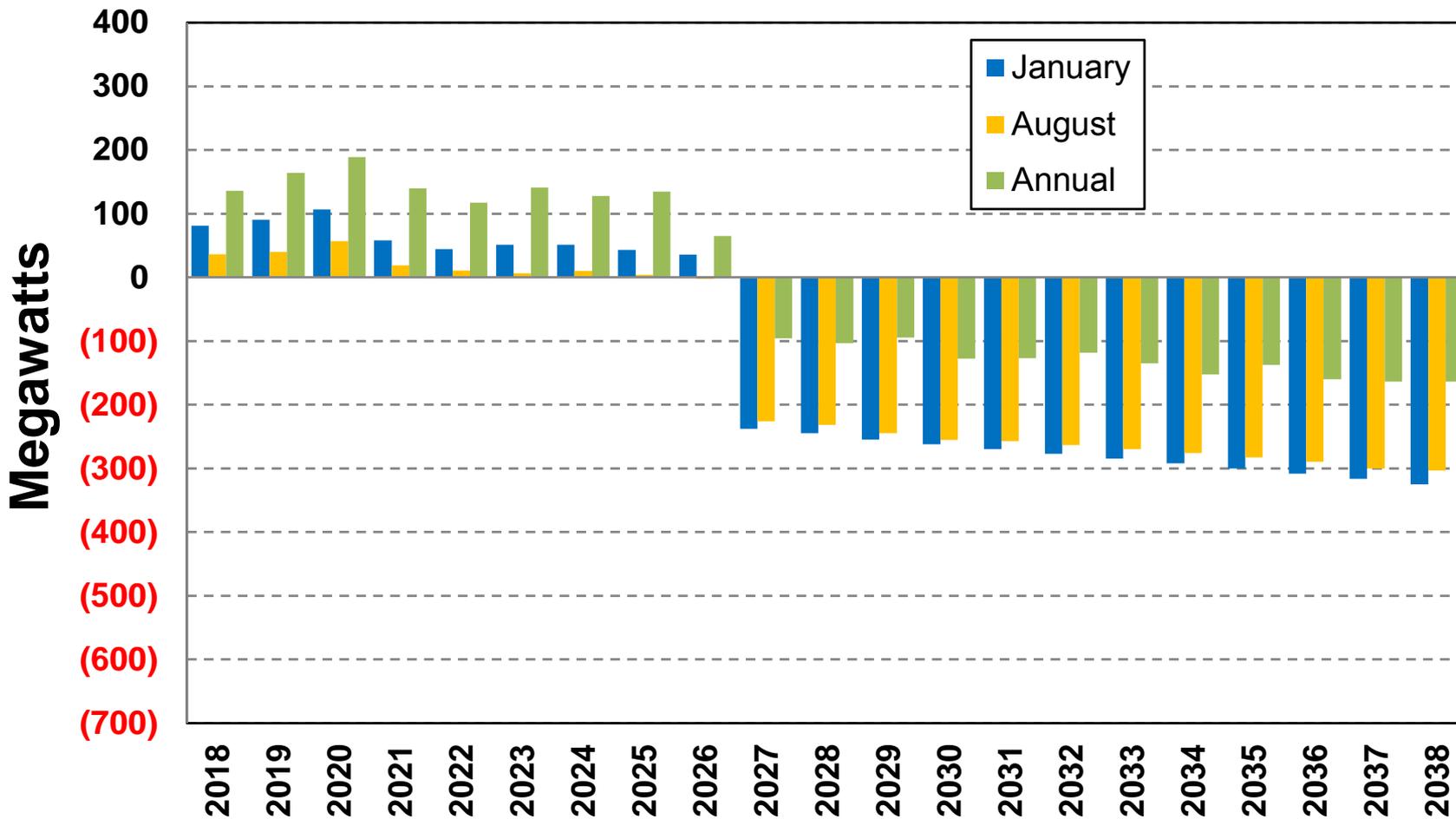
# One Hour Peak L&R



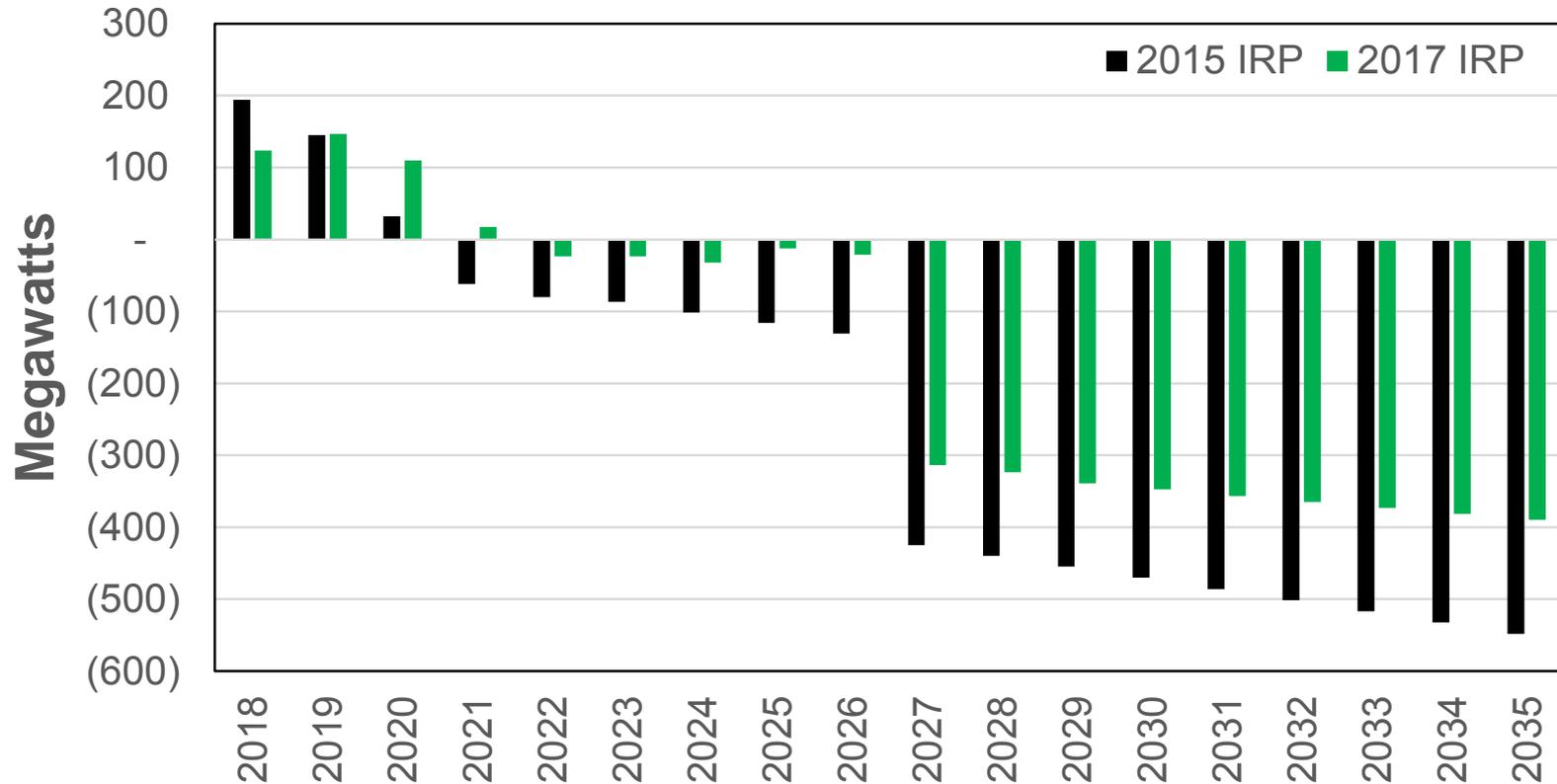
# 18 Hour Sustained Peak L&R



# Energy L&R



# 2017 Winter Peak L&R vs 2015 IRP

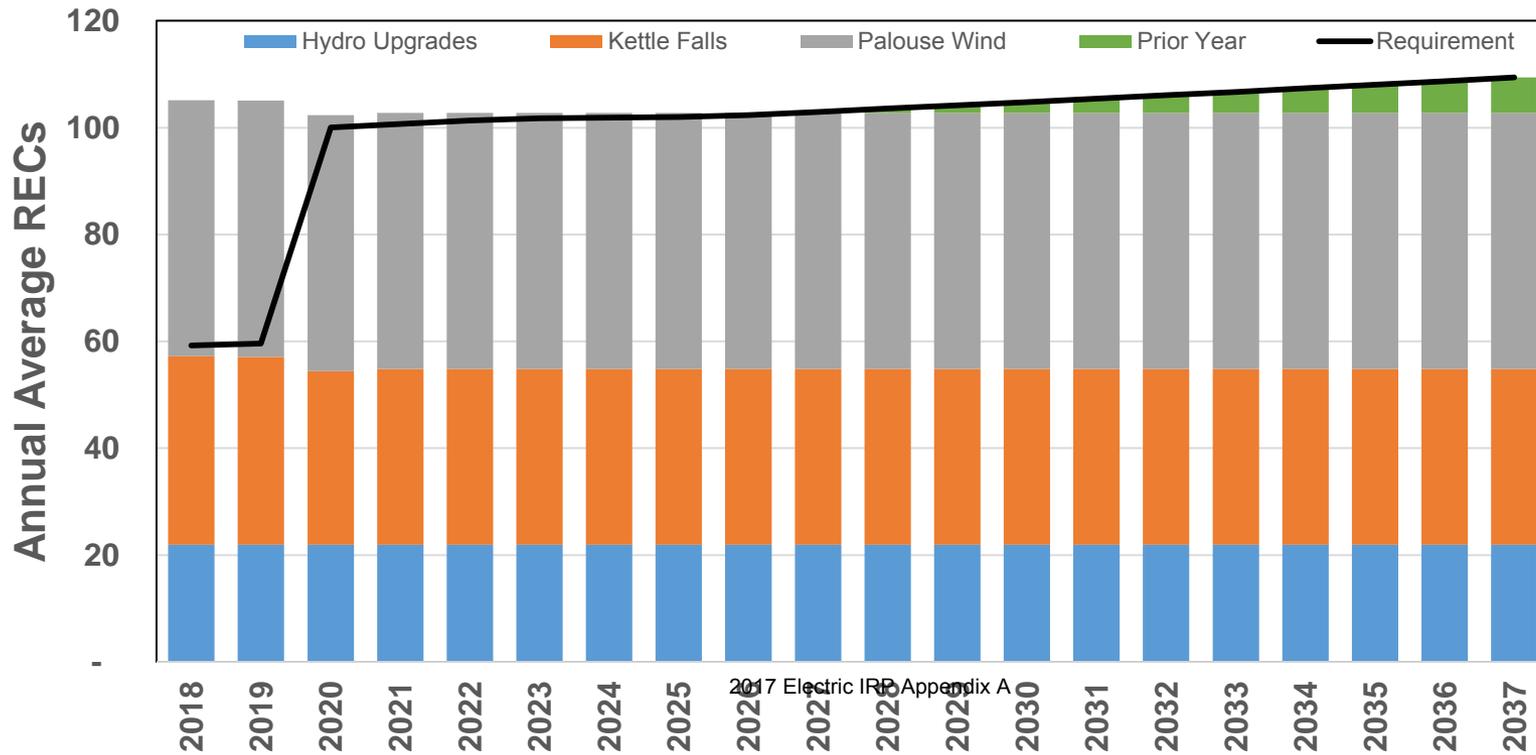


## Significant changes since last IRP

- CCCT upgrade/adjustments: + 9.5 MW
- Mid-C contract extension: +7 to 18 MW
- Load reduction w/ planning margin: -41 to -166 MW

# Renewable Portfolio Standards

- 9% of Washington retail load until 2019
- 15% of Washington retail load after 2020
- Qualifying resources less any forward sales obligations
- Banking provisions help smooth out year-to-year variation
- Palouse Wind @ 40 aMW; Kettle Falls @ 33 aMW



2017 Electric IRP Appendix A





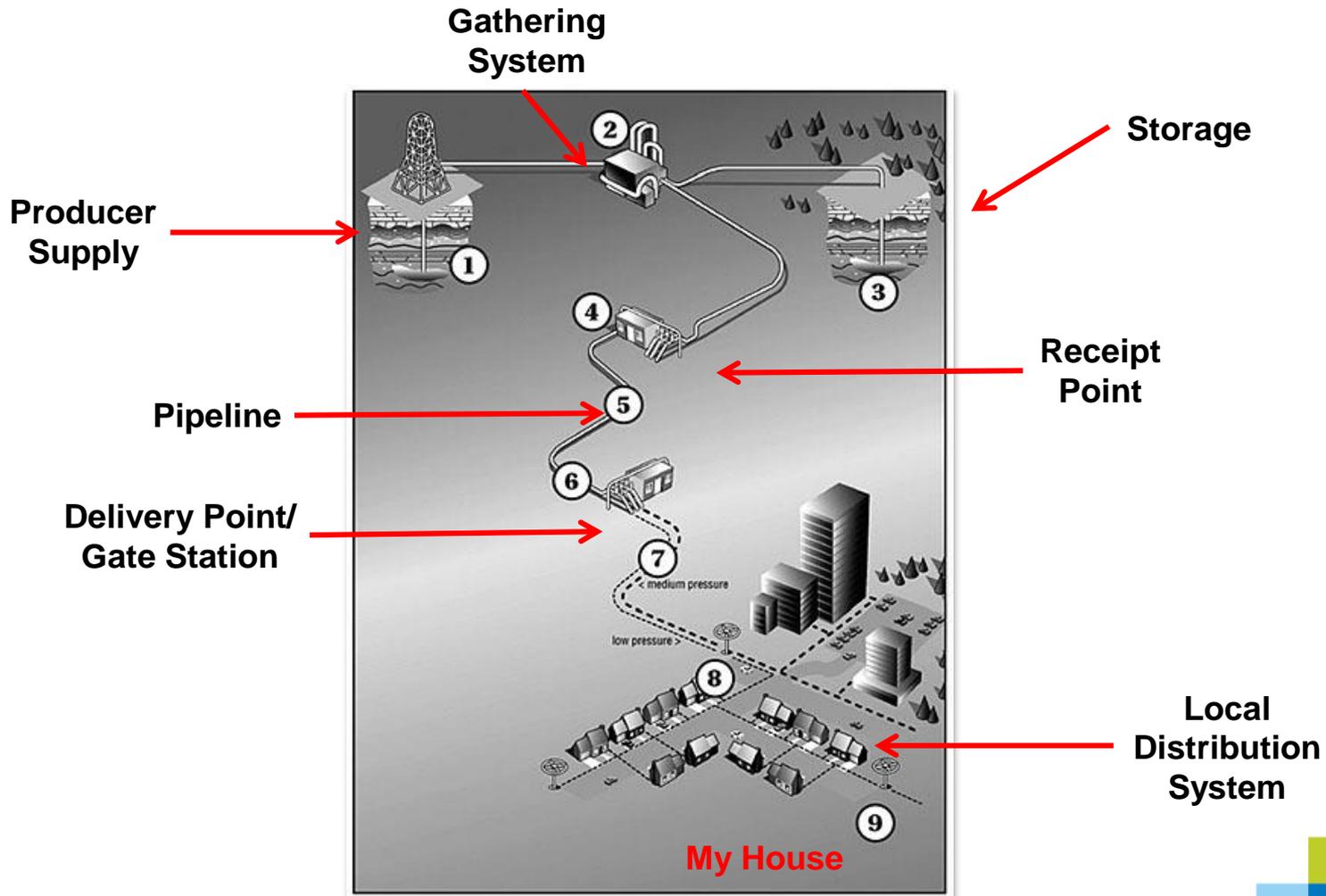
# Avista Electric IRP Natural Gas Price Forecast

Tom Pardee, Natural Gas Planning Manager  
Fourth Technical Advisory Committee Meeting  
February 15, 2017

# Agenda

- Supply and Infrastructure
- Natural Gas Price Fundamentals
- Methane Emissions

# The Natural Gas System



# Pacific Northwest Supply and Infrastructure

## SUPPLY

- ▶ **AECO**  
Canadian gas coming out of Alberta, Canada
- ▶ **Rockies**  
U.S. domestic gas coming from Wyoming and Colorado
- ▶ **Sumas**  
Canadian gas coming out of British Columbia, Canada
- ▶ **Malin**  
South central at the Oregon and California border
- ▶ **Stanfield**  
Intersection of two major pipelines in North Central Oregon

## PIPELINES

- ▶ **Williams Northwest Pipeline**
- ▶ **TransCanada Gas Transmission Northwest**
- ▶ **TransCanada Foothills**
- ▶ **TransCanada Alberta**
- ▶ **Spectra Energy**
- ▶ **Ruby Pipeline**

## STORAGE

- ▶ **Jackson Prairie Storage**
- ▶ **Mist Storage**

## Avista Natural Gas Service Areas, Gas Fields, Trading Hubs and Major Pipelines



# Types of Pipeline Contracts <sup>245</sup>

## Firm Transport

- Contractual rights to:
  - Receive
  - Transport
  - Deliver
- From point A to point B

## Interruptible Transport

- Contractual rights to:
  - Receive
  - Transport
  - Deliver
- From point A to Point B *AFTER FIRM TRANSPORT HAS BEEN SCHEDULED*

## Seasonal Transport

- Firm service available for limited periods (Nov-Mar) or for a limited amount (TF2 on NWP)

## Alternate Firm Transport

- The use of firm transport outside of the primary path
- Priority rights below firm
- Priority rights above interruptible

# Jackson Prairie Interesting Energy Comparisons

## 1.2 Bcf per day (energy equivalent)

- 10 coal trains with 100 - 50 ton cars each
- 29 - 500 MW gas-fired power plants
- 13 Hanford-sized nuclear power plants
- 2 Grand Coulee-sized hydro plants (biggest in US)

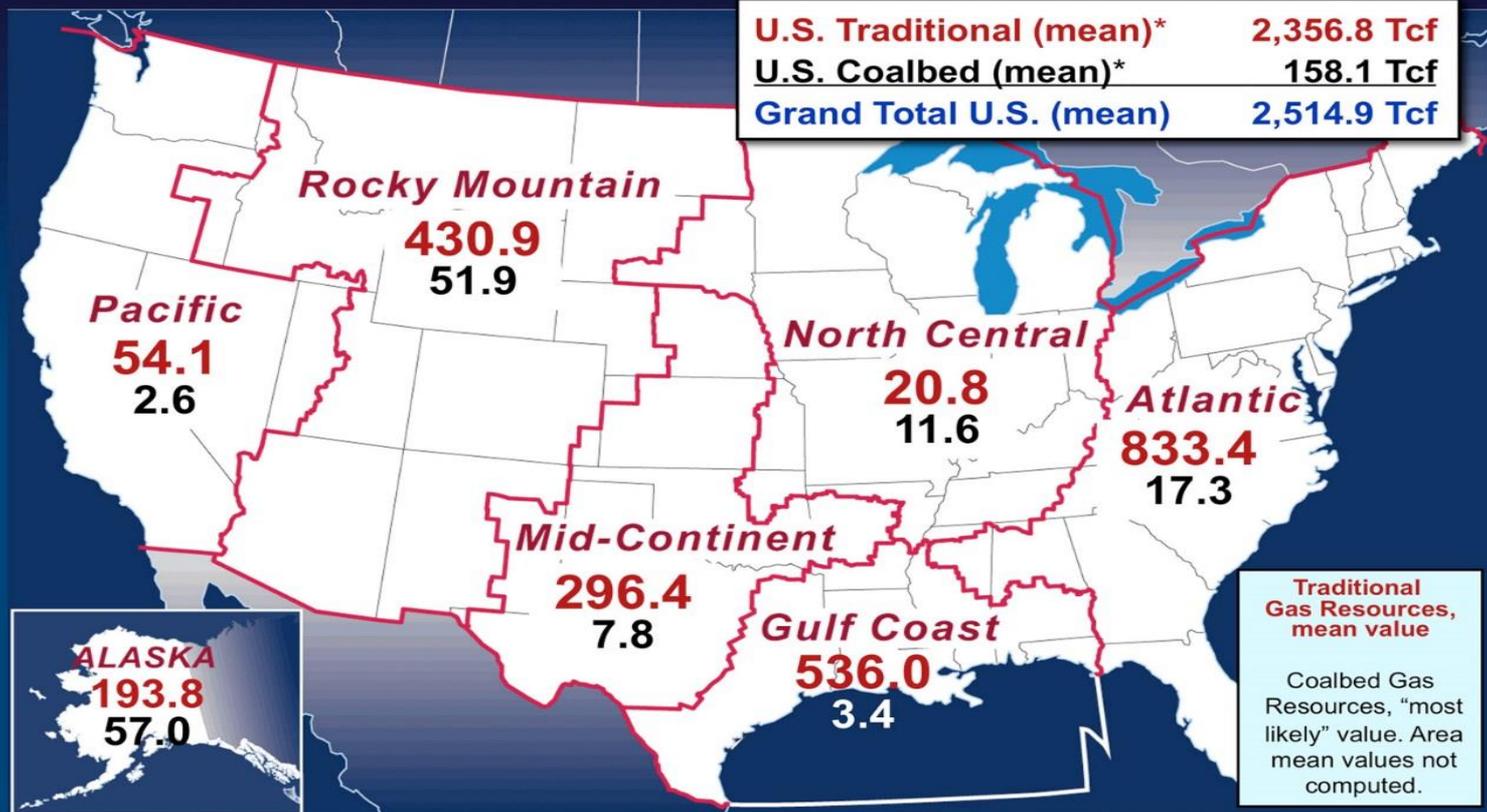
## 46 Bcf of stored gas

- 12" pipeline 11,000,000 miles long (226,000 miles to the moon)
- 1,400 Safeco Fields (Baseball Stadiums)
- Average flow of the Columbia River for 2 days
  - Cube - 3,550 feet on a side

# Natural Gas Pricing Fundamentals

# Who Estimates The Reserve Base?

## Regional Resource Assessment



Data source: Potential Gas Committee (2015)

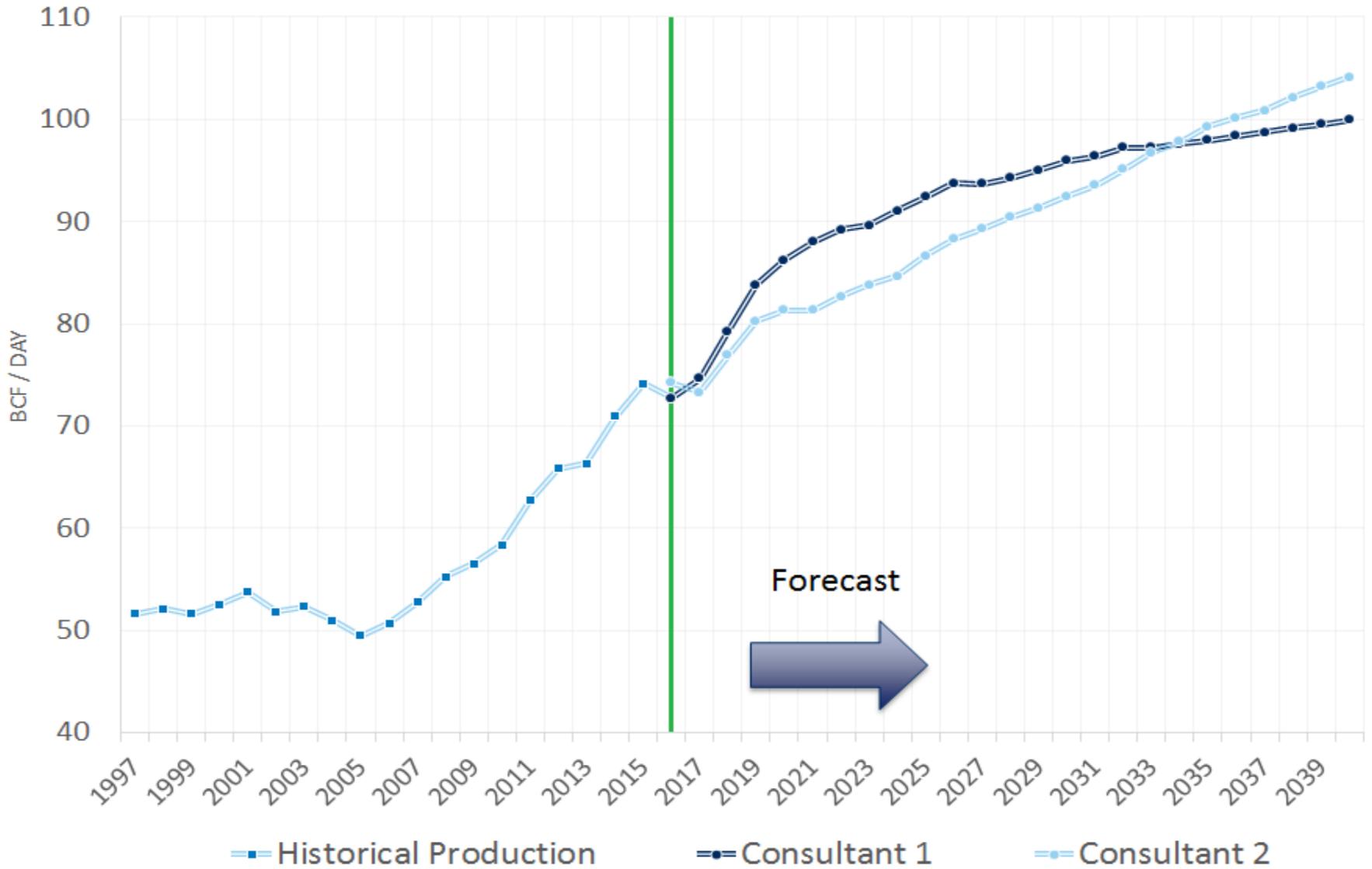
\* Separately aggregated from all province data.

Who is the Potential Gas Committee? 100 Volunteer Geoscientists & Petroleum Engineers

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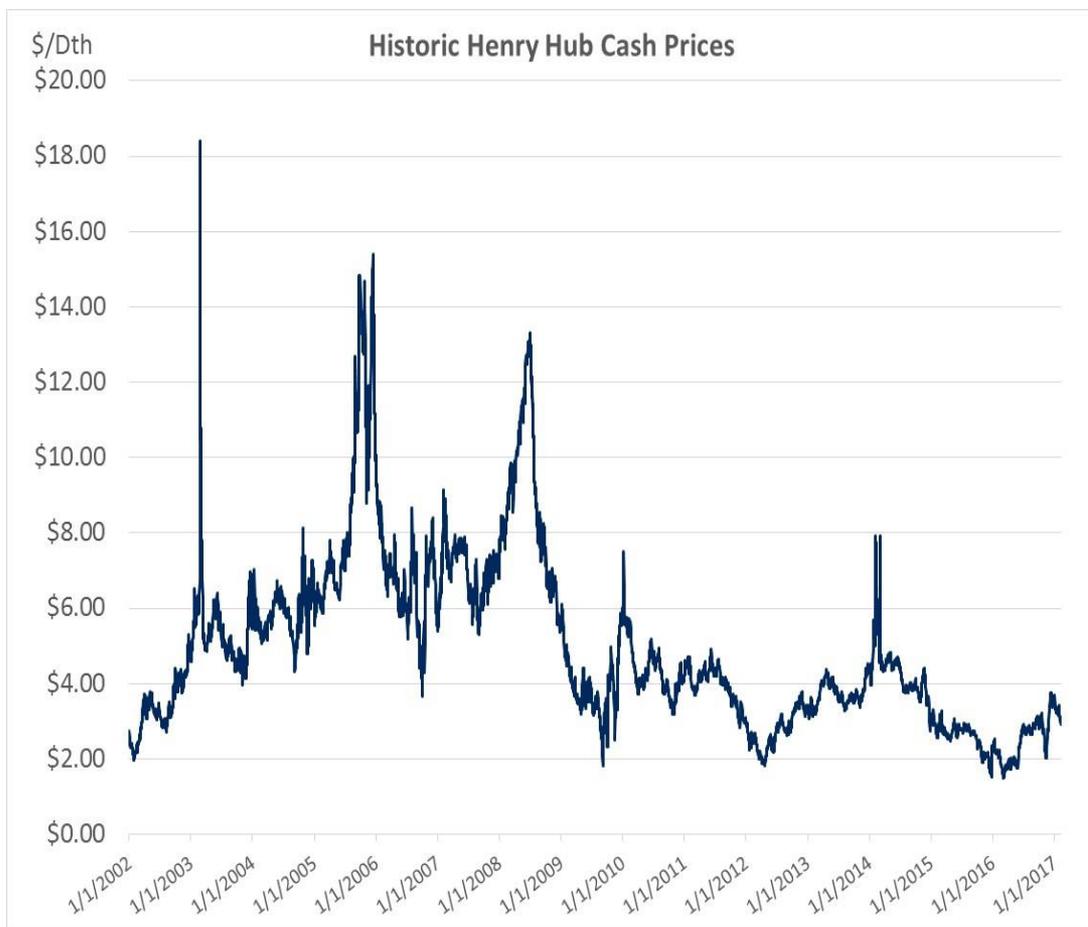
# US NATURAL GAS PRODUCTION

249



# What Drives the Natural Gas Market?

## Natural Gas Spot Prices (Henry Hub)



### ▶ Supply

- Type: Conventional vs. Non-conventional
- Location
- Cost

### ▶ Demand

- Residential/Commercial/Industrial
- Power Generation
- Natural Gas Vehicles
- Mexico Exports

### ▶ Legislation

- Environmental

### ▶ Energy Correlations

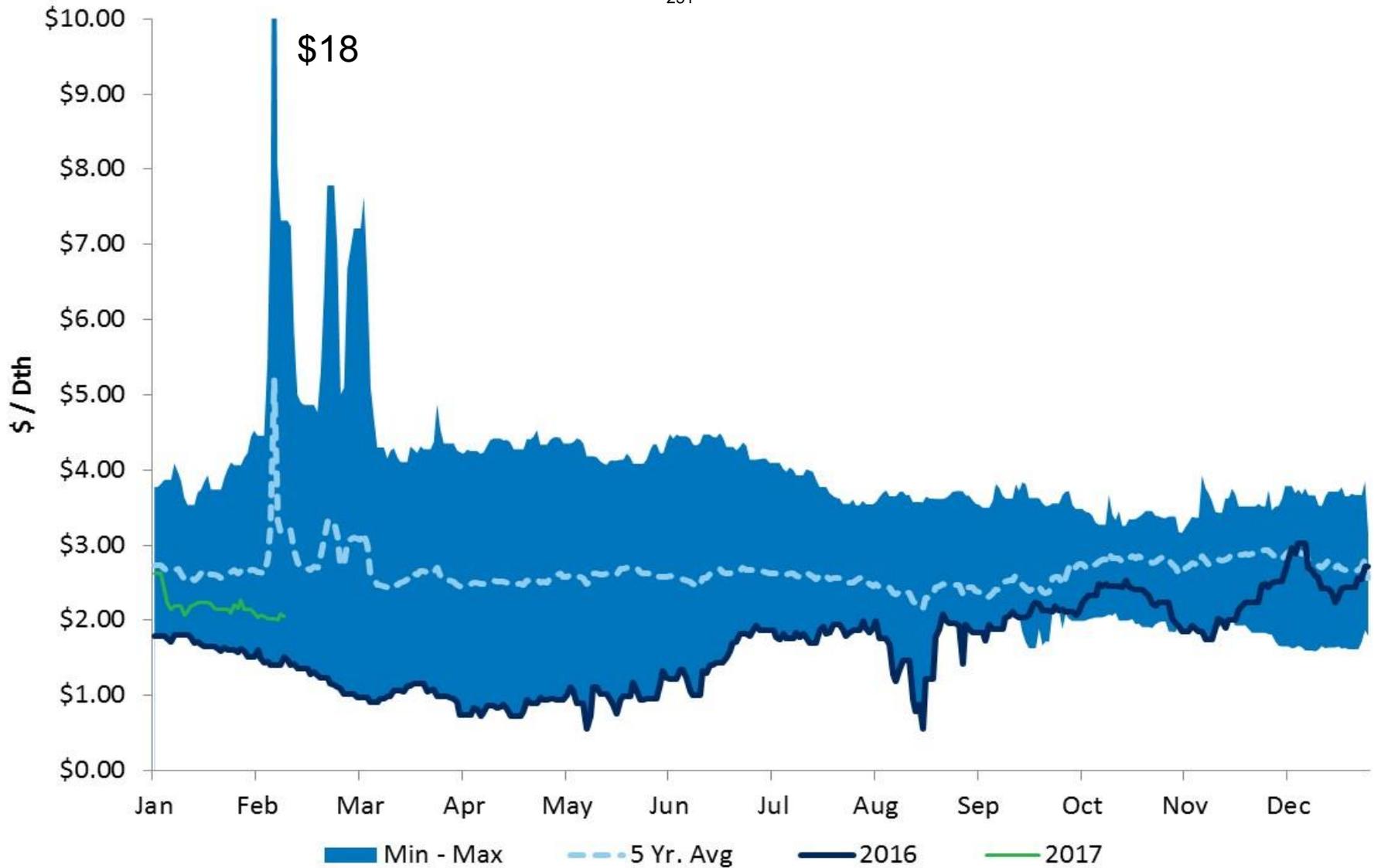
- Oil vs. Gas
- Coal vs. Gas
- Natural Gas Liquids

### ▶ Weather

### ▶ Storage

# AECO Gas Daily Prices

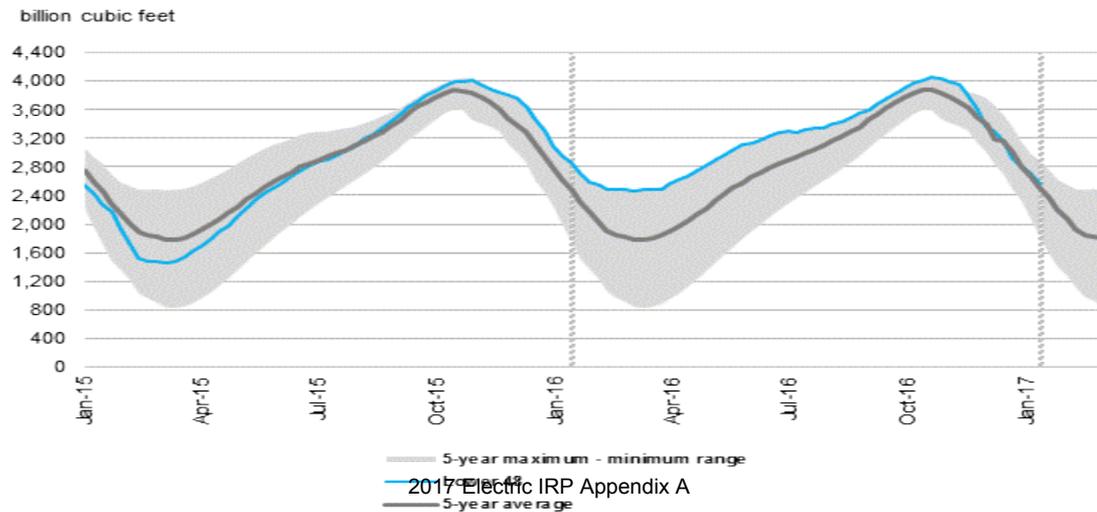
251



# US Storage

billion cubic feet (Bcf)				
Region	2/3/2017	1/27/2017	net change	implied flow
East	520	569	-49	-49
Midwest	685	730	-45	-45
Mountain	155	164	-9	-9
Pacific	208	221	-13	-8
South Central	991	1,027	-36	-36
Salt	338	340	-2	-2
Nonsalt	654	687	-33	-33
<b>Total</b>	<b>2,559</b>	<b>2,711</b>	<b>-152</b>	<b>-147</b>

Working gas in underground storage compared with the 5-year maximum and minimum



Source: U. S. Energy Information Administration

# The Short Term Fundamentals

## Bulls

- Historically low rig counts
- LNG & Methanol Plants
- Weather – Normal is now bullish
- Power Demand
- Mexican exports
- Dropping production

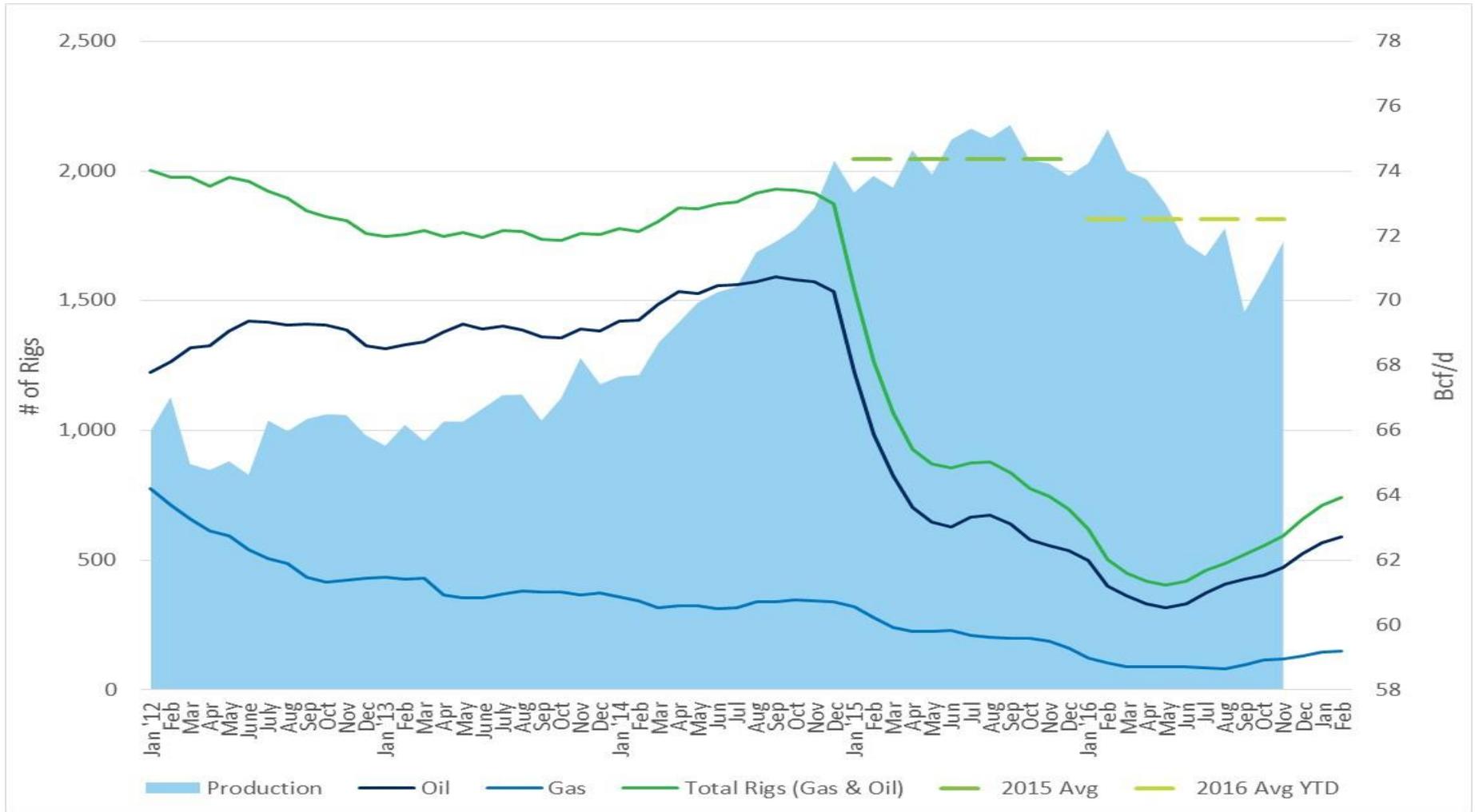


## Bears

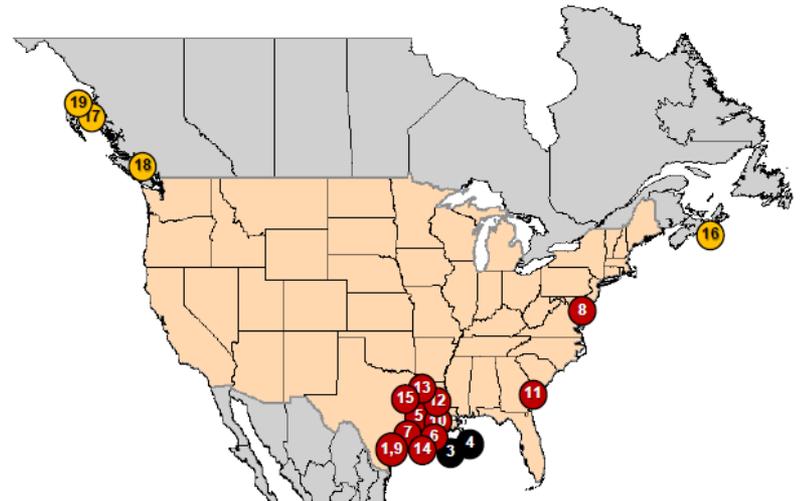
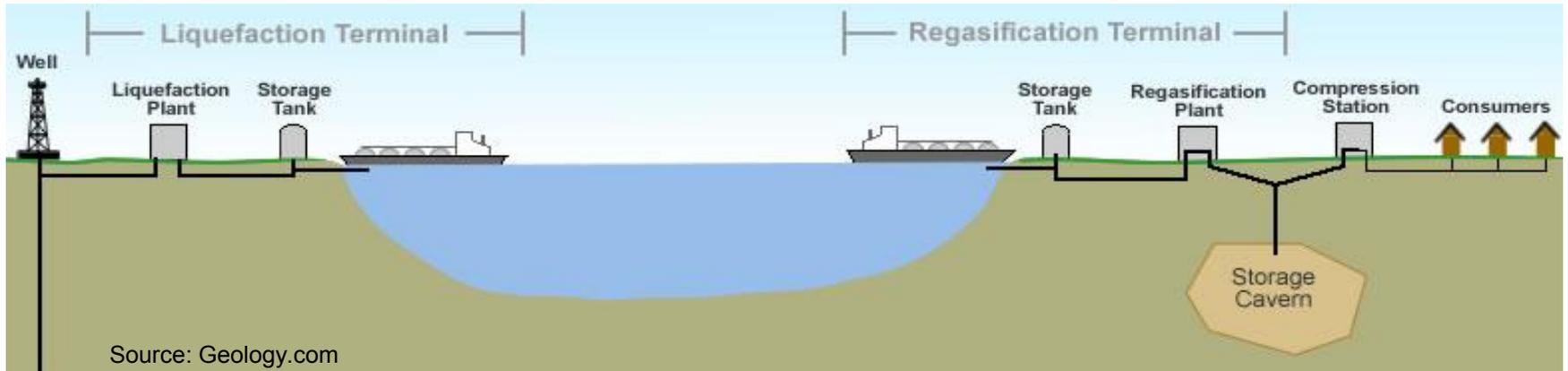
- Production is easy to bring on quickly
- Increased drilling efficiency
- DUC Wells
- Reduced demand for power burn



# Link Between Rig Counts and Production



# LNG



Source: Federal Energy Regulatory Commission  
As of January 5, 2017

Sabine Pass can process over 3.5 Bcf / Day

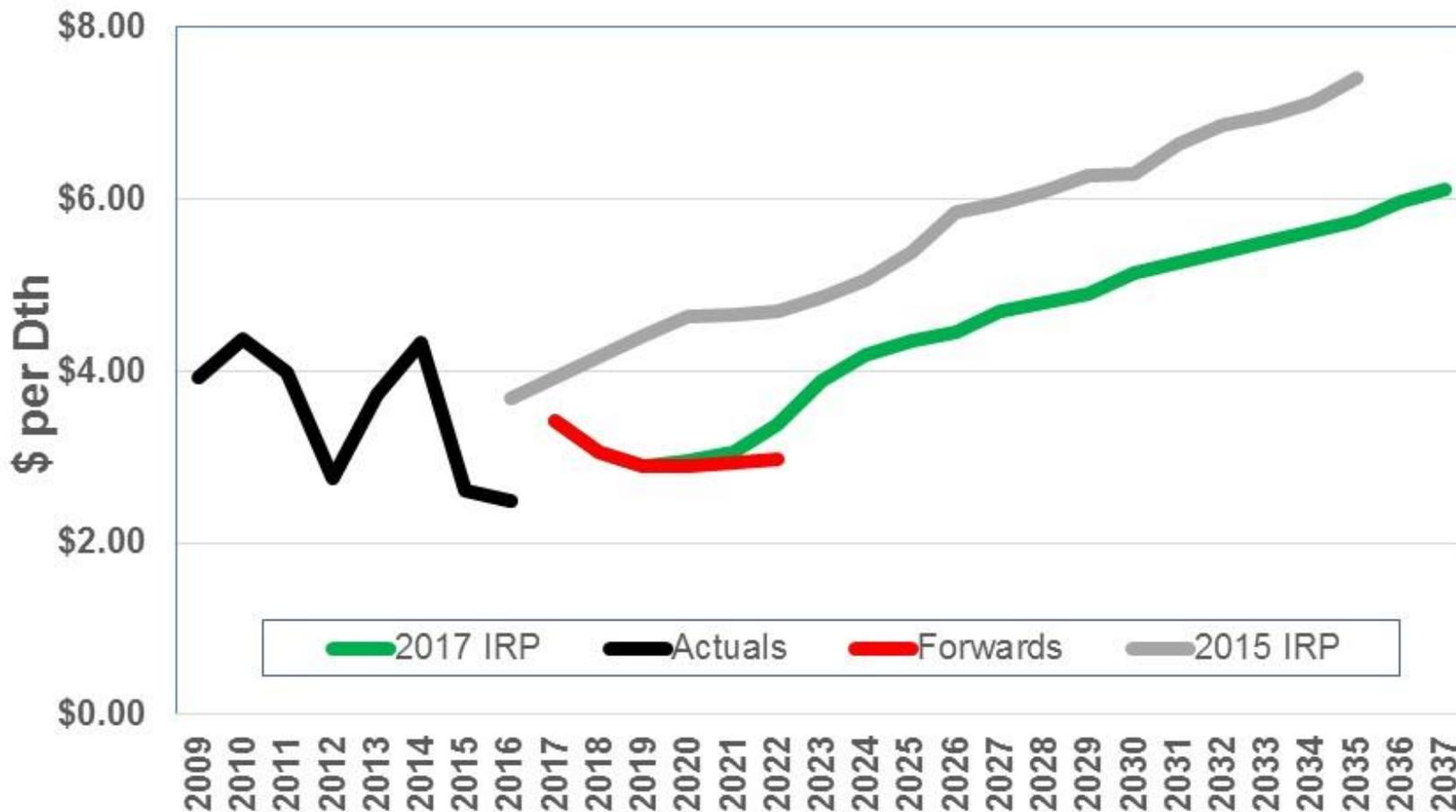
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# IRP Natural Gas Price Forecast Methodology

1. One fundamental forecast (Consultant #1)
2. Forward prices
3. Year 1 - forward price only
4. Year 2 – forward price only
5. Year 3 - 75% forward price / 25% consultant forecast
6. Year 4 - 50% forward price / 50% consultant forecast
7. Year 5 - 25% forward price / 75% consultant forecast
8. Year 6+ - 100% Consultant forecast

# Forecasted Levelized Price



# Methane Emissions

# EPA and Methane

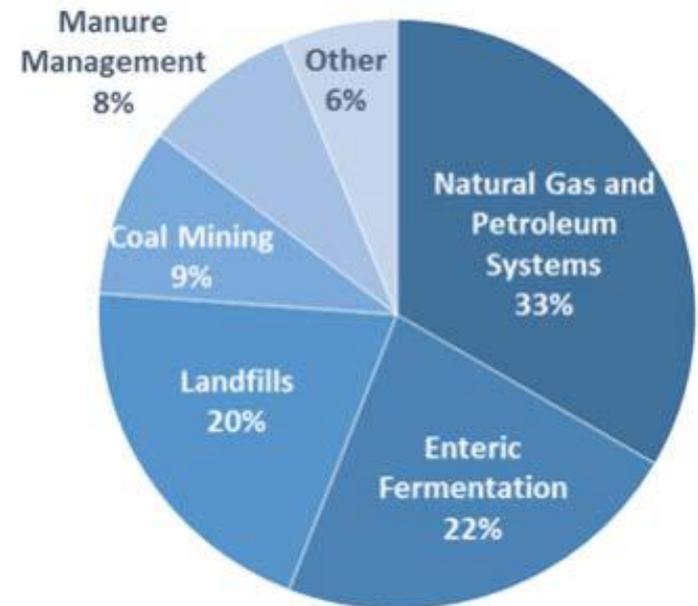


- Methane's lifetime in the atmosphere is much shorter than carbon dioxide (CO<sub>2</sub>), but methane (CH<sub>4</sub>) is more efficient at trapping radiation than CO<sub>2</sub>. Pound for pound, the comparative impact of CH<sub>4</sub> on climate change is more than 25 times greater than CO<sub>2</sub> over a 100-year period.
- Methane is also emitted from a number of natural sources. Wetlands are the largest source, emitting CH<sub>4</sub> from bacteria that decompose organic materials in the absence of oxygen. Smaller sources include termites, oceans, sediments, volcanoes, and wildfires.

# Methane

- Methane is a **potent greenhouse gas** with a global warming potential more than 25 times greater than that of CO<sub>2</sub>.
- Methane is the **second most prevalent greenhouse gas emitted** in the US from human activities, and approximately one-third of those emissions come from oil production and the production, transmission and distribution of natural gas.
- Methane from the oil and gas industry comes **packaged with other pollutants**: volatile organic compounds (VOCs), which are a key ingredient in ground-level ozone (smog); and a number of pollutants known as “air toxics” –in particular, benzene, toluene, ethylbenzene and xylene.

U.S. Methane Emissions, By Source



Note: All emission estimates from the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014*.

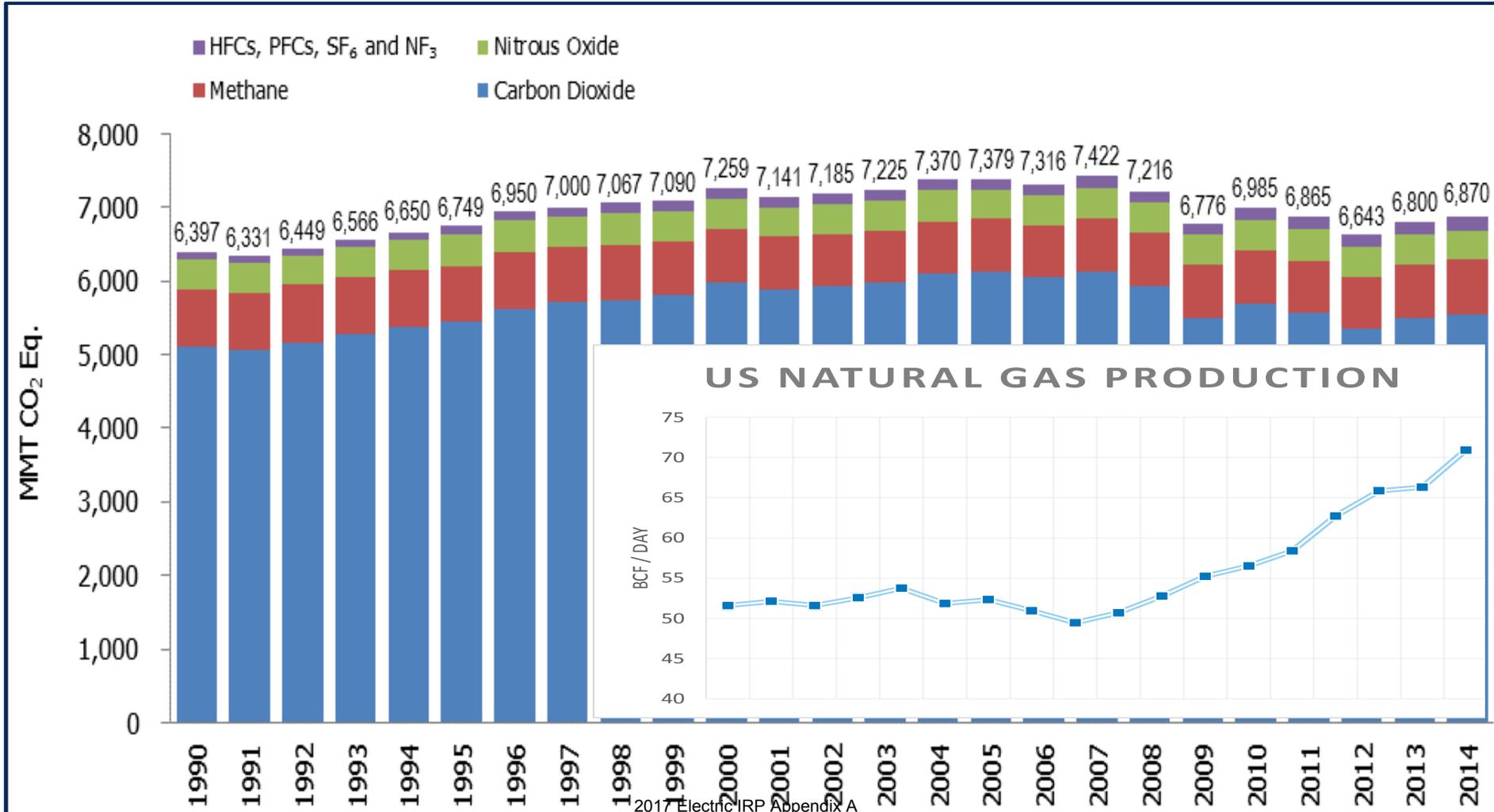
# Emissions and Trends

- Methane (CH<sub>4</sub>) emissions in the United States decreased by 6 percent between 1990 and 2014. During this time period, emissions increased from sources associated with agricultural activities, while emissions decreased from sources associated with the exploration and production of natural gas and petroleum products.

Note: All emission estimates from the [\*Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014\*](#). These estimates use a [\*global warming potential\*](#) for methane of 25, based on reporting requirements under the United Nations Framework Convention on Climate Change.

# U.S. Greenhouse Gas Emissions by Gas (MMT CO<sub>2</sub>e)

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2017 Electric IRP Appendix A

# EPA Actions to Reduce Methane and VOC Emissions from the Oil and Natural Gas Industry

On April 17, 2012, the U.S. Environmental Protection Agency (EPA) issued cost-effective regulations to reduce harmful air pollution from the oil and natural gas industry.

A key component of the final rules is expected to yield a nearly 95 percent reduction in volatile organic compounds (VOCs) emitted from more than 11,000 new hydraulically fractured gas wells each year. This significant reduction would be accomplished primarily through the use of a proven process – known as a “reduced emissions completion” or “green completion” -- to capture natural gas that currently escapes to the air.

In a green completion, special equipment separates gas and liquid hydrocarbons from the flowback that comes from the well as it is being prepared for production. The gas and hydrocarbons can then be treated and used or sold, avoiding the waste of natural resources that cannot be renewed.

## EPA Actions to Reduce Methane and VOC Emissions from the Oil and Natural Gas Industry

- 2012 New Source Performance Standards (NSPS) that will reduce methane
- volatile organic compounds (VOCs)
- toxic air emissions in the oil and natural gas industry.
- cutting methane emissions from the oil and gas sector by 40 to 45 percent from 2012 levels by 2025.
- The standards also are expected to reduce 210,000 short tons of ozone-forming VOCs in 2025, along with 3,900 tons of air toxics, such as benzene, toluene, ethylbenzene and xylene.

# EPA Actions to Reduce Methane and VOC Emissions from the Oil and Natural Gas Industry



## New Source Performance Standards

Updates to 2012 NSPS

2016 NSPS requires oil and gas industry to reduce greenhouse gas and VOC emissions, covers additional processes and equipment

- Sets emissions limits for methane
  - Owners/operators will be able to meet limits using technologies that are cost-effective and readily available
  - Types of sources subject to the 2012 NSPS for VOCs that now have to reduce methane will not have to install additional controls; the same controls reduce both
- Covers additional sources:
  - Hydraulically fractured oil wells, some of which can contain a large amount of gas along with oil
  - Pneumatic pumps at well sites and gas processing plants
  - Compressors and pneumatic controllers at transmission and storage facilities
- Requires owners/operators required to find and repair leaks
  - At well sites (twice a year) and gathering & boosting and transmission compressor stations (four times a year)

*Leaks, also known as “fugitive emissions,” can be significant sources of both methane and VOC pollution*

Source: [https://www.epa.gov/sites/production/files/2016-09/documents/epa-oilandgasactions-may2016\\_presentation.pdf](https://www.epa.gov/sites/production/files/2016-09/documents/epa-oilandgasactions-may2016_presentation.pdf)

# EPA Actions to Reduce Methane and VOC Emissions from the Oil and Natural Gas Industry



## Changes in the Final Rule

Updates to 2012 NSPS

Based on information received during the public comment period

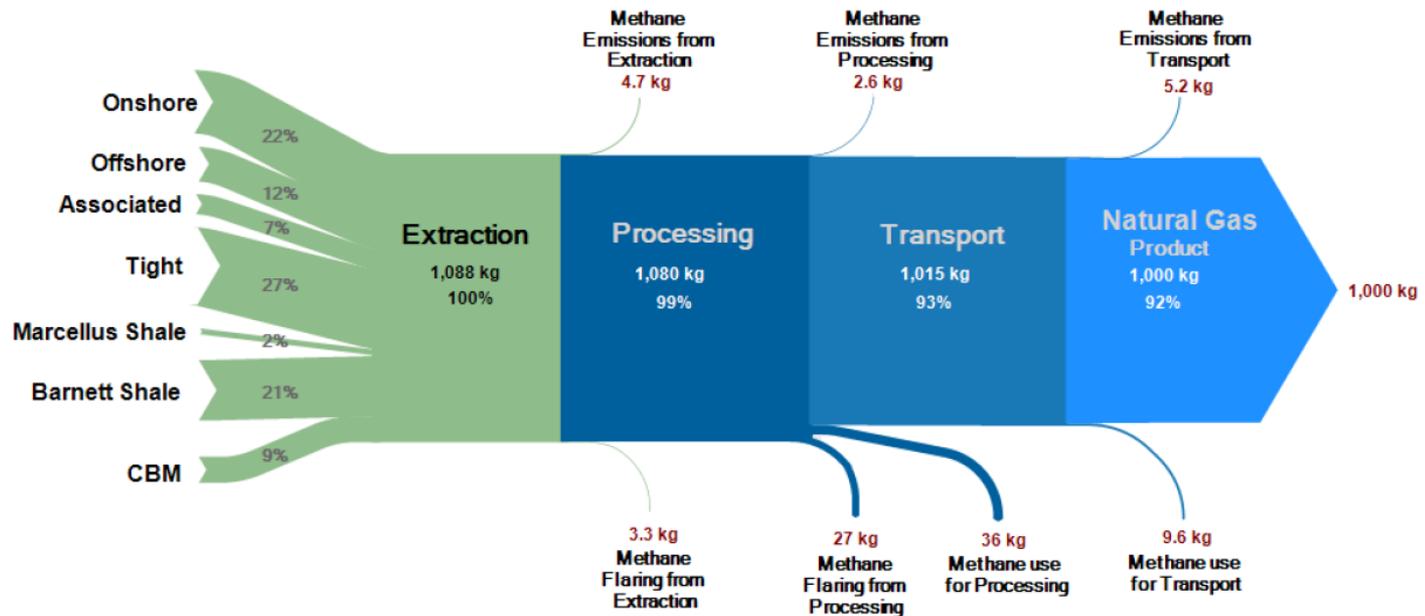
- **Sets a fixed schedule for monitoring leaks**, rather than a schedule that varies with performance
- **Allows an alternative approach for finding leaks**
  - In addition to optical gas imaging (OGI), owners/operators may use “Method 21”
- **Offers owners/operators the opportunity to use emerging, innovative technologies to monitor leaks**
  - Outlines information owners/operators must submit in seeking technology approval
- **Phases in requirements for:**
  - Green completions at hydraulically fractured oil wells (six months from publication in the Federal Register; owners/operators must use combustion until green completion requirement takes effect)
  - Conducting initial leaks monitoring survey at well sites and compressor stations (1 year after publication - applies at all sites); and
  - Reducing emissions from pneumatic pumps (six months after publication)

*EPA received more than 900,000 public comments on the proposed rule and held three public hearings.*

# US Department of Energy

Natural gas-fired electricity has 57 percent lower GHG emissions than coal per delivered megawatt-hour (MWh) using current technology.

Figure ES-2: Cradle-to-Gate Reduction in Delivered Natural Gas for 2010



Source: [https://www.netl.doe.gov/energy-analyses/temp/NaturalGasandPowerLCAModelDocumentationNC%20Report\\_052914.pdf](https://www.netl.doe.gov/energy-analyses/temp/NaturalGasandPowerLCAModelDocumentationNC%20Report_052914.pdf)

# Natural Gas STAR Program

- EPA pollution prevention
- The Natural Gas STAR Program provides a framework for partner companies with U.S. oil and gas operations to implement methane reducing technologies and practices and document their voluntary emission reduction activities. By joining the Program, partners commit to:
  - 1) evaluate their methane emission reduction opportunities,
  - 2) implement methane reduction projects where feasible,
  - 3) annually report methane emission reduction actions to the EPA.

# Questions?





# 2017 IRP Electric Market Price Forecast

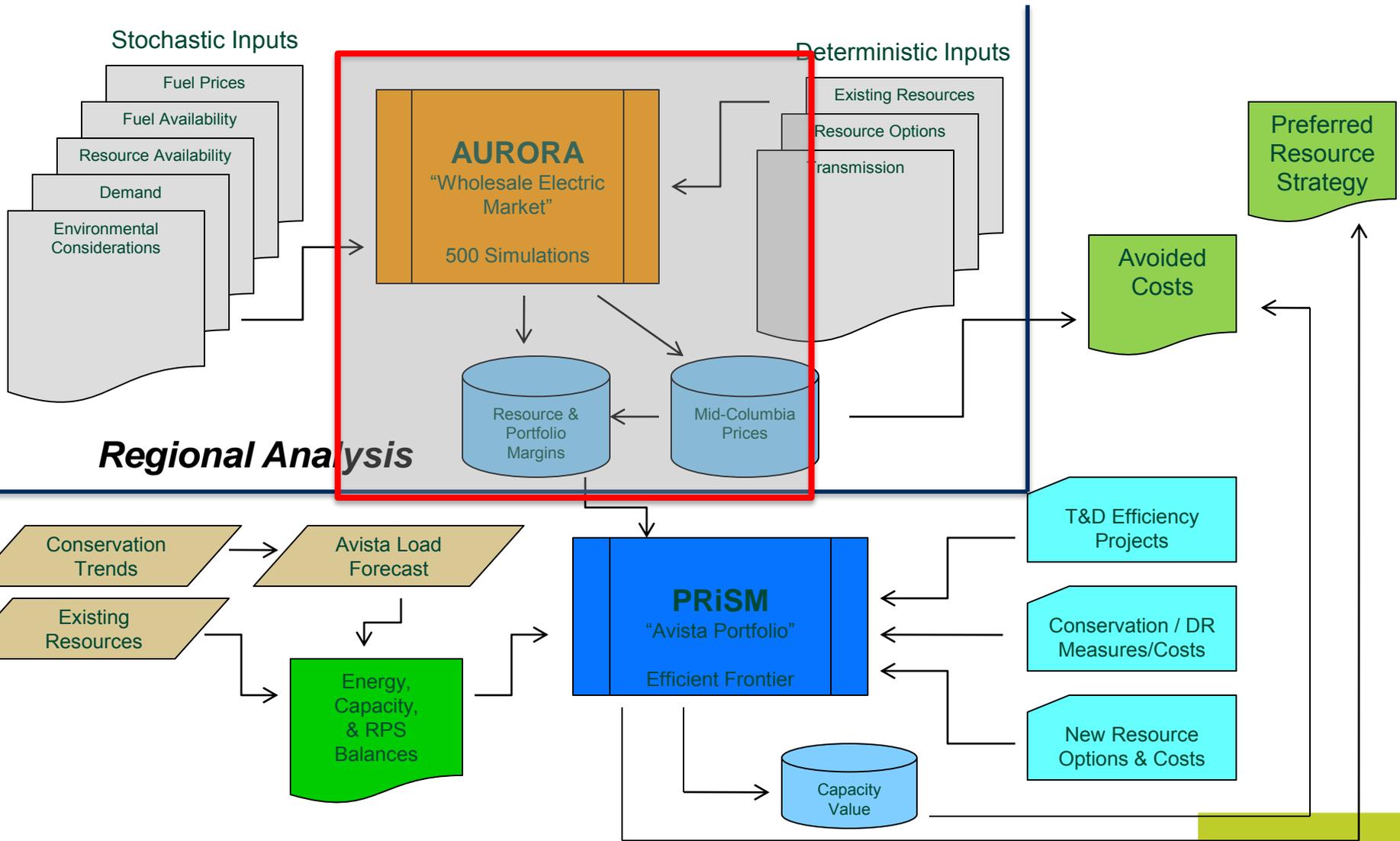
James Gall  
Fourth Technical Advisory Committee Meeting  
February 15, 2017

# Agenda

- Energy Market Review
- Electric Price Forecast Methodology
- Electric Price Forecast Results

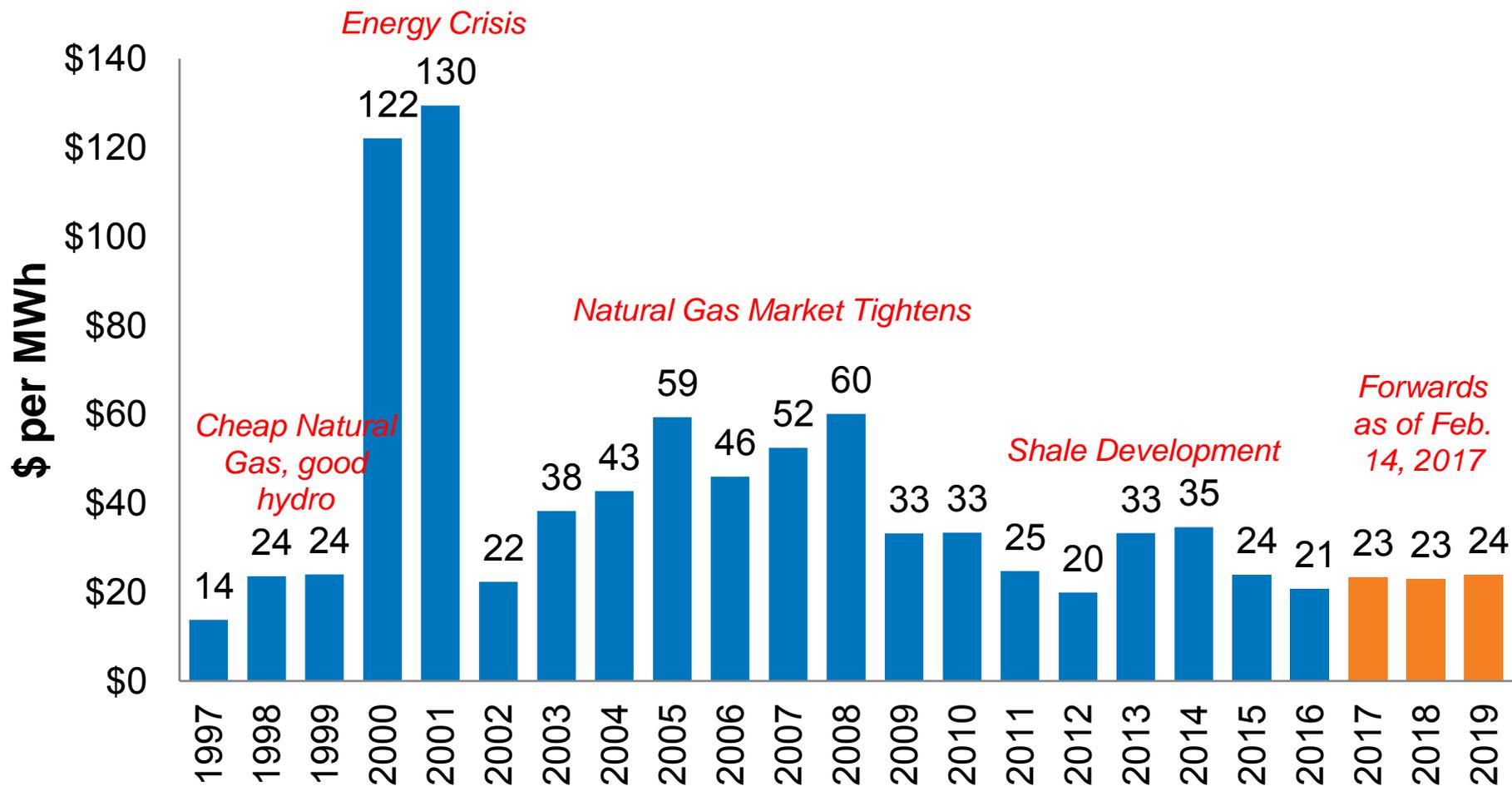
# 2017 IRP Modeling Process

272

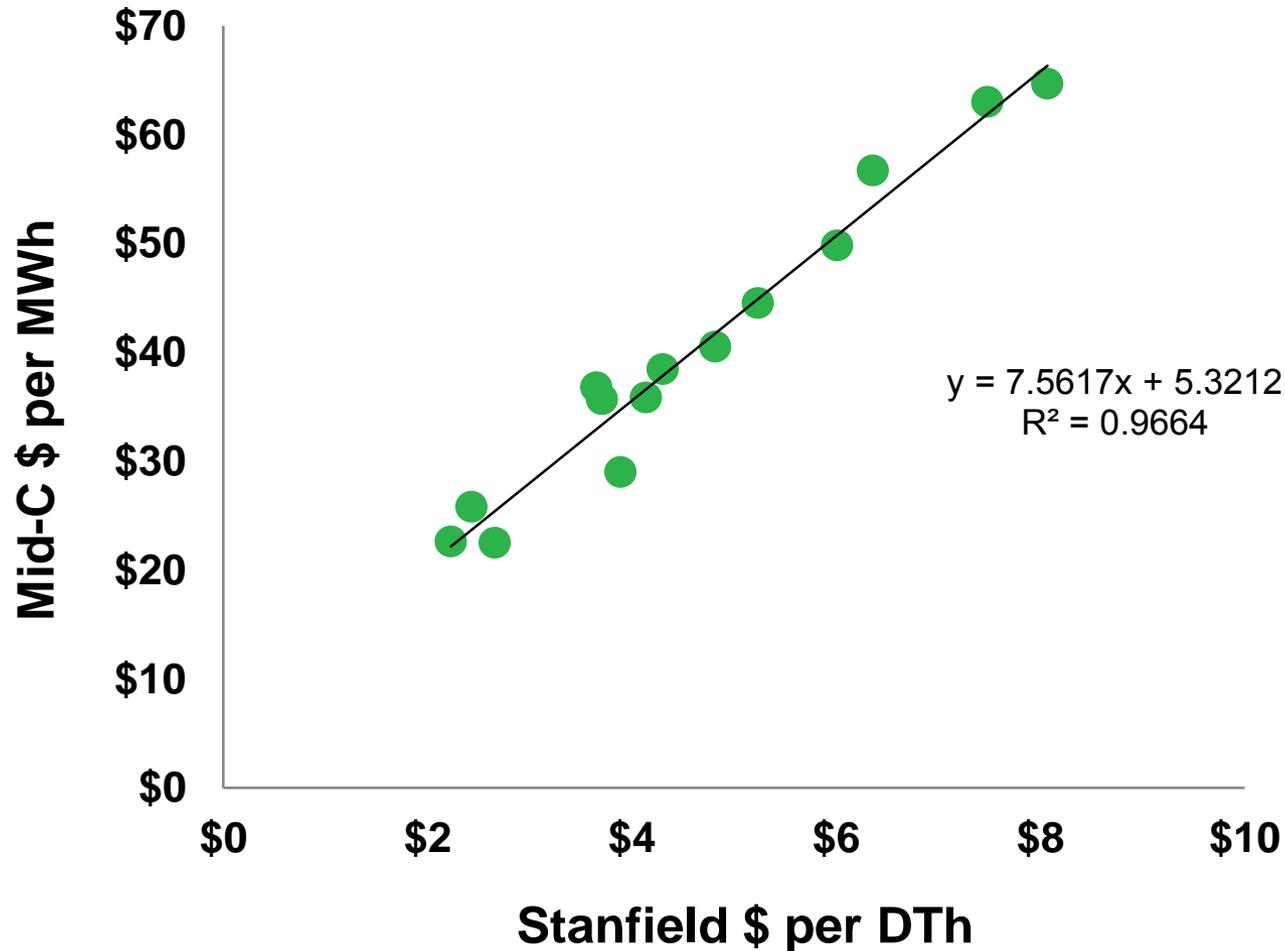


## Avista Analysis

# Mid-Columbia Flat Firm Price Index History

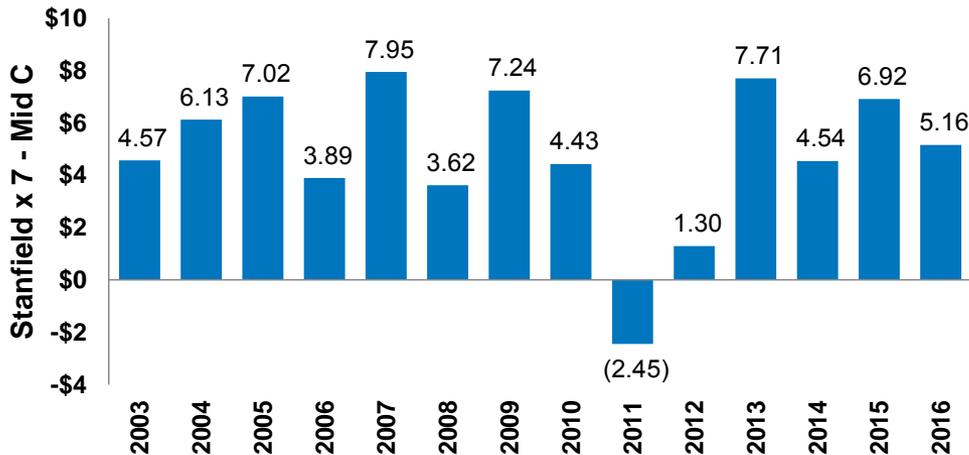


# Natural Gas vs. Electric Prices (2003-16)

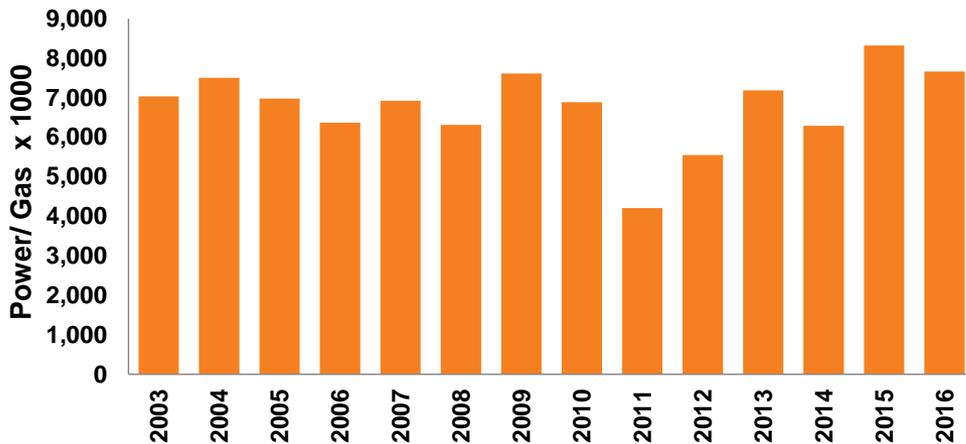


# Market Indicators

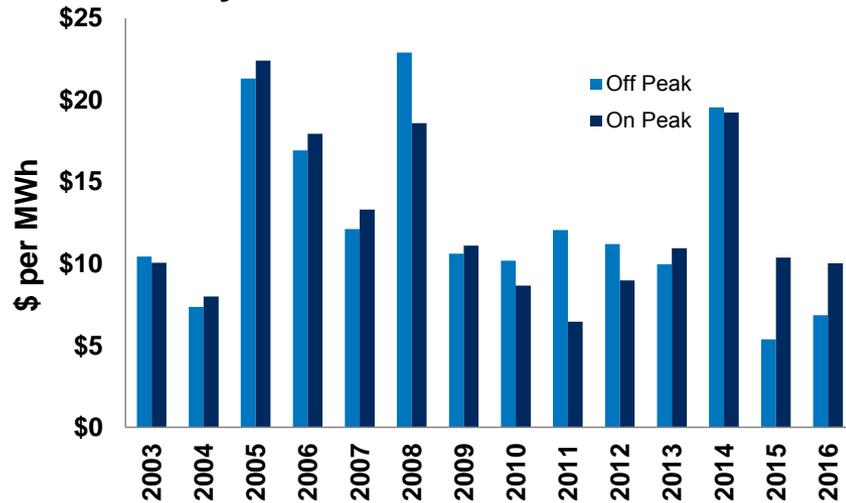
### Spark Spread



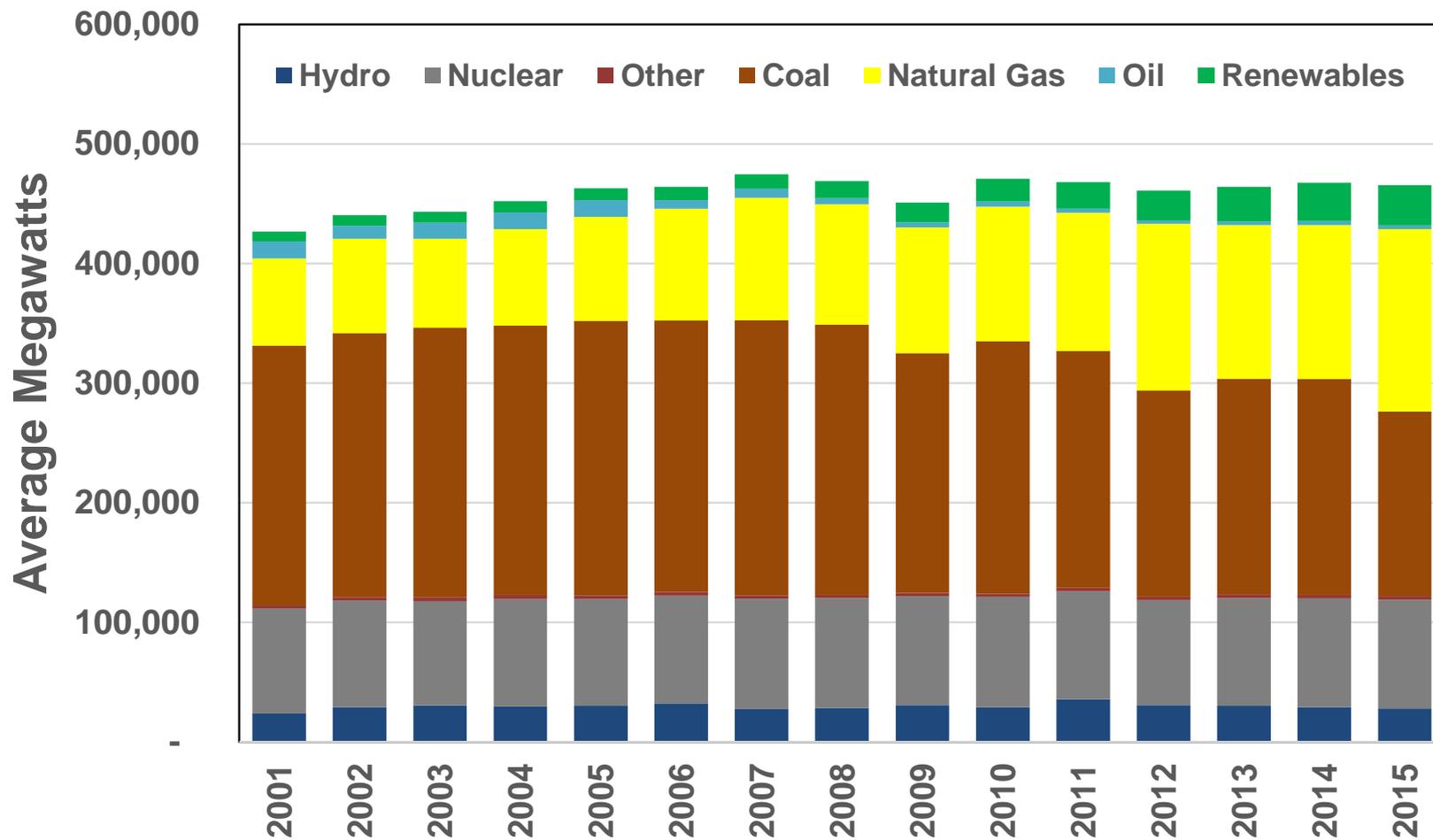
### Implied Market Heat Rate



### Daily Price Standard Deviation

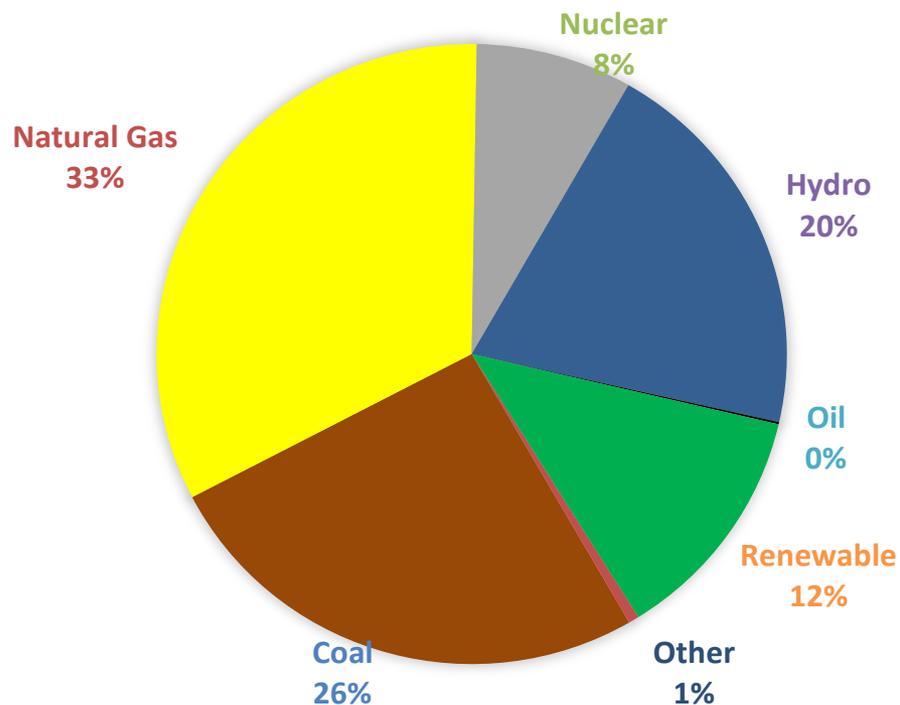


# US Power Generation

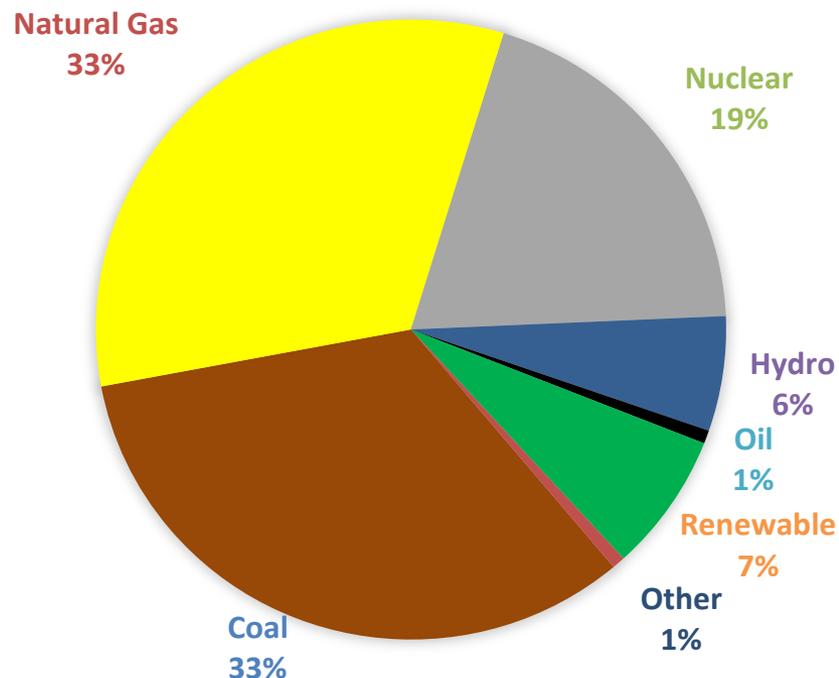


# Fuel Mix Comparison (2015)

## US Western Interconnect

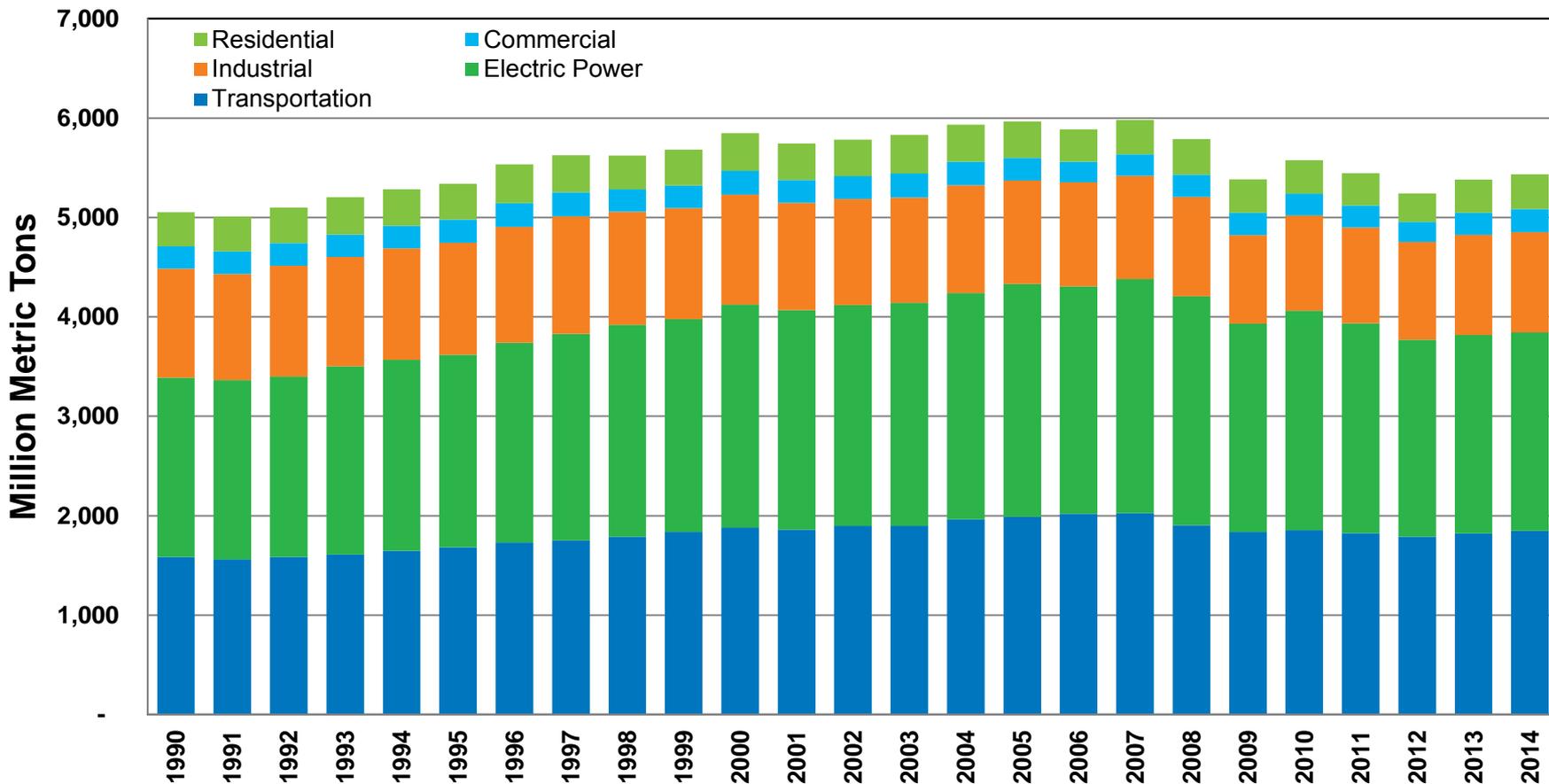


## US Total

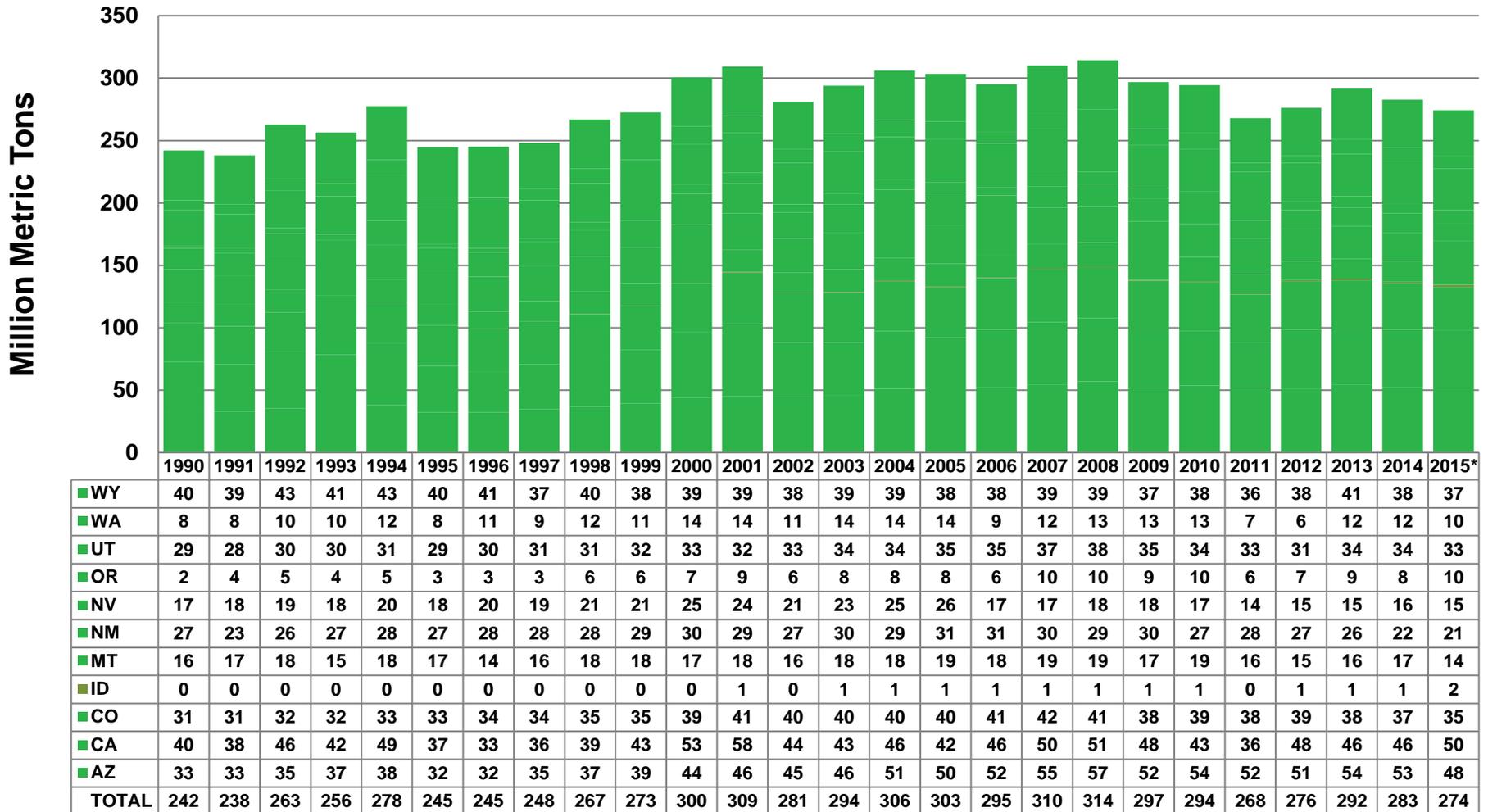


# US Greenhouse Gas Emissions

## All Sources



# Western Greenhouse Gas Emissions Power Industry



# Electric Market Modeling

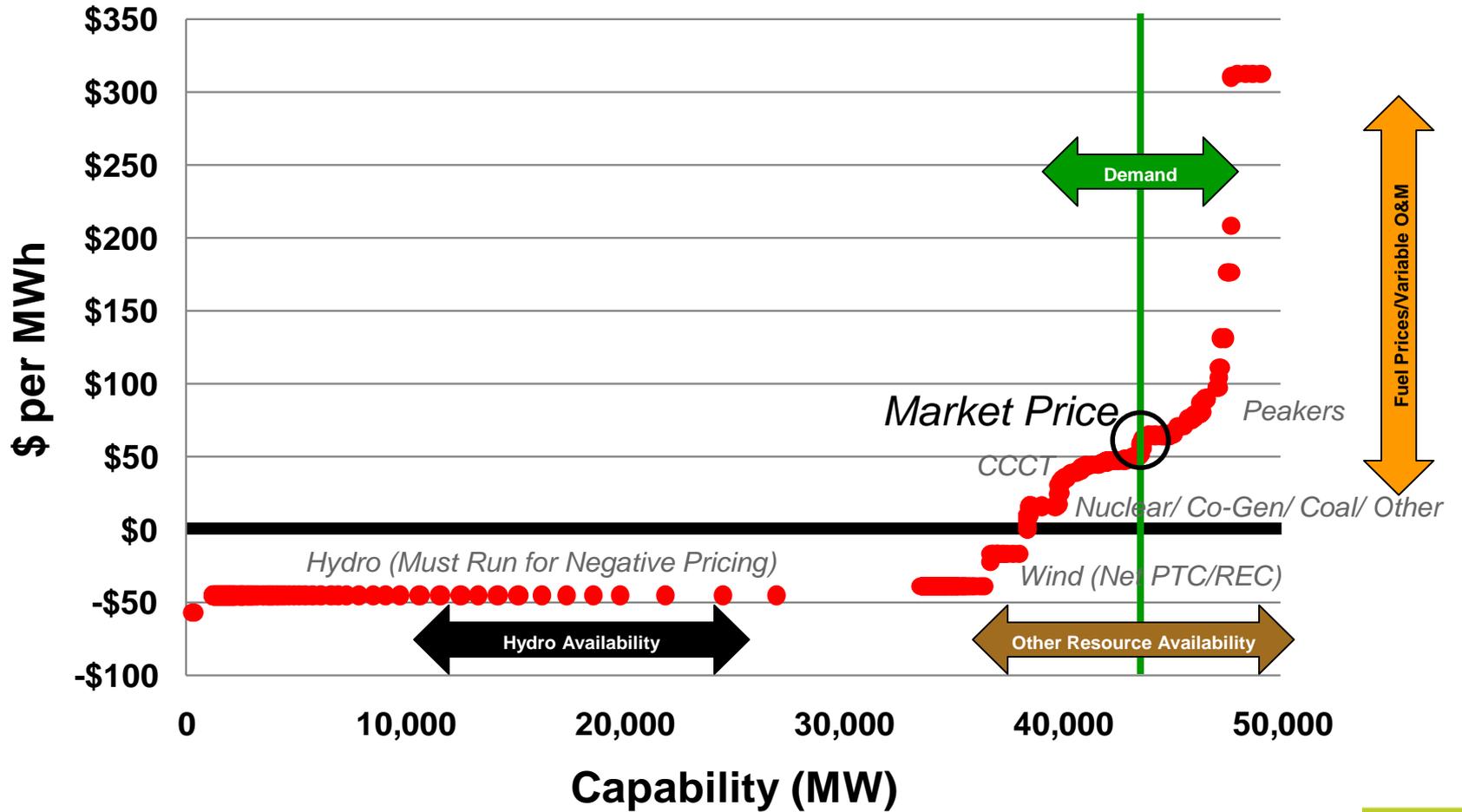


- 3<sup>rd</sup> party software- EPIS, Inc.
- Electric market fundamentals- production cost model
- Simulates generation dispatch to meet load
- Outputs:
  - Market prices (electric & emission)
  - Regional energy mix
  - Transmission usage
  - Greenhouse gas emissions
  - Power plant margins, generation levels, fuel costs
  - Avista's variable power supply costs

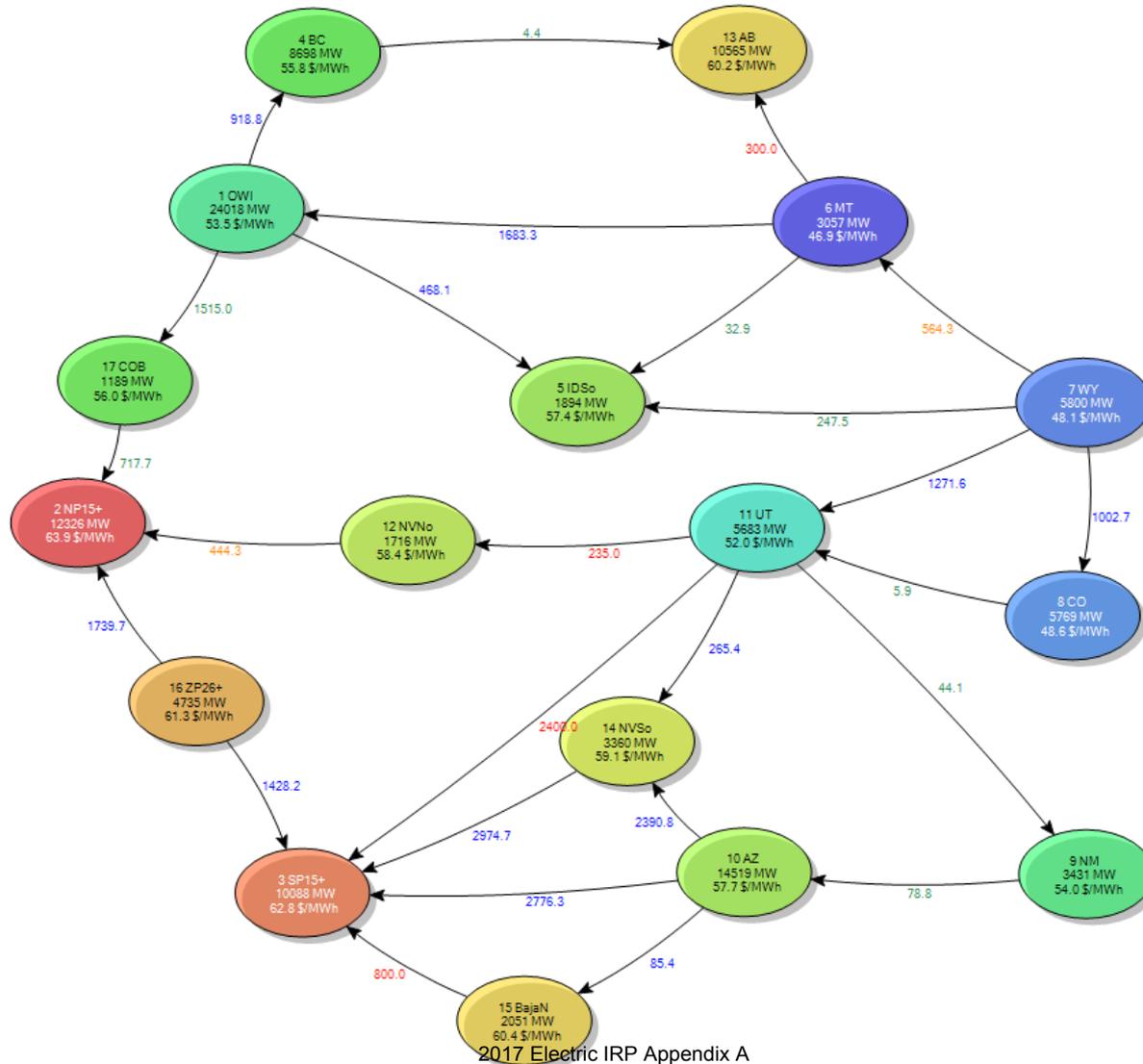
# Stochastic Approach

- Simulate Western Electric market hourly for next 20 years (2018-37)
  - That is 175,248 hours for each study
- Model 500 potential outcomes
  - Variables include fuel prices, loads, wind, hydro, outages, inflation
  - Simulating 87.6 million hours
- Run time is about 7 days on 27 processors
- Why do we do this?
  - Allows for complete financial evaluation of resource alternatives
  - Without stochastic prices we cannot account for tail risk

# AURORA Pricing Example- Supply/Demand Curve



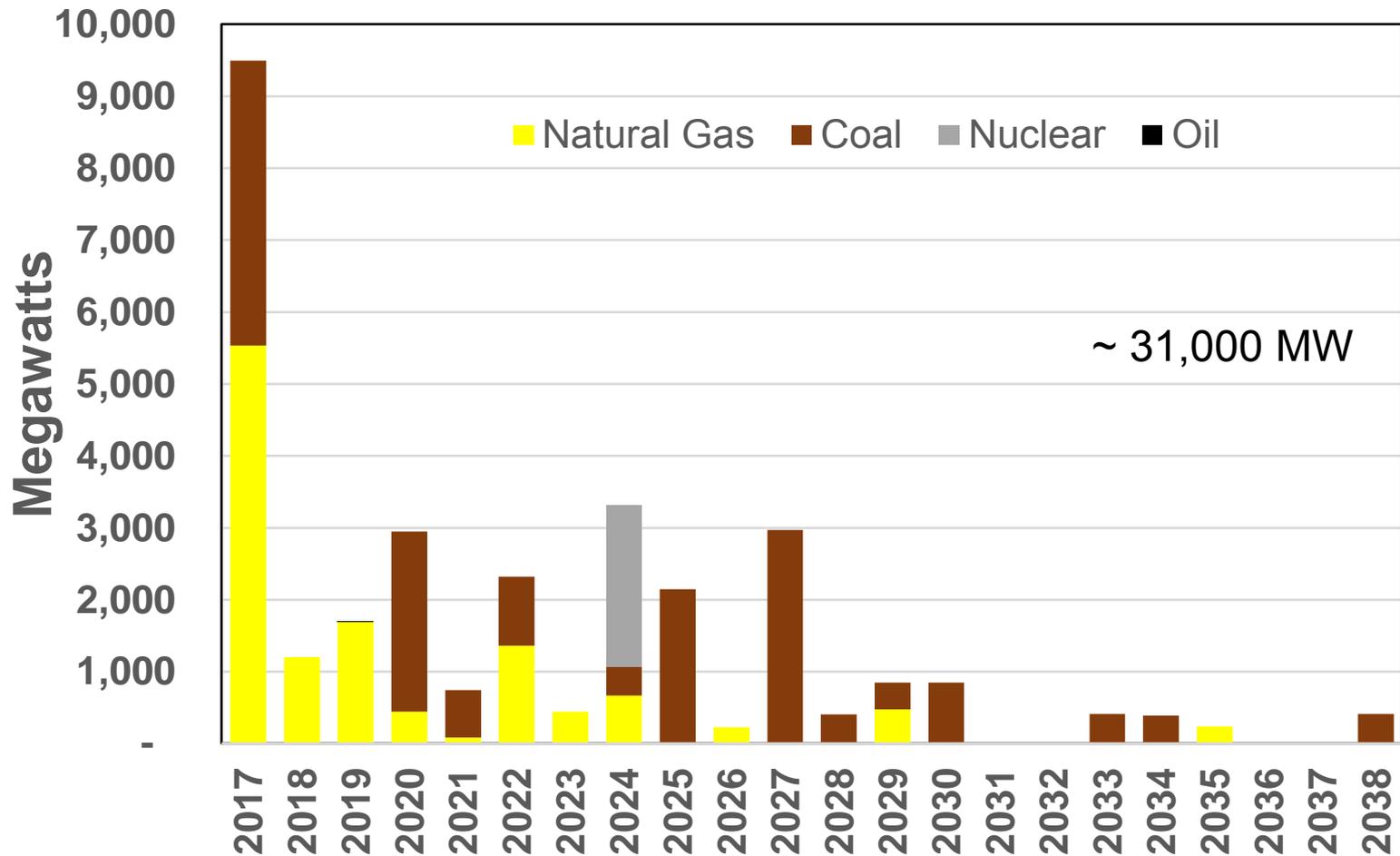
# Modeled Western Interconnect Topology



# Greenhouse Gas Reduction Modeling

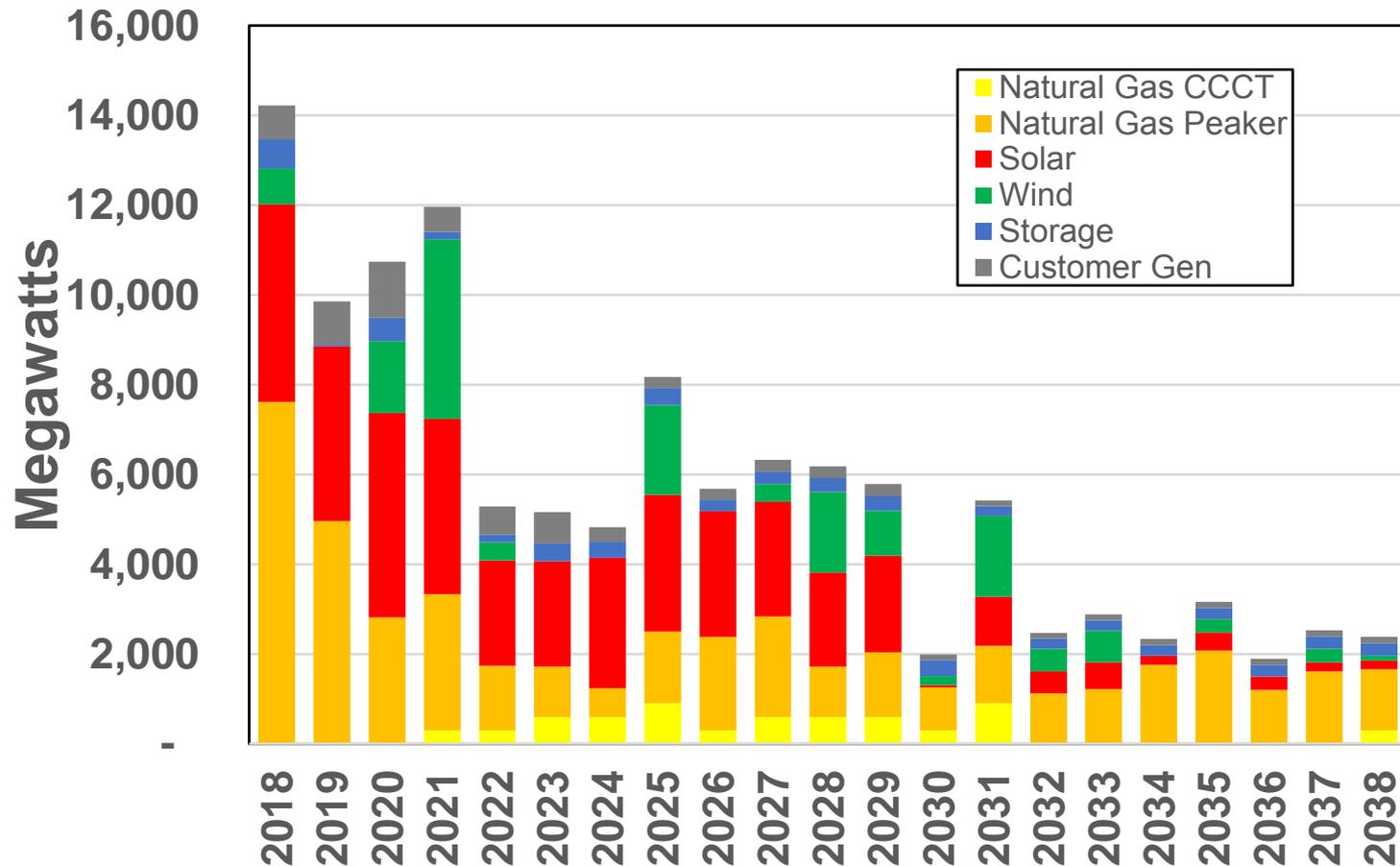
- Updated methodology since last TAC meeting
  - California, BC, and Alberta include CO<sub>2</sub> price adder
  - WA: Clean Air Rule
  - OR: 30% reduction by 2025
  - MT: Clean Power Plan Emission Cap (delayed)
  - ID: Clean Power Plan Emission's Intensity (delayed)
  - Rocky Mountains: Plan Emission Cap (delayed & regional trading allowed)
  - No new coal-fired generation
  - Uses existing state Renewable Portfolio Standards
  - 1% of load met with customer driven renewables

# Western Resource Planned Retirements



Note: Includes only announced plant closures and estimated Canadian retirements. Majority of natural gas-fired retirements are once through cooling.

# New Resources to Western Interconnect



Natural Gas: 49,000 MW

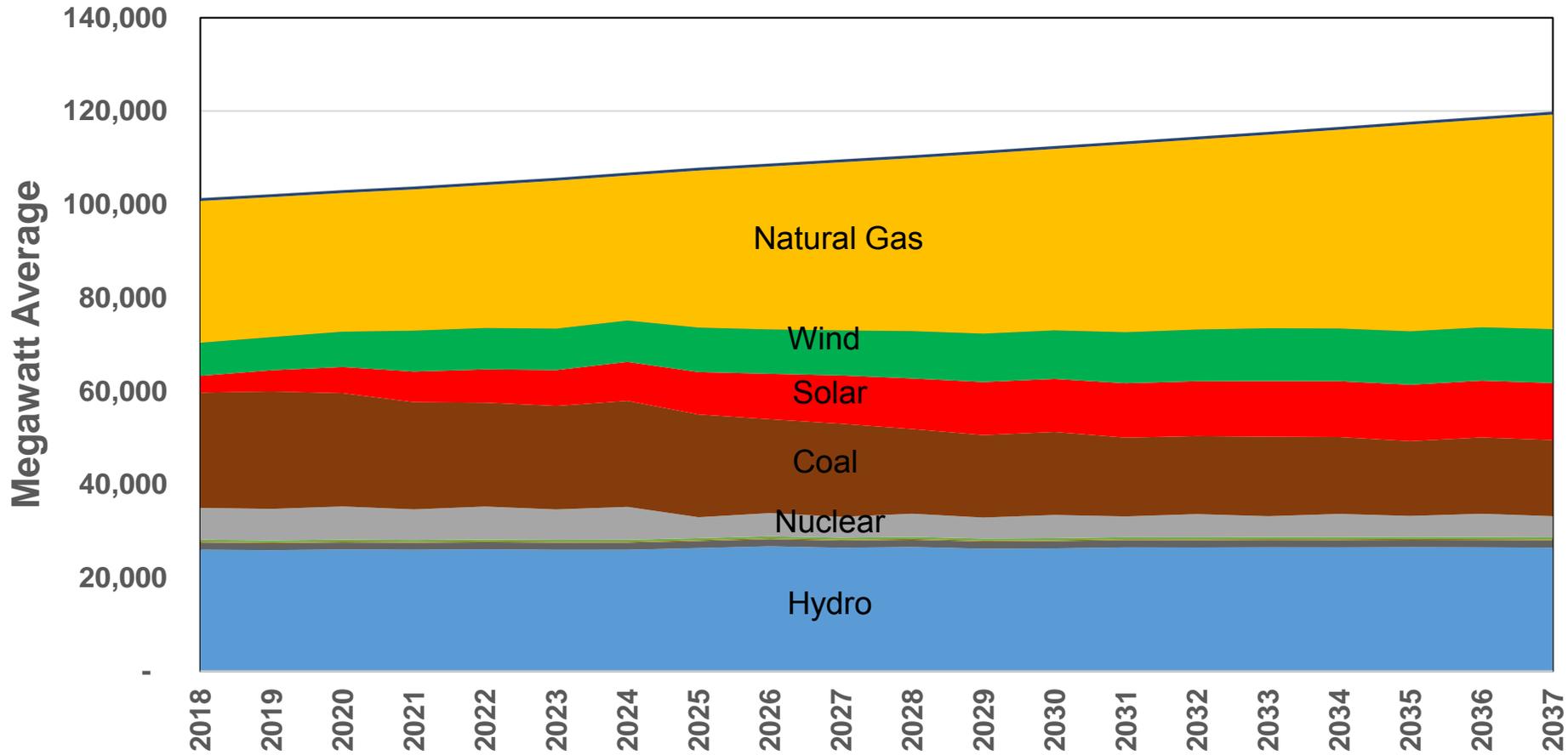
Wind: 16,000 MW

Solar: 40,500 MW

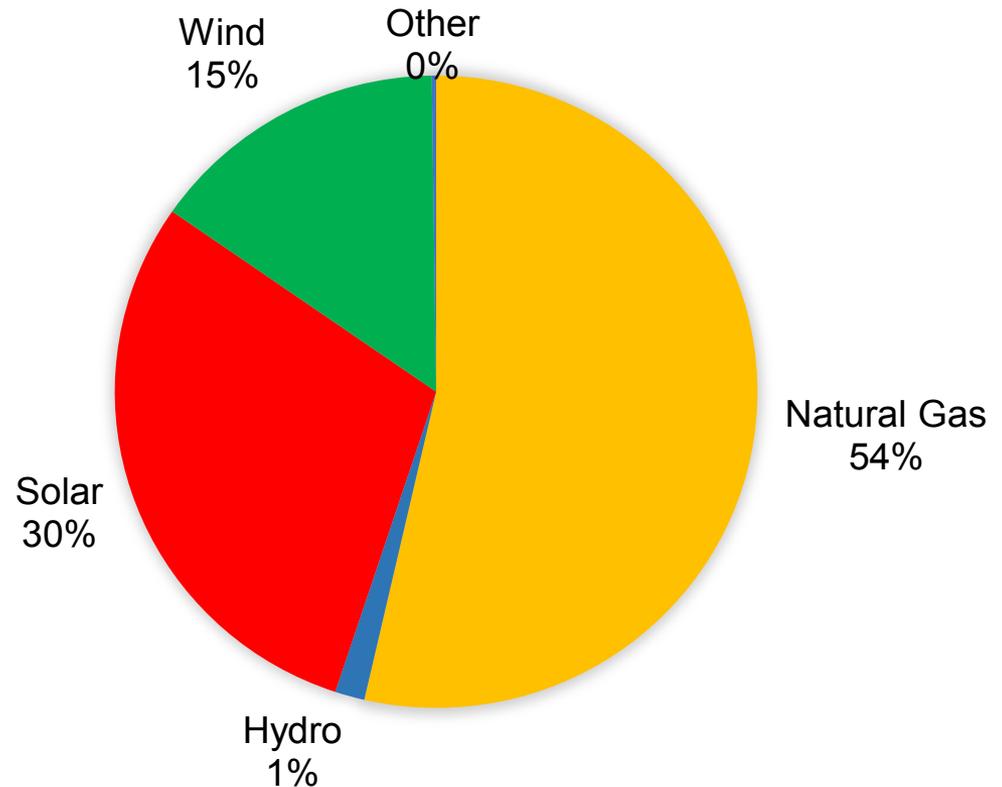
Storage: 6,400 MW

Customer: 7,600 MW

# Resource Type Mix Forecast (Western Interconnect)

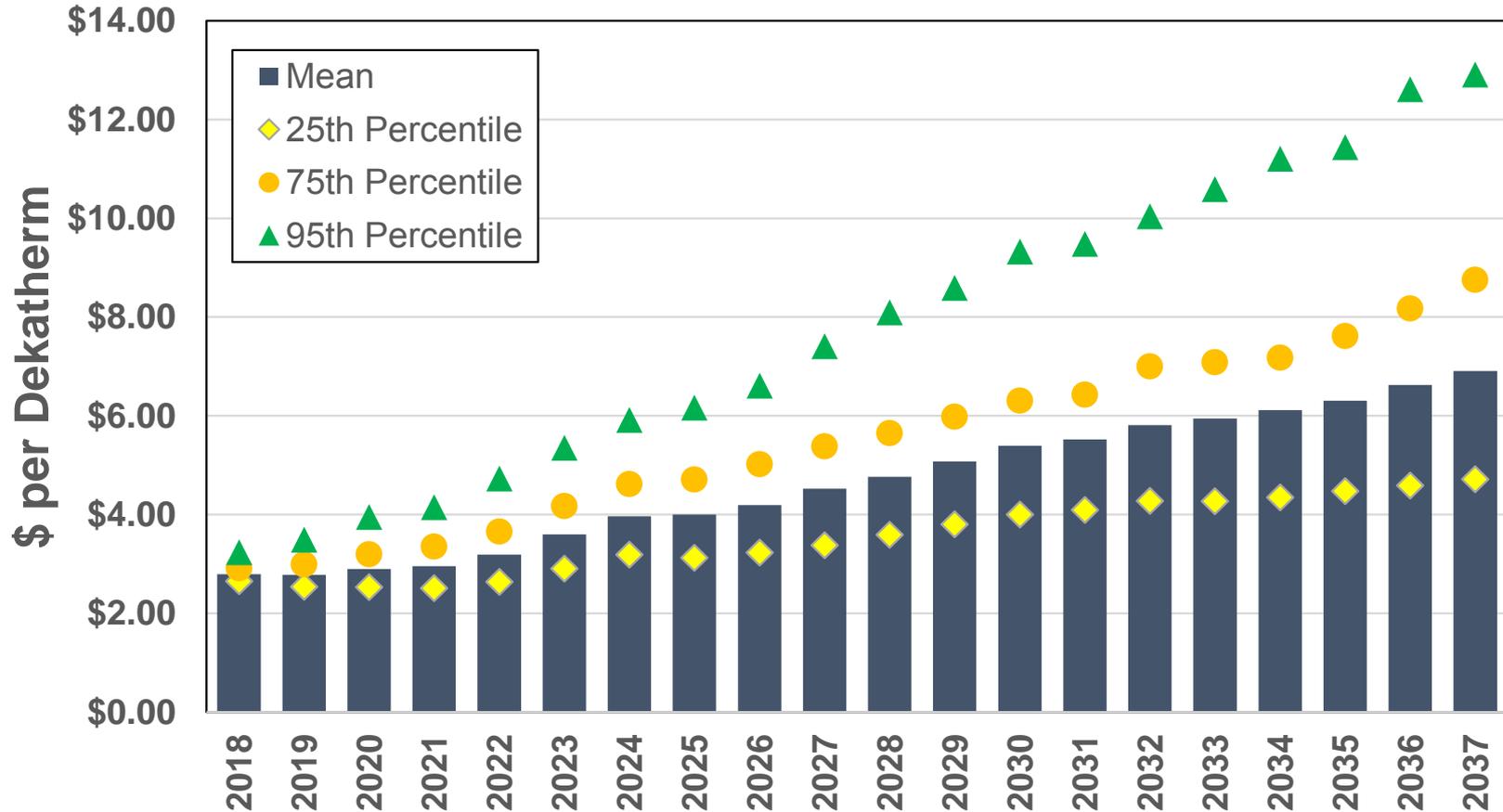


# Resource Mix Serving Load Growth & Resource Retirements



Fuel Type	2037/2018 Change aGW
Natural Gas	+15.6
Hydro	+0.4
Solar	+8.6
Wind	+4.4
Other	+0.1
Coal	-8.4
Nuclear	-2.3

# Stanfield Natural Gas Price Forecast



Levelized mean price \$4.20/dth

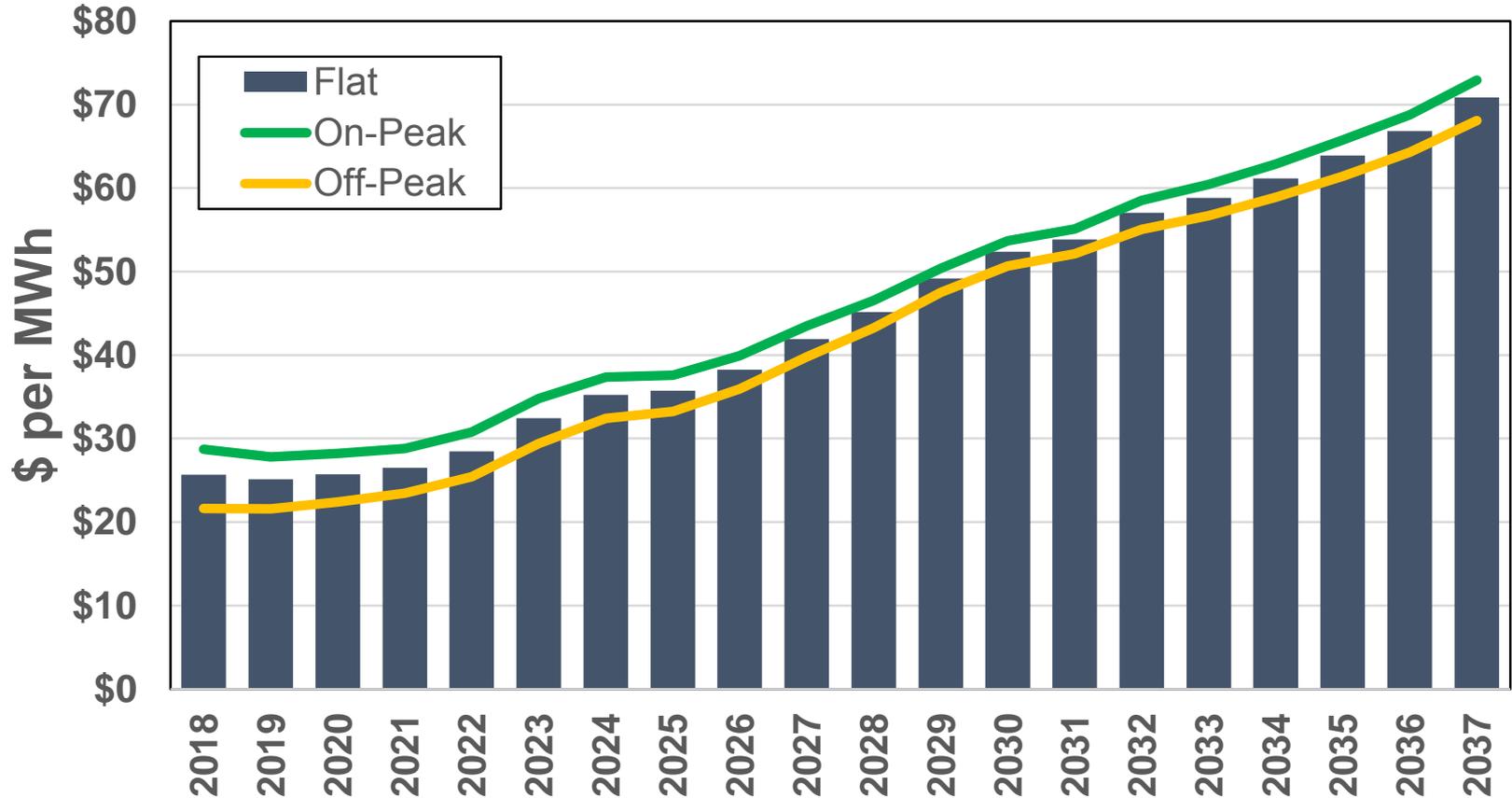
2017 Electric IRP Appendix A



Note: Coefficient of variation (stdev/mean) in 2018 is 10%, in 2037, the volatility increases to 45%

# Mid-Columbia Electric Price Forecast

(Mean of 500 iterations)



Levelized Prices

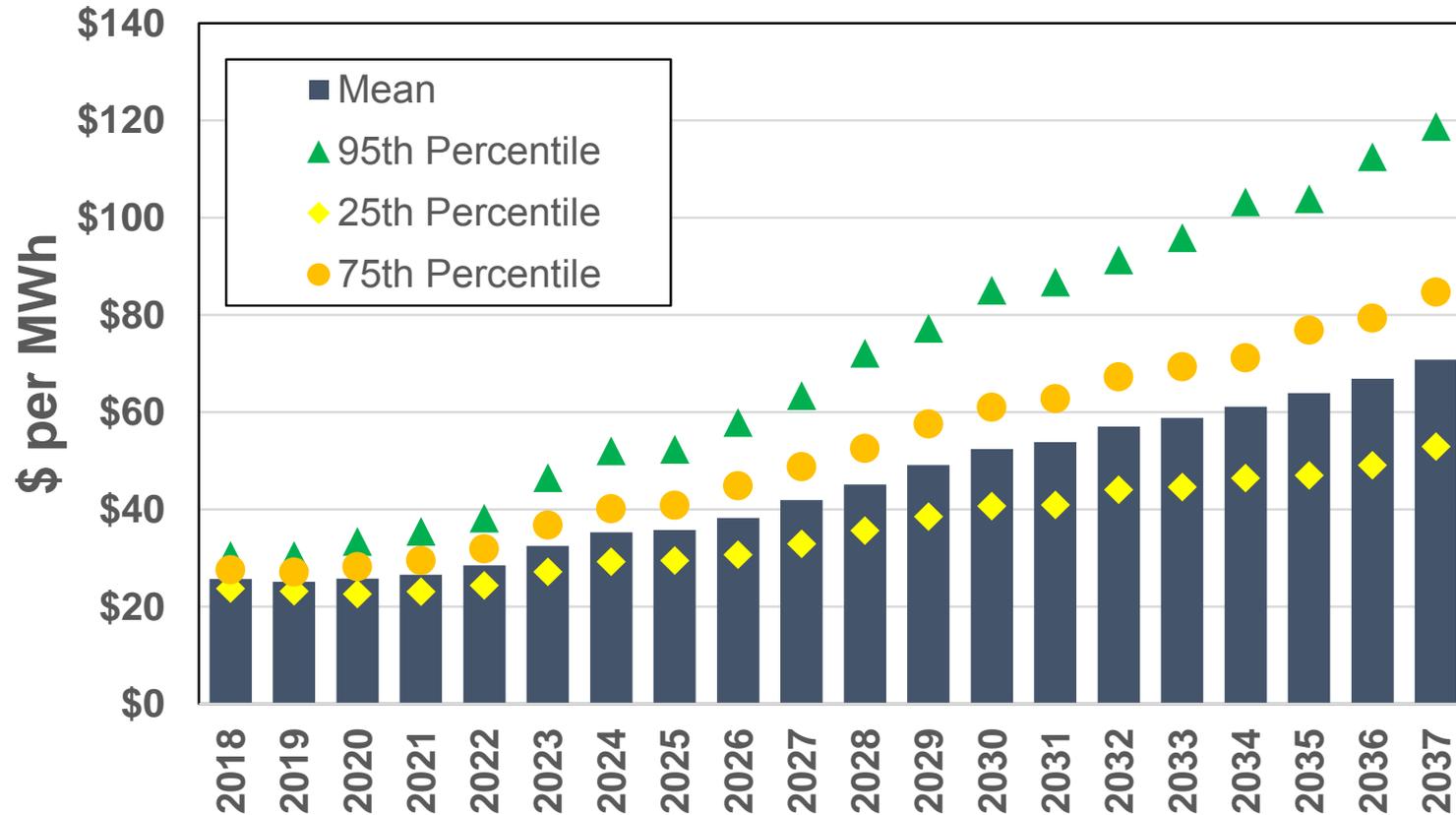
Flat: \$39.52/MWh

On Peak: \$41.56/MWh

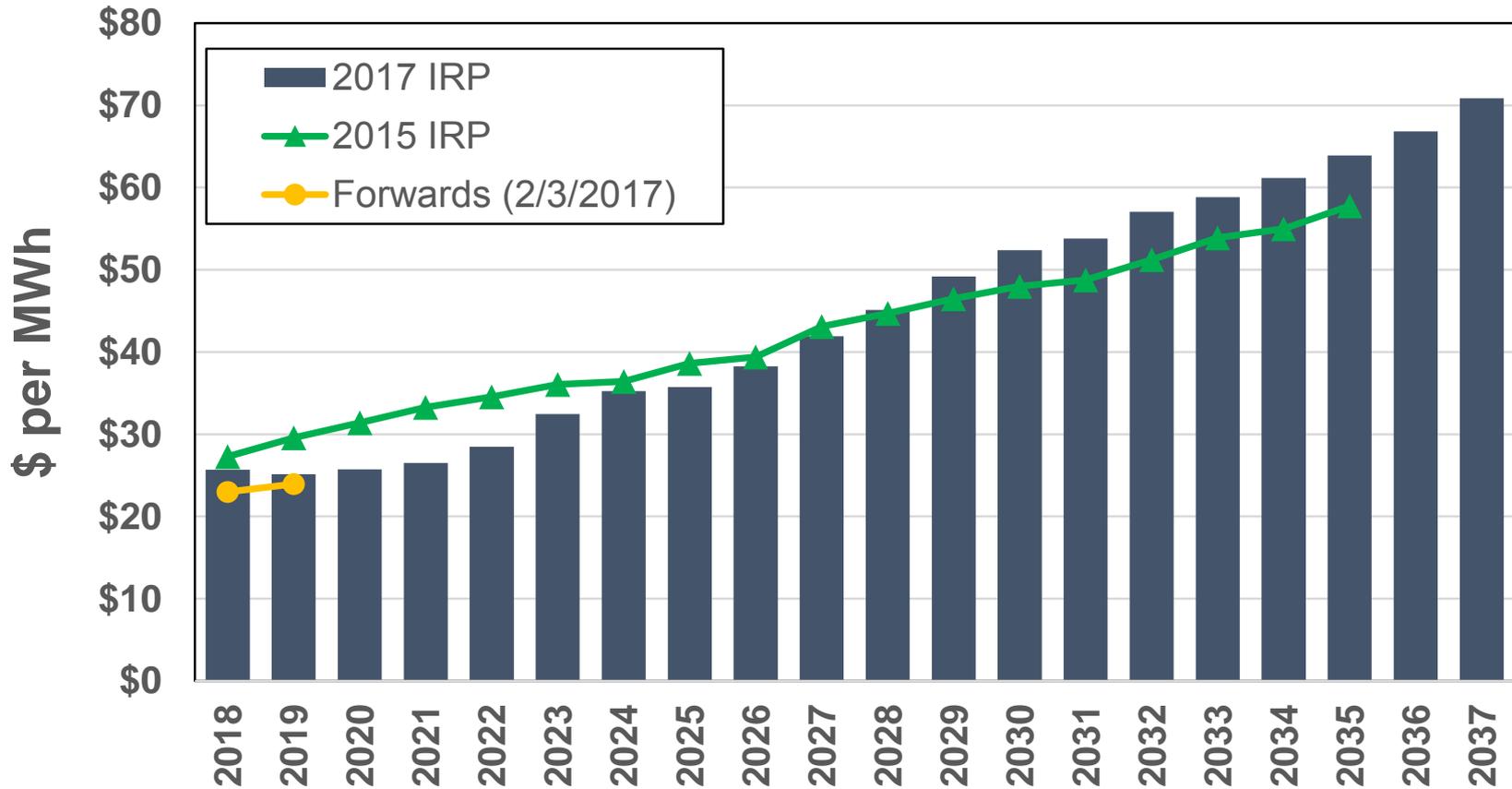
Off Peak: \$36.79/MWh

# Mid-Columbia Electric Price Forecast

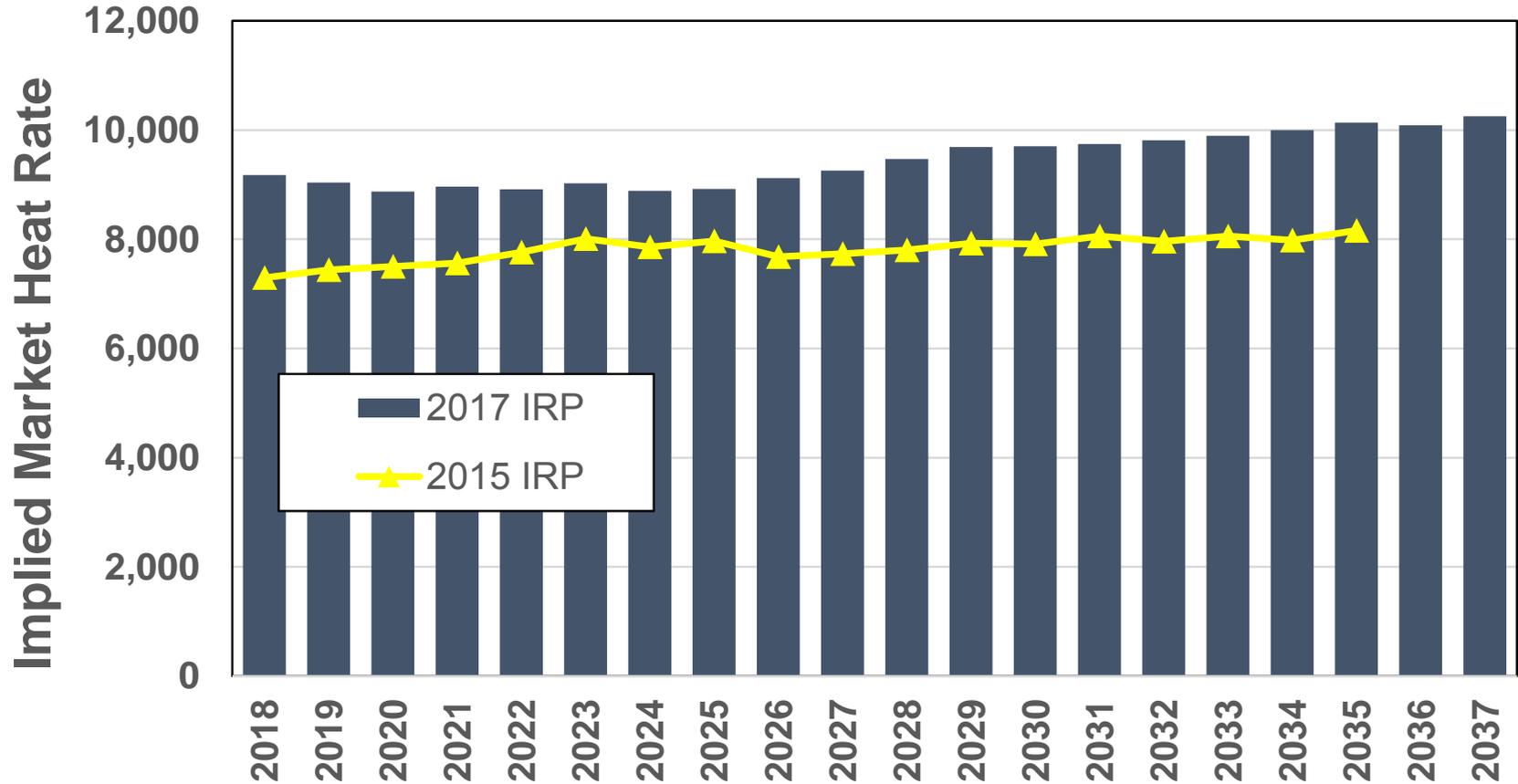
## (Flat Price Statistics)



# IRP Price Forecast Comparison (Flat Prices)

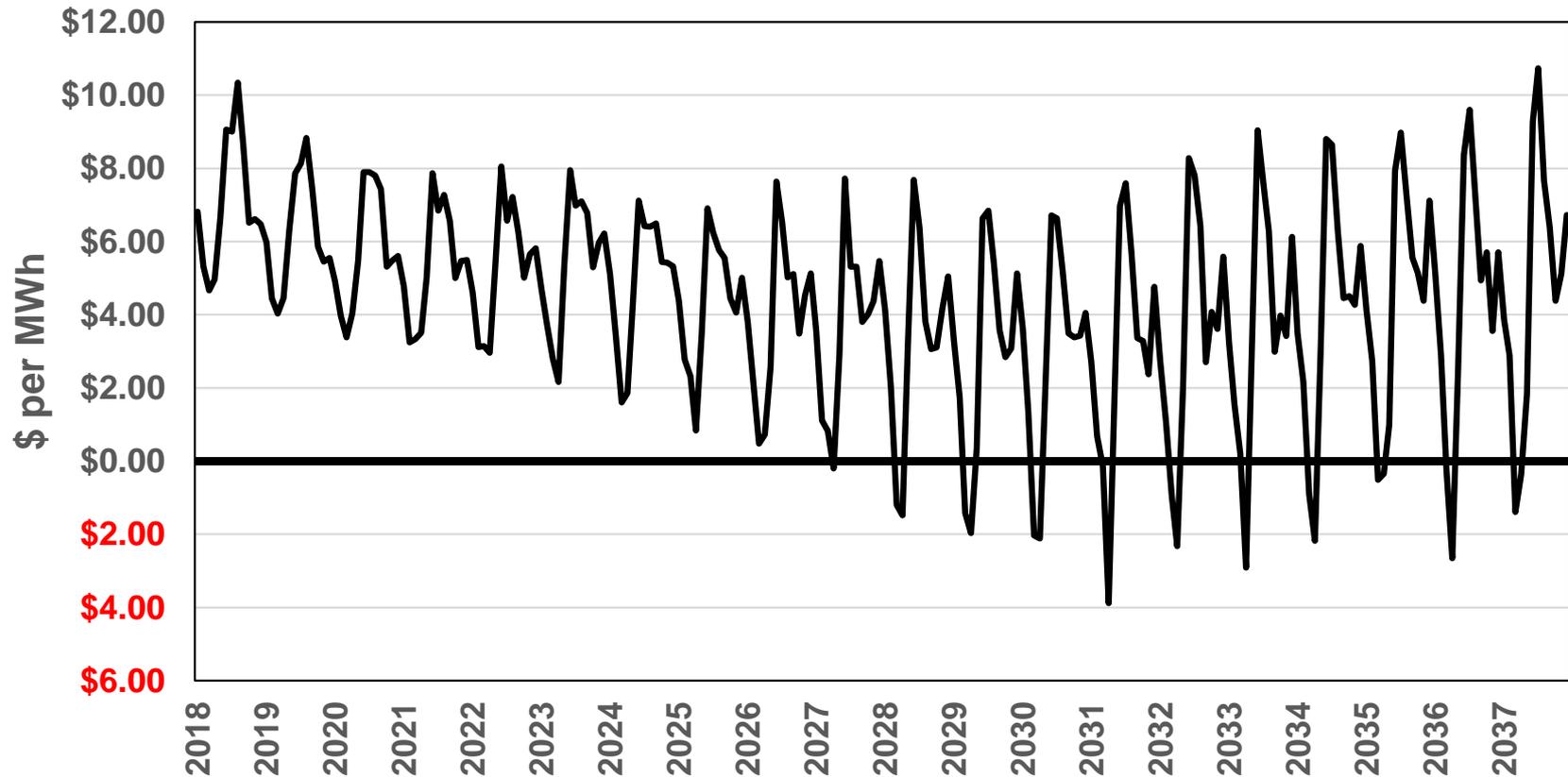


# Implied Market Heat Rate

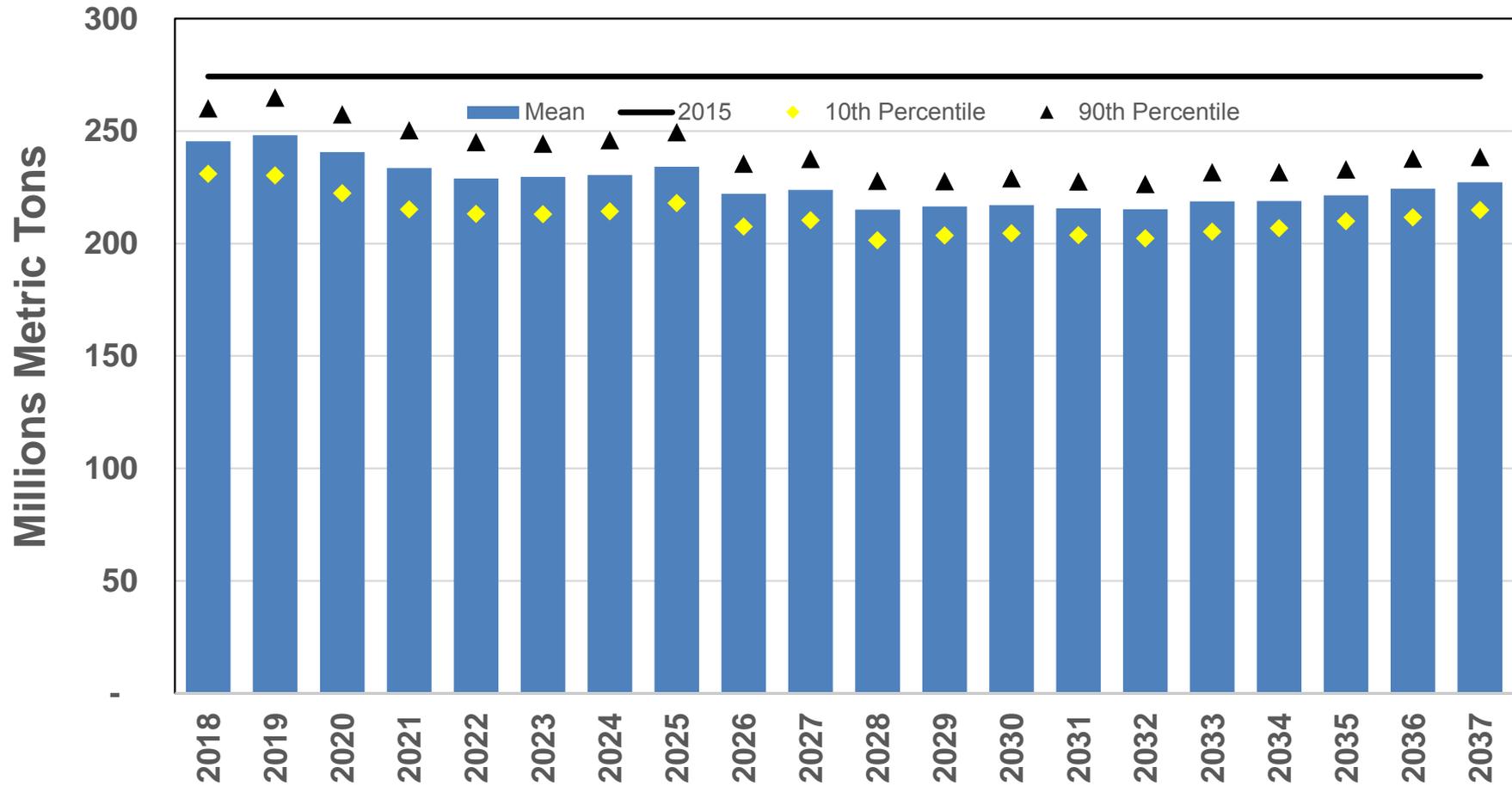


# On/Off Peak Price Spread

Spring months will have lower prices during the day due to solar

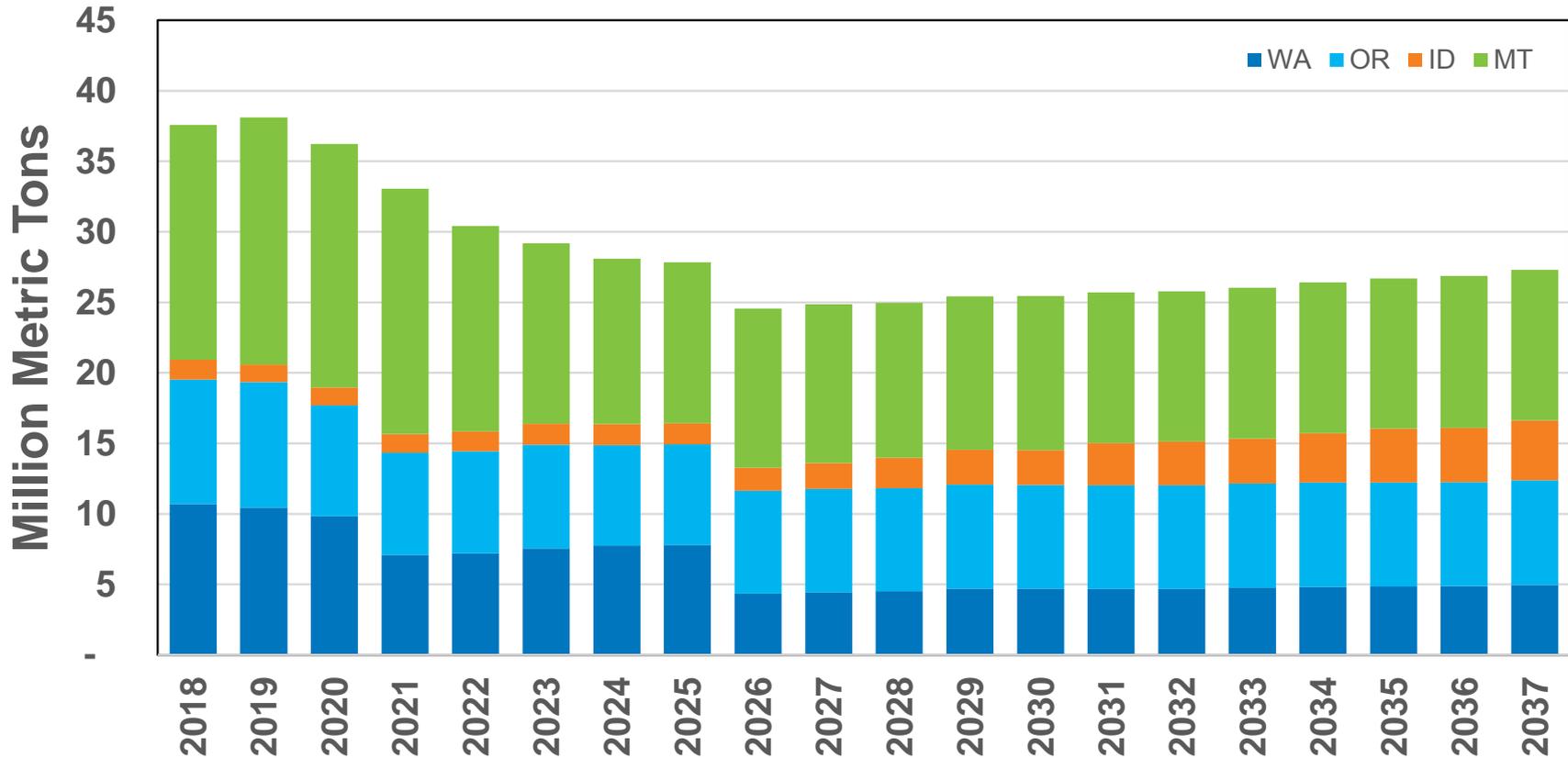


# Greenhouse Gas Emissions Forecast (US Western Interconnect Total)

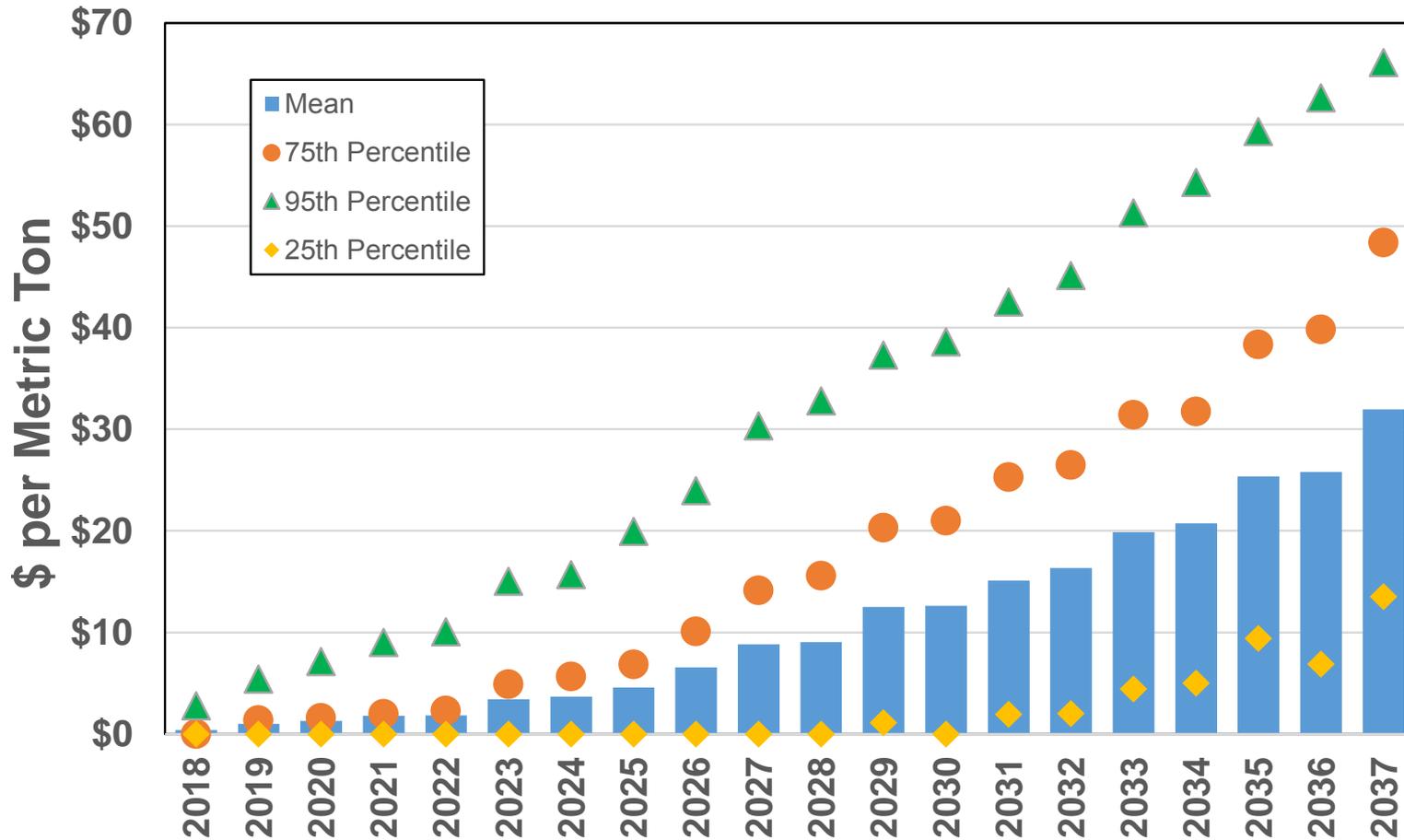


# Greenhouse Gas Emissions Forecast

## (Northwest- WA,OR,ID,MT)

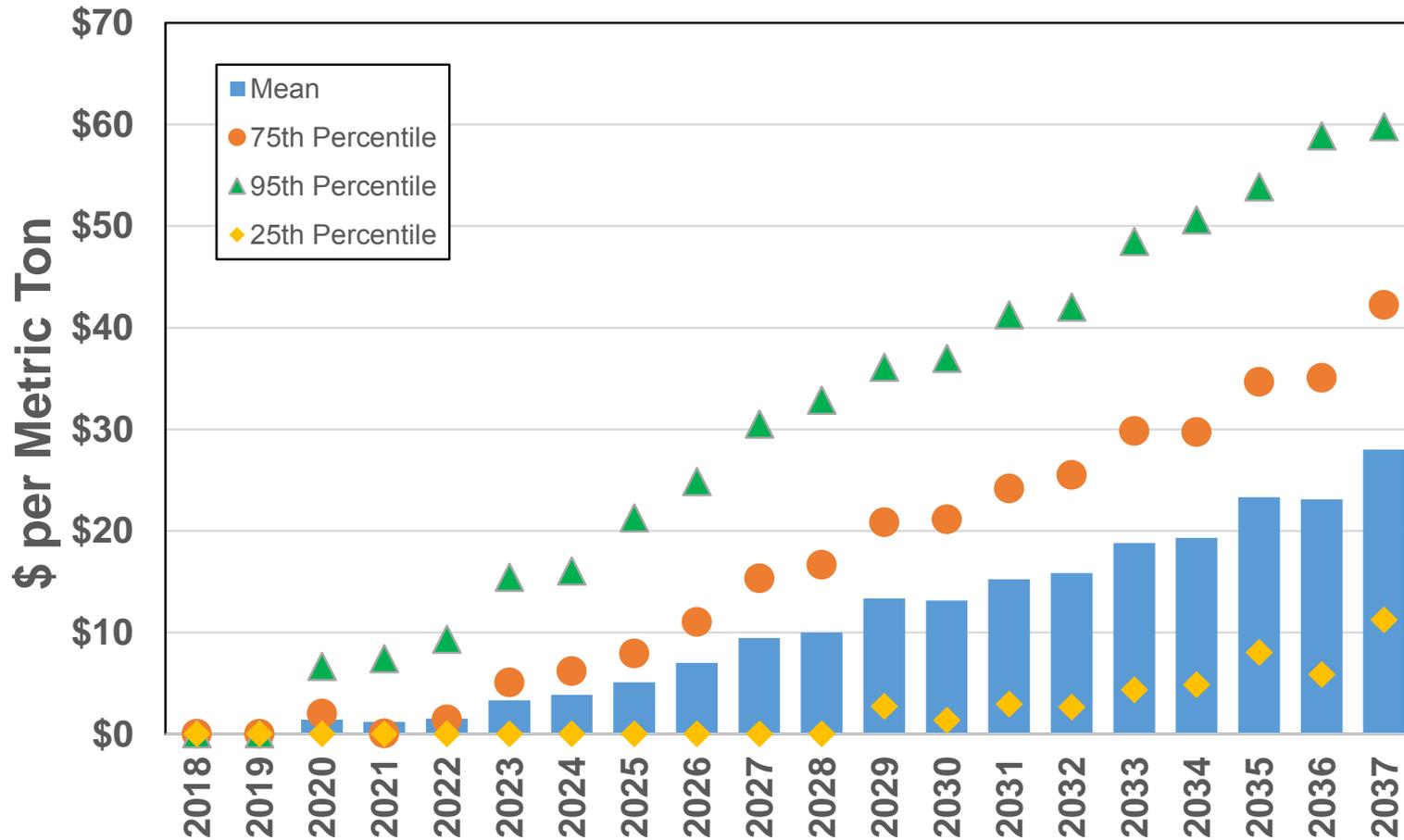


# CAR Rule Shadow Price



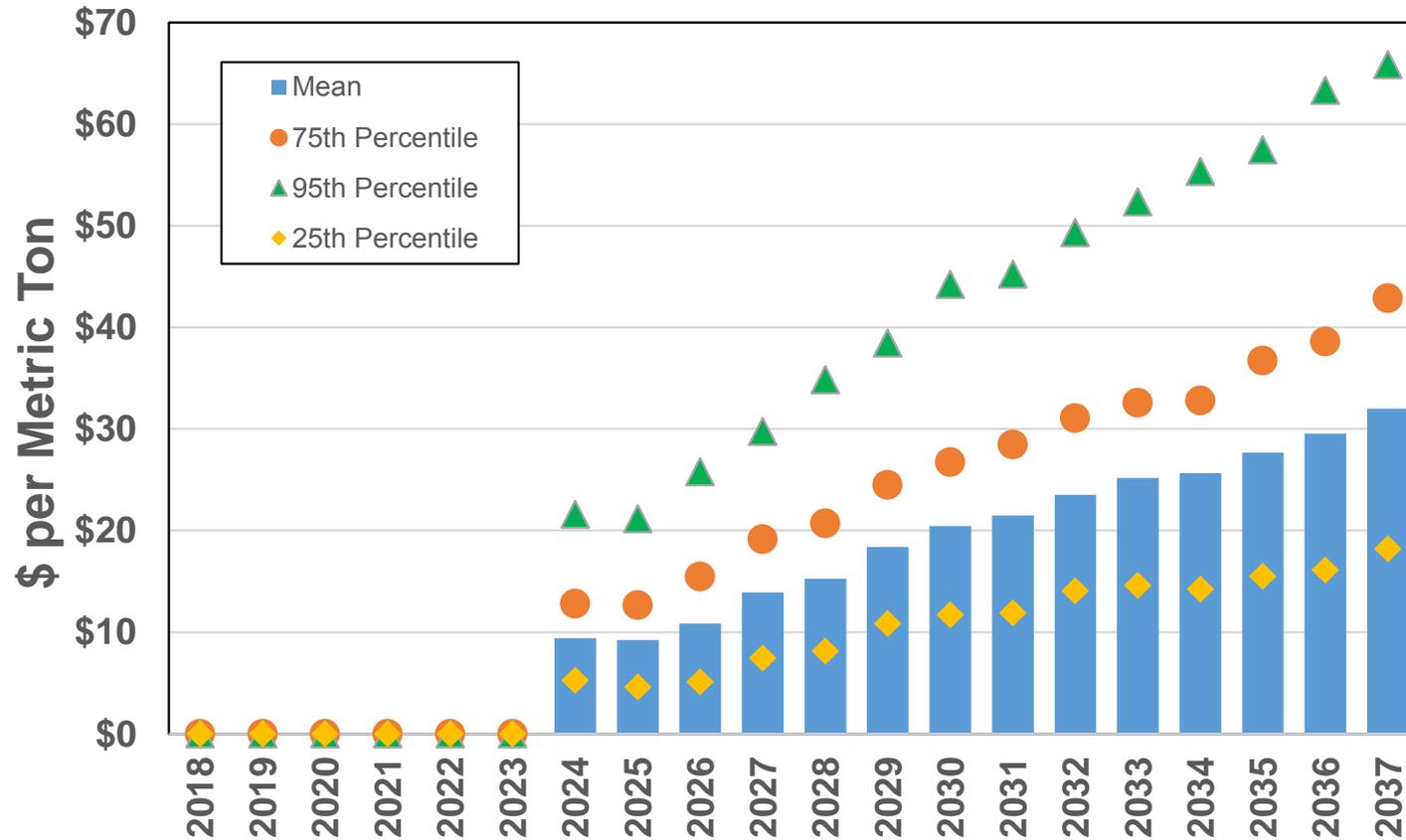
Levelized Mean Price \$8.04/metric ton

# Oregon Reduction Shadow Price



Levelized Mean Price \$7.73/metric ton

# CPP Montana Shadow Price



Levelized Mean Price \$15/metric ton  
(2024-37)



# 2017 Electric IRP Interconnection Studies

Richard Maguire, Transmission Planning Engineer  
Fourth Technical Advisory Committee Meeting  
February 15, 2017

# Federal Standards of Conduct

Non-public transmission information can not be shared with Avista Merchant Function employees

There are Avista Merchant Function employees attending today

We will not be sharing any non-public transmission information

# Agenda

- Introduction to Avista System Planning
  - Useful information about Transmission Planning
  - Recent Avista projects
- Generation Interconnection Study Process
  - Large Generation Interconnection Queue
  - Integrated Resource Plan (IRP) Requests

# Introduction to Avista System Planning

Avista's System Planning Group includes:

- Transmission Planning
- Distribution Planning
- Asset Management
- And we all care about:
  - Federal, regional, and state compliance
  - Regional system coordination
  - Reliable electric service

# Useful information about Transmission Planning<sup>304</sup>

- We care about the Bulk Electric System (BES)
  - Our 115 kV and 230 kV facilities
- If the Avista BES looks like it won't reliably deliver electrons to our customers in the near or distant future, we put together plans to fix it
  - “Corrective Action Plans”
  - Mandated and Described in NERC TPL-001-4

# TPL-001-4

- Describes outages we must study
  - P0: everything online and working
  - P1: single facility outages, like a transformer
  - P2 to P5: increasing levels of outages
  - P6: any combination of two facilities

# TPL-001-4

- A couple of NERC directives for the faults above
  - “The System shall remain stable”
  - “Applicable Facility Ratings shall not be exceeded”
  - “An objective of the planning process is to minimize the likelihood and magnitude of Non-Consequential Load Loss following planning events”

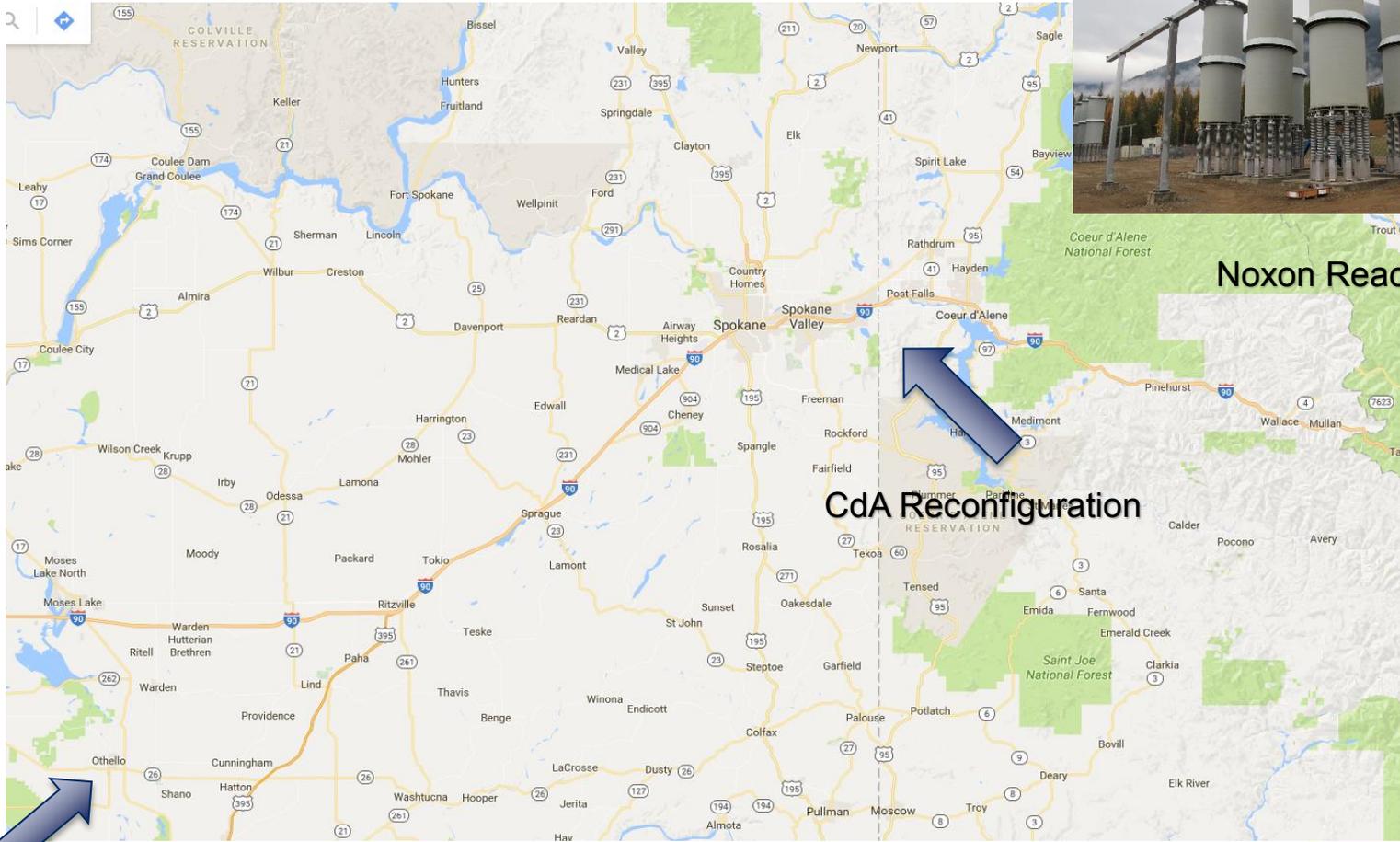
# Two Approaches to Reliability Issues

- Transmission Operators (TO) are guided by significantly different standards than Transmission Planners (TP).
- TO standards provide *flexibility* that TP standards do not allow

## Last TP slide, but really quite helpful

- “Why build TP projects if the overloads they are addressing can be mitigated by the TO’s flexible procedures?”
- Imagine the hottest day this summer...

# Recent Transmission Projects



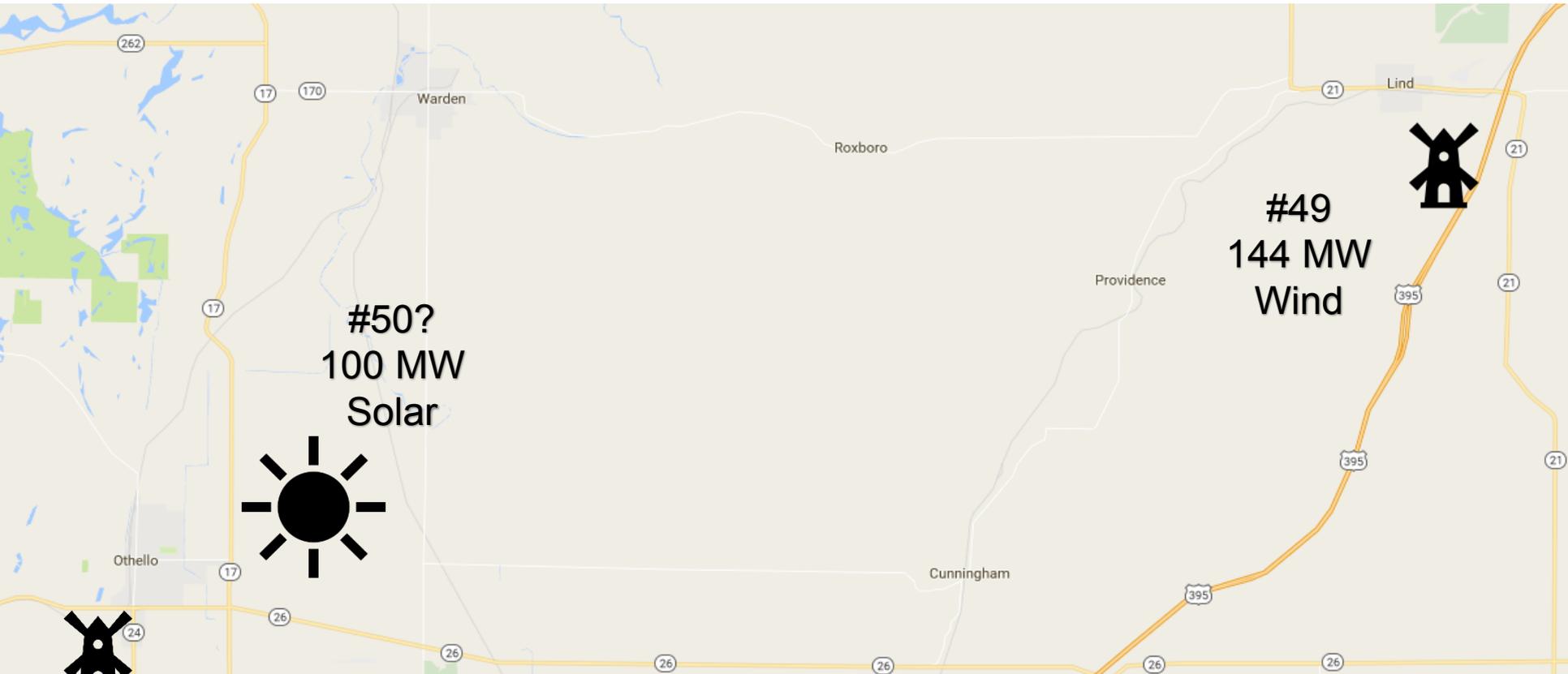
Benton – Othello 115 kV Rebuild

# Generation Interconnection Study Process

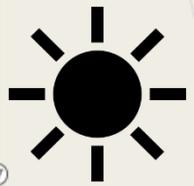
## Process for Generation Requests

- Two sources:
  - External developers – like First Wind
  - Internal IRP requests
- Typical process:
  - Hold a scoping meeting to discuss particulars
  - Outline a study plan
  - Augment WECC approved cases for our studies
  - Analyze the system against the standards
  - Publish our findings and recommendations

# Current LGIA Studies



#50?  
100 MW  
Solar



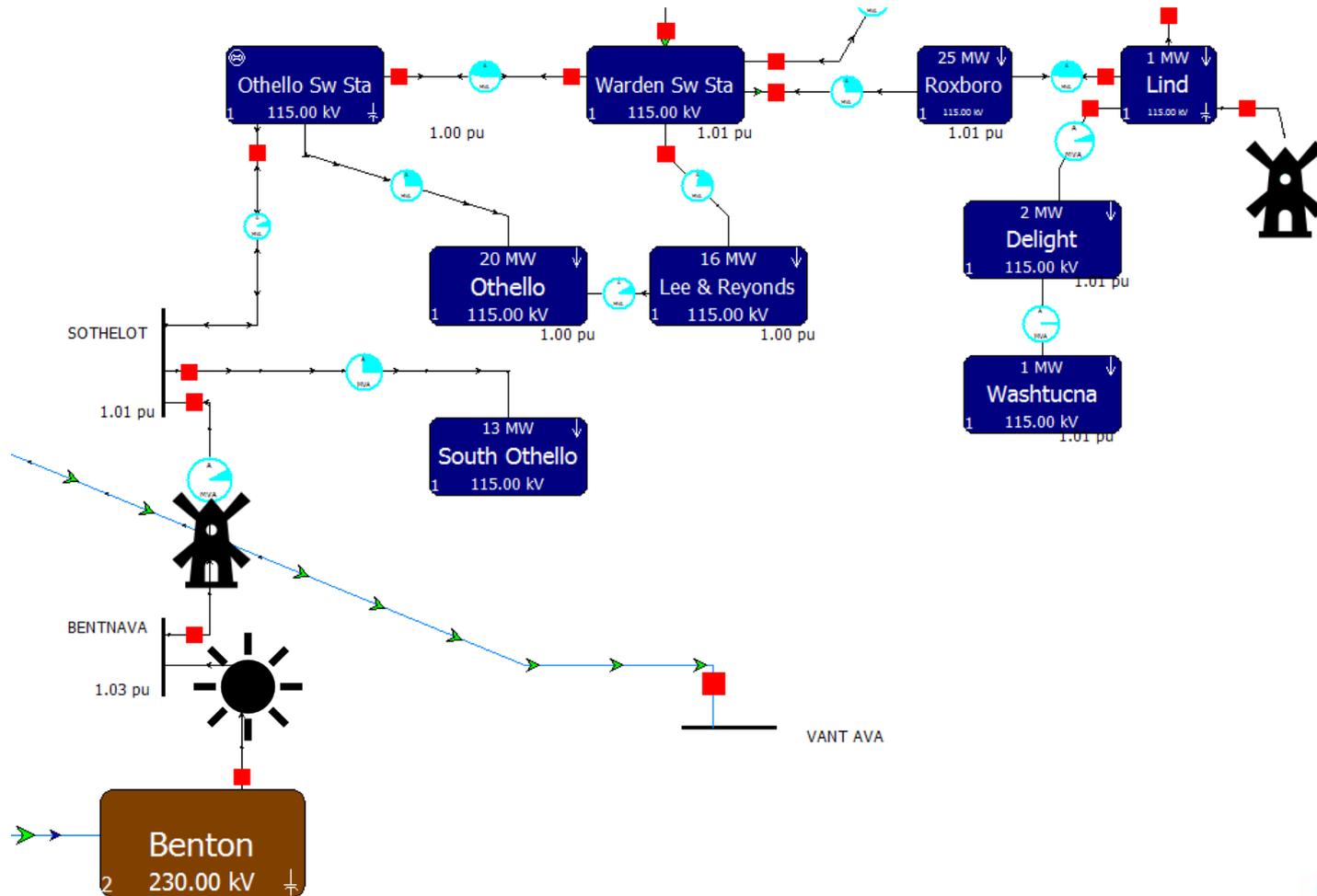
#49  
144 MW  
Wind



#46  
126 MW  
Wind



# Current LGIA Requests

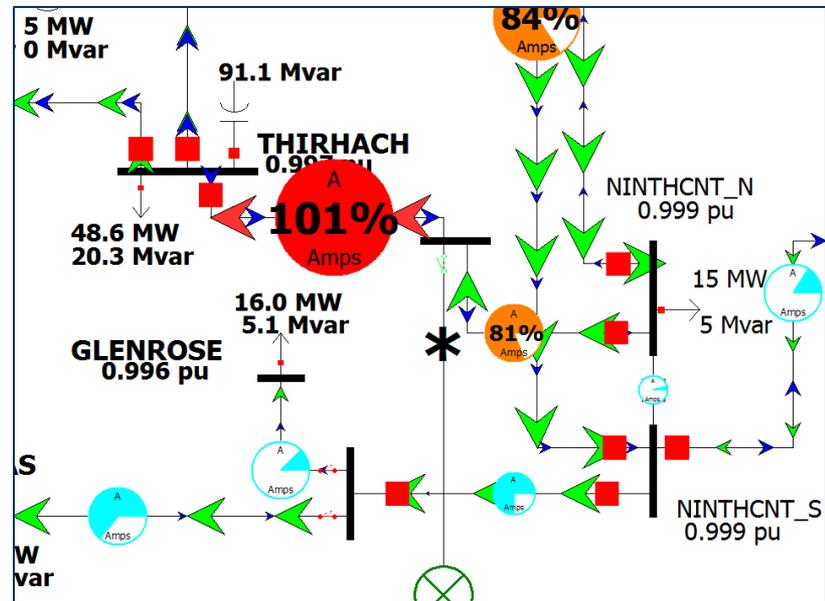
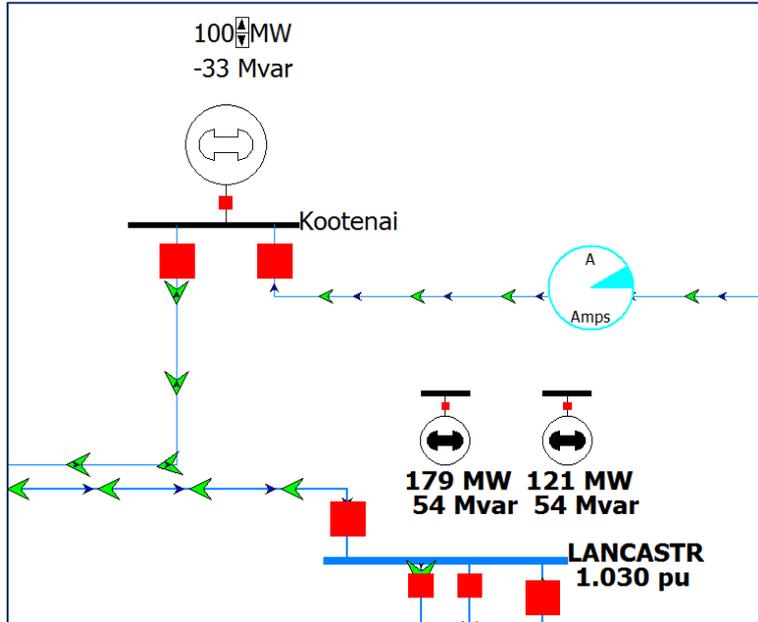


# 2017 IRP Transmission Cost Estimates

Station	Request (MW)	POI Voltage	Cost Estimate (\$ million)
Kootenai County	100	230 kV	2
Kootenai County	350	230 kV	80-100
Rathdrum	26	115 kV	<1
Rathdrum	50	115 kV	<1
Rathdrum	200	115 kV	55
Rathdrum	50	230 kV	<1
Rathdrum	200	230 kV	56
Thornton	30	230 kV	<1
Thornton	100	230 kV	<1
Othello	25	115 kV	<1
Northeast	10	115 kV	<1
Kettle Falls	10	115 kV	<1
Long Lake	68	115 kV	33
Monroe Street	80	115 kV	2
Post Falls	10	115 kV	<1
Post Falls	20	115 kV	<1

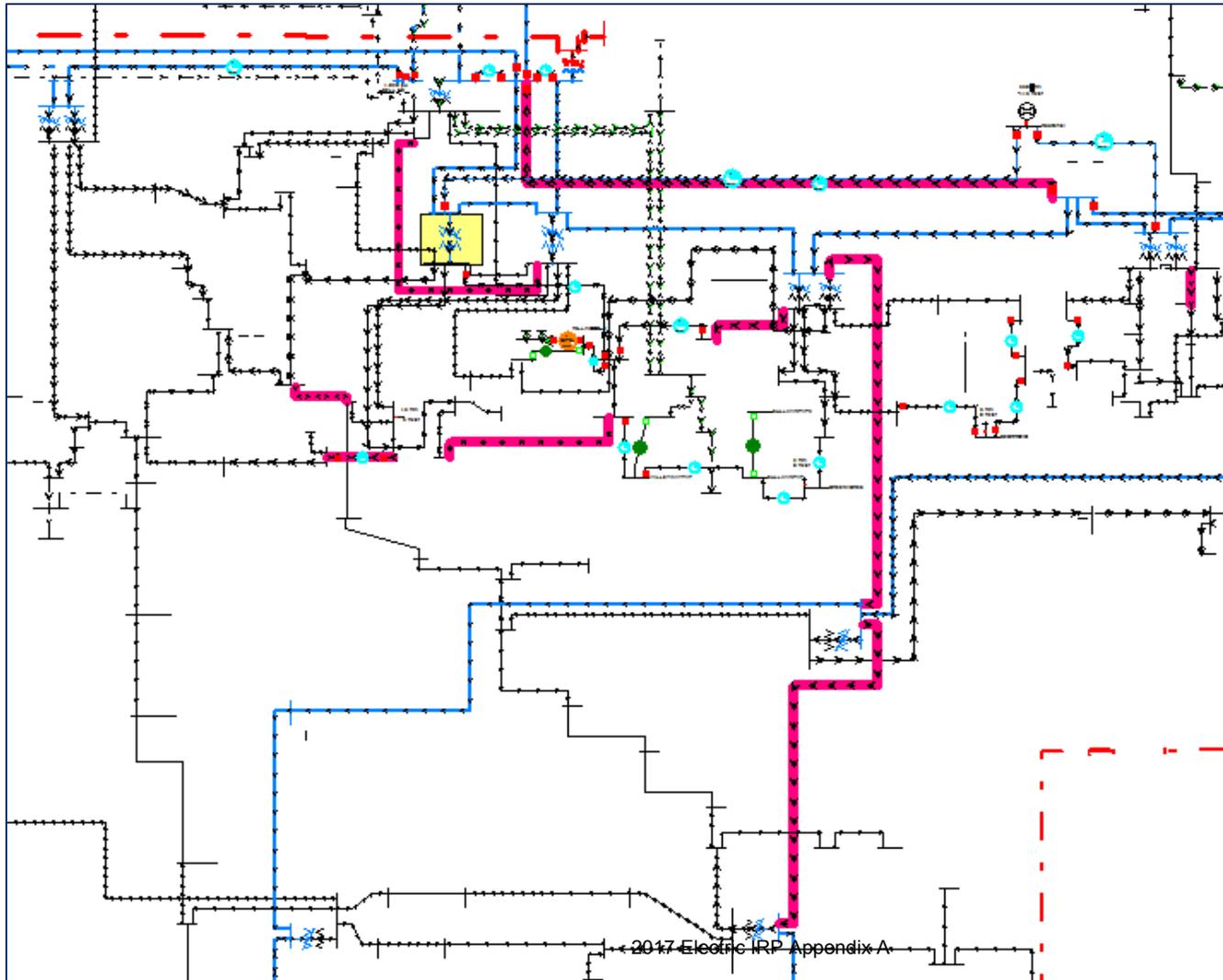
- 4 miles of 115 kV

# Kootenai: 100 MW @ 230 kV



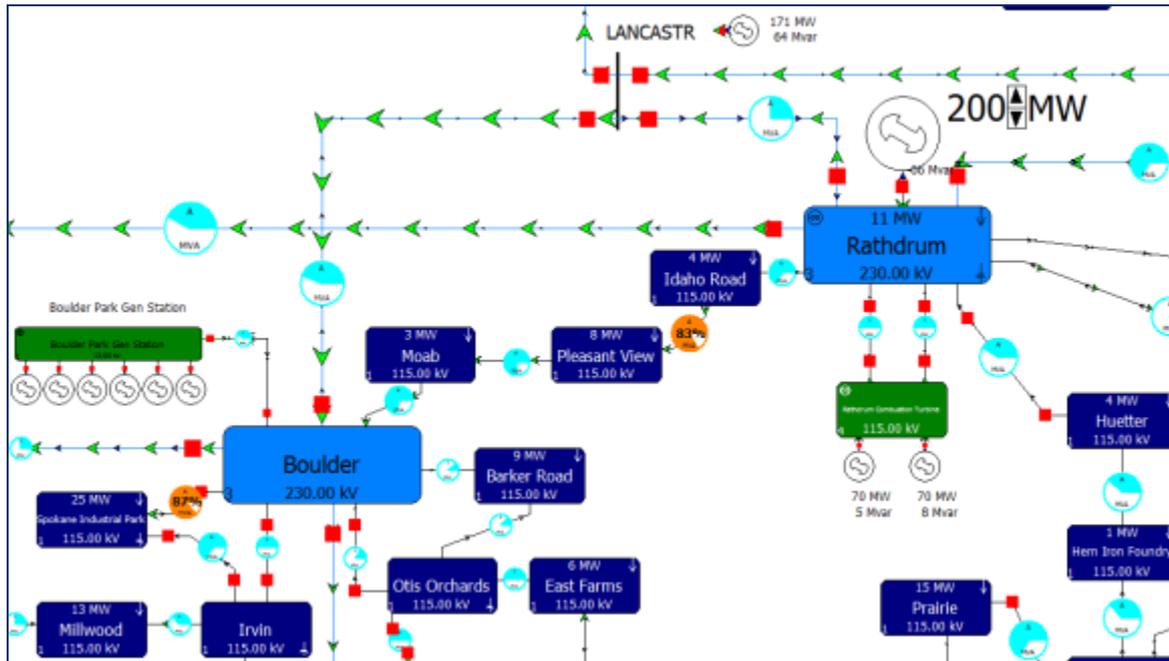
# Kootenai: 350 MW

- 88 miles of 230 kV
- 18 miles of 115 kV
- One 230/115 kV transformer



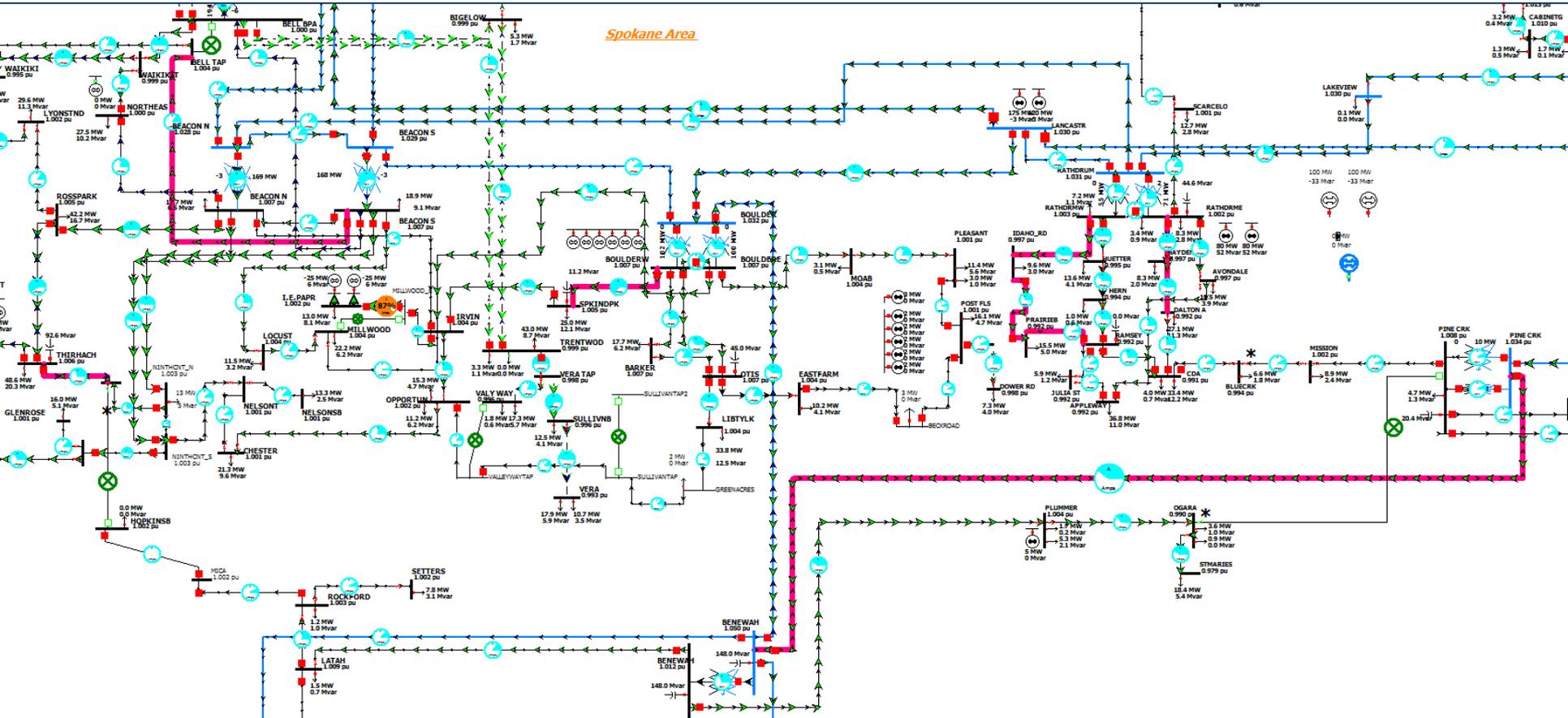
- Interconnection Only

# Rathdrum: 26 MW & 50 MW



# Rathdrum: 200 MW @ 115 kV

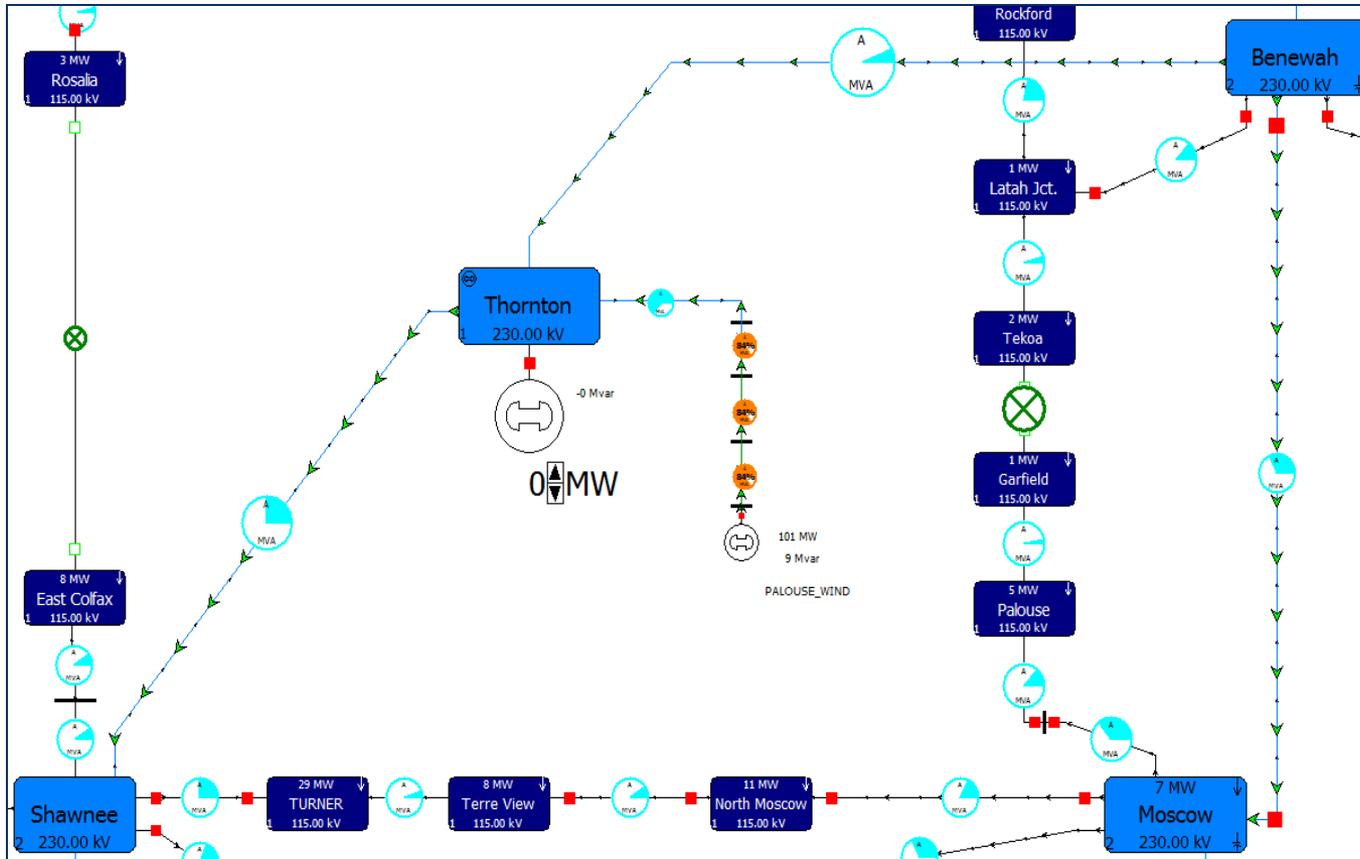
- 40 miles of 230 kV
- 30 miles of 115 kV





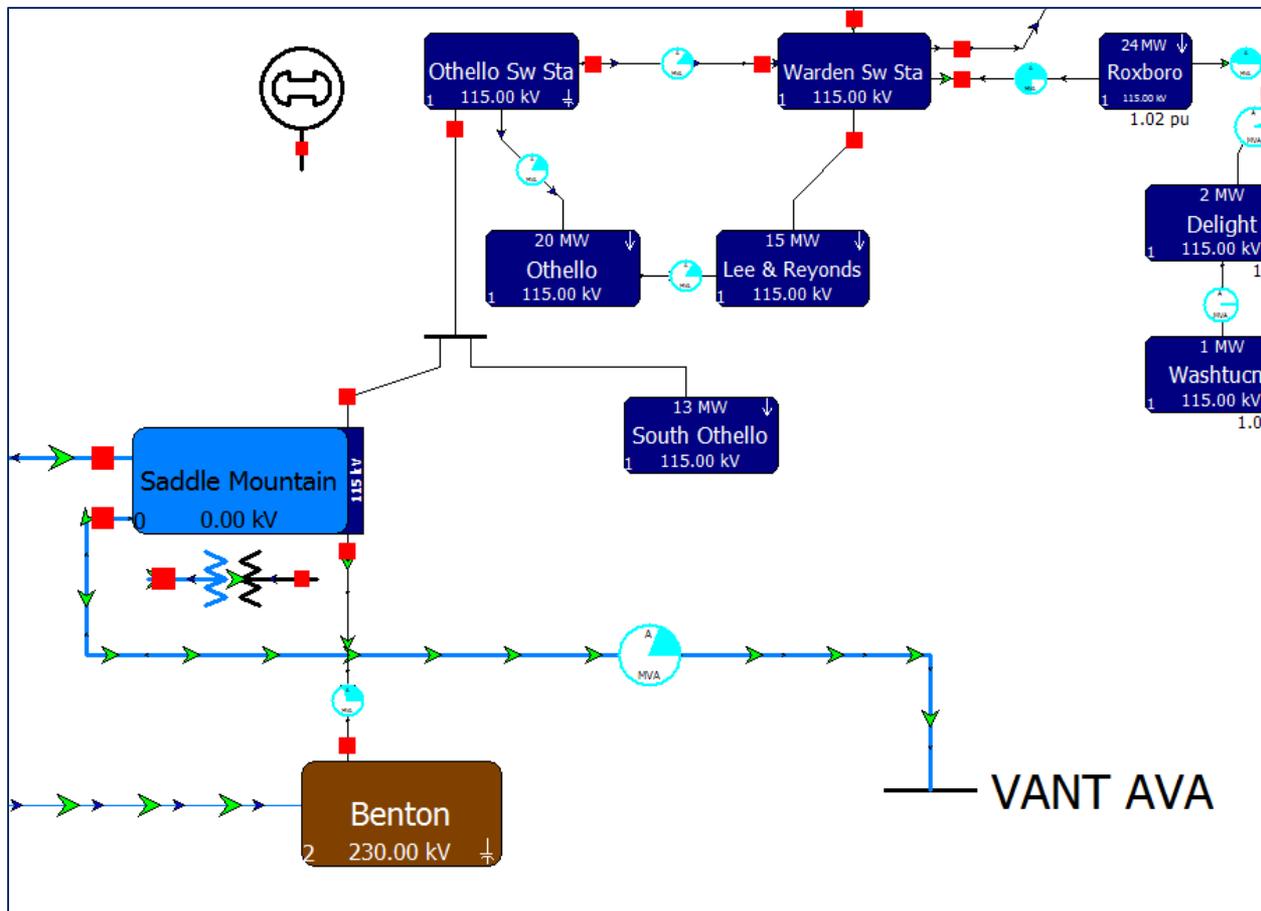
- Interconnection Only

# Thornton: 30 MW to 100 MW



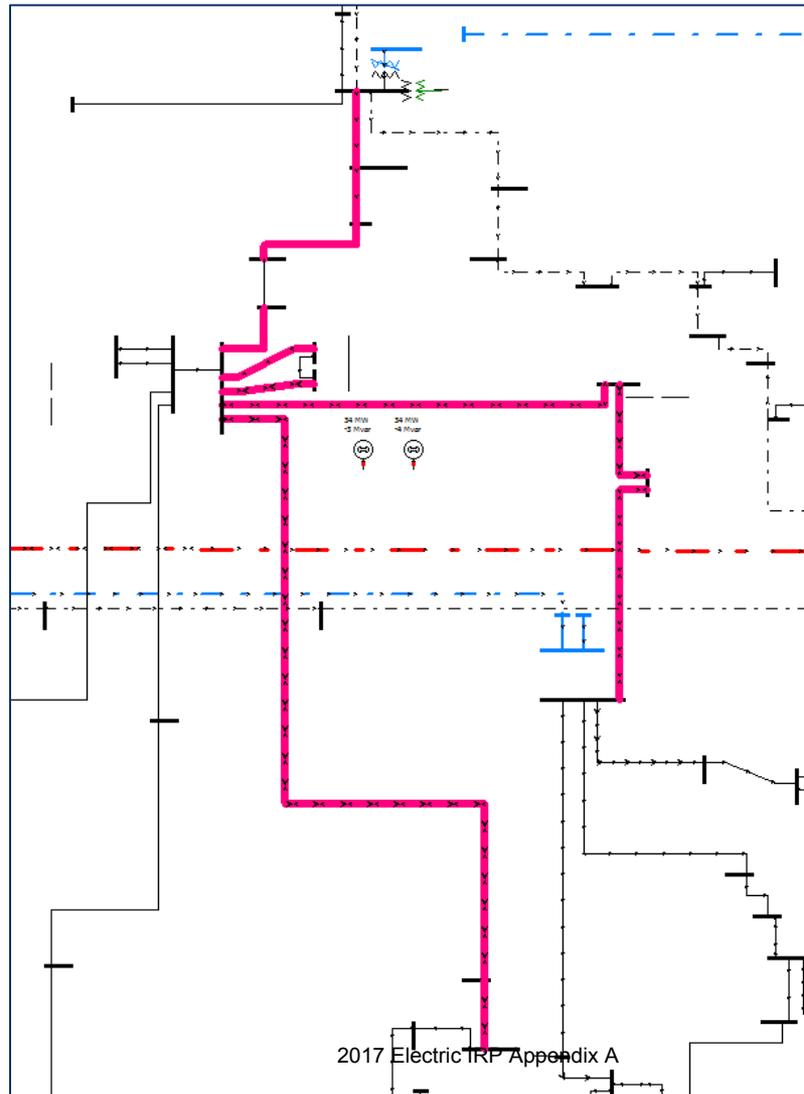
- Interconnection Only

# Othello: 25 MW



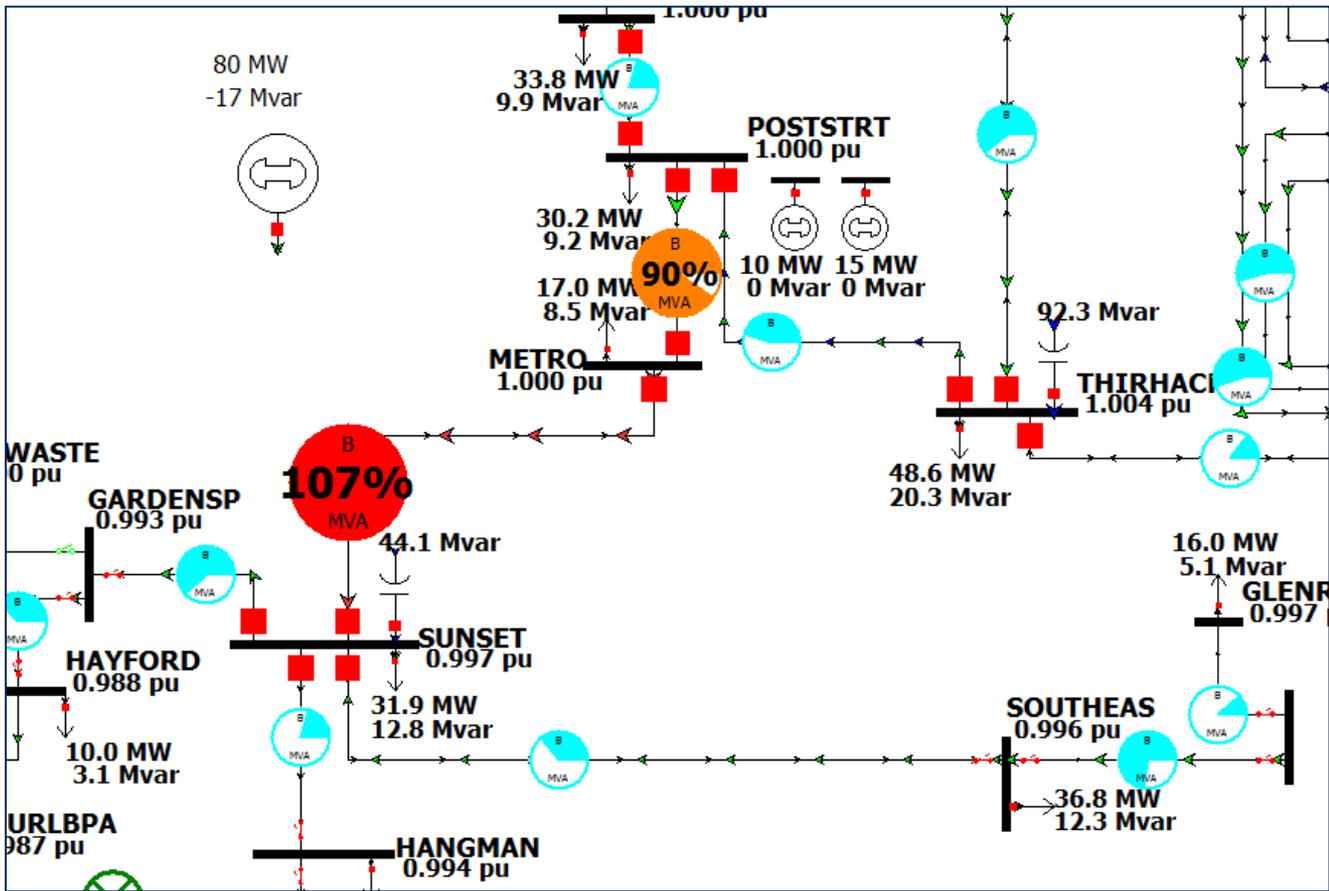
# Long Lake: 68 MW

- 75 miles of 115 kV



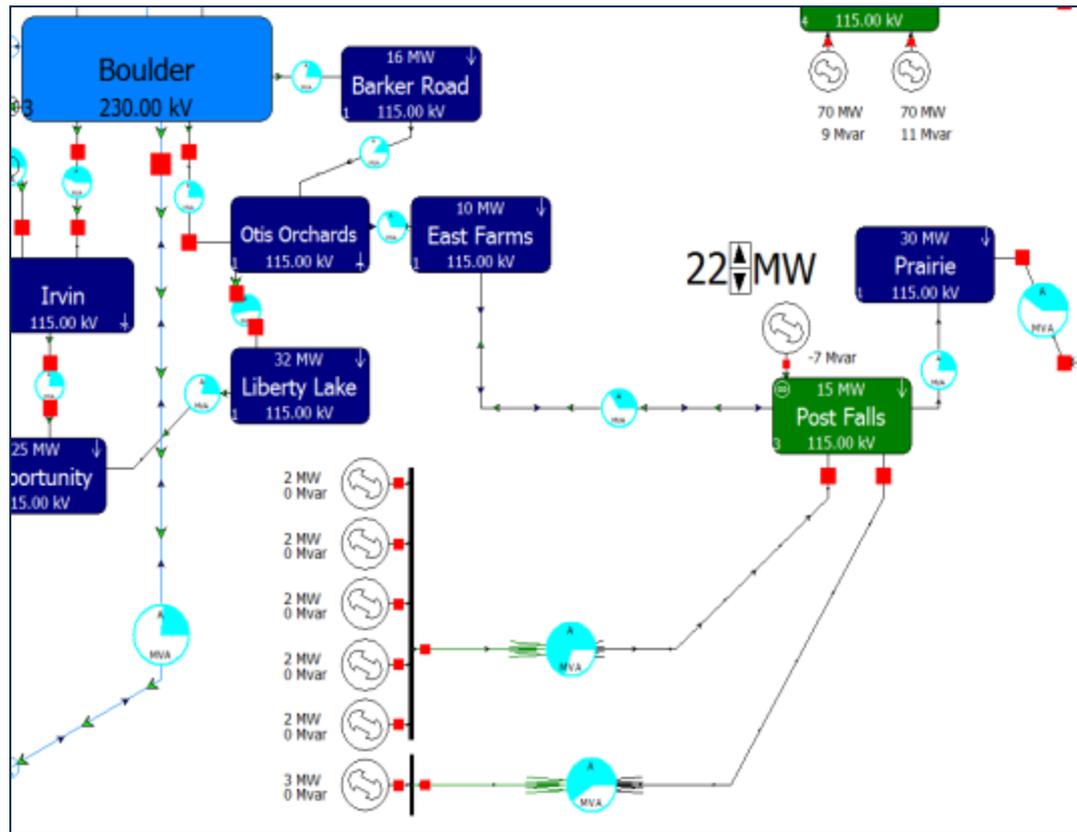
- 3 miles of 115 kV

# Monroe Street: 80 MW



- Interconnection Only

# Post Falls: 10 MW to 20 MW



# Questions?

**Avista OASIS link:**

**<http://www.oasis.oati.com/avat/index.html>**



# 2017 IRP Scenarios

John Lyons, PhD  
Fourth Technical Advisory Committee Meeting  
February 15, 2017

# Colstrip Expected Case Assumptions

- Avista's share of fuel, O&M, and capital investment costs
- Increased common costs due to shut down of units 1 & 2
- Selective catalytic reduction (SCR) – 2029, includes capital costs, ammonia and fixed and variable O&M to reduce NO<sub>x</sub>
- Enhanced mercury controls
- Coal Combustion Residuals (CCR's)
  - Coal dry ash handling (2022) and long term storage
- Smart Burn combustion controls installed in 2017
- Water management
- Depreciation schedule extends beyond 20-year plan horizon

# Colstrip Retirement Scenarios

Shows how Avista's future portfolio could change if Colstrip Units #3 and #4 close early

- Scenario 1: Retire Colstrip Units #3 and #4 in 2030 as alternative to SCR investment
- Scenario 2: Retire Colstrip Units #3 and #4 in 2035 to coincide with state of Oregon legislation and assumes no SCR investment
- Both of these cases assume the closure of Colstrip Units #1 and #2 by July 2022 to coincide with the agreements with the owners of those units

# High Colstrip Case

- This case answers the question posed by the Washington Commission in the 2015 IRP acknowledgement letter about several higher cost issues impacting Colstrip's compliance cost
- This scenario assumes:
  - Expected case assumptions, except:
  - EPA expands regional air quality programs and rules to the western U.S. such as CASPR and NAAQS requiring SCR installation on Units #3 and #4 at an earlier date **(End of 2023)**
  - Units #1 and #2 shut down earlier than announced, increasing the amount of shared costs cover by Units #3 and #4 **(End of 2018)**
  - MACT PM/MATS RTR compliance problems. Dry system required to remove particulates and reduce water use **(End of 2023)**
  - No enhancement to existing SO<sub>2</sub> scrubbers as no current regulation drives reduction levels beyond current plant emissions

# Avista Emissions Scenarios

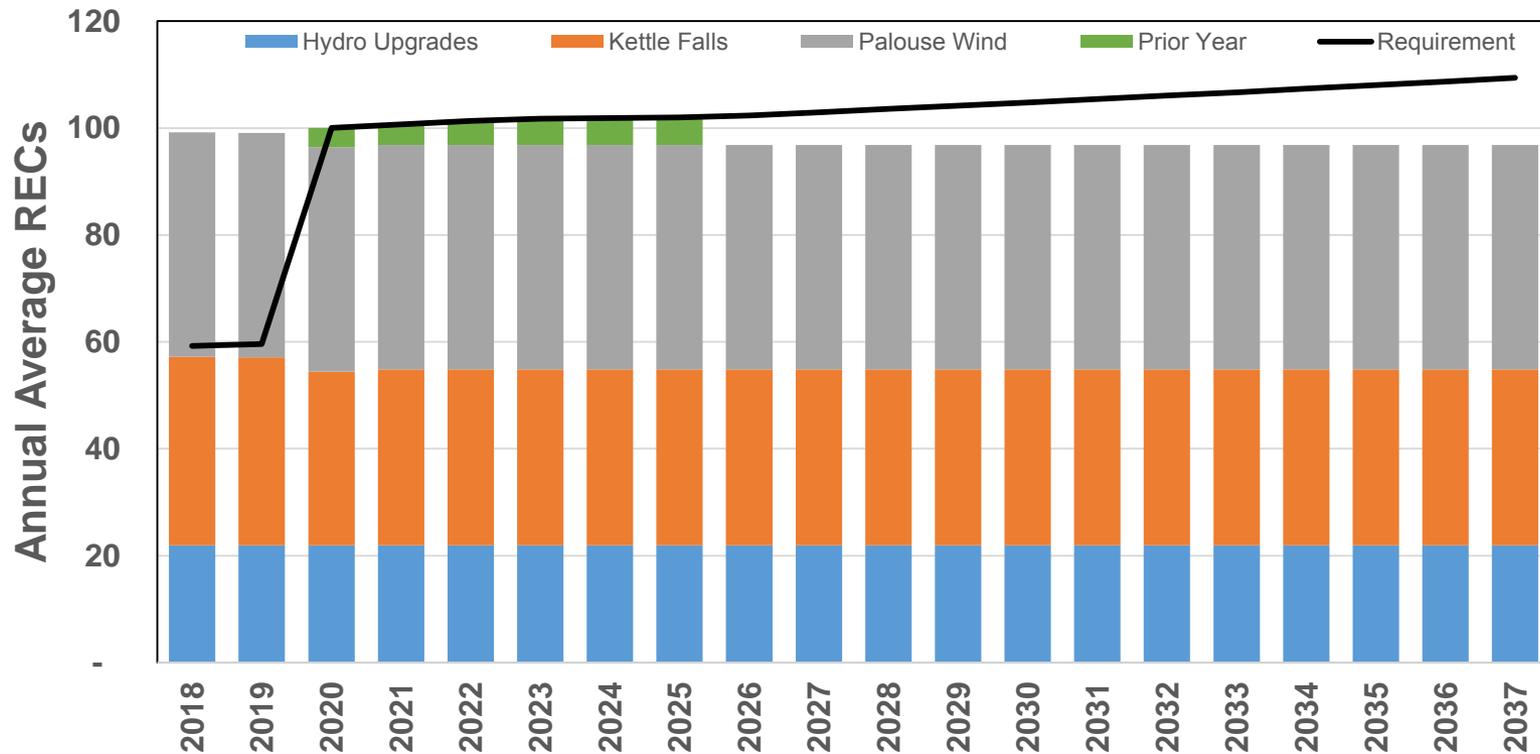
- Avista resource emissions to be 20% below 1990 levels by 2035
  - Should we assume Avista gets credit for Centralia?
  - Assumes average water year
- Avista resource emissions remain flat
  - Assumes average water year

# Renewables and Storage Scenarios

- Storage and renewables meet new resource needs
  - New resource needs met with a mixture of energy efficiency, renewables and energy storage
- Market and conservation only
- Palouse Wind at 36 aMW vs. 40 aMW
  - Study the actual performance of Palouse Wind instead of the projected energy

# What If Palouse Underperforms

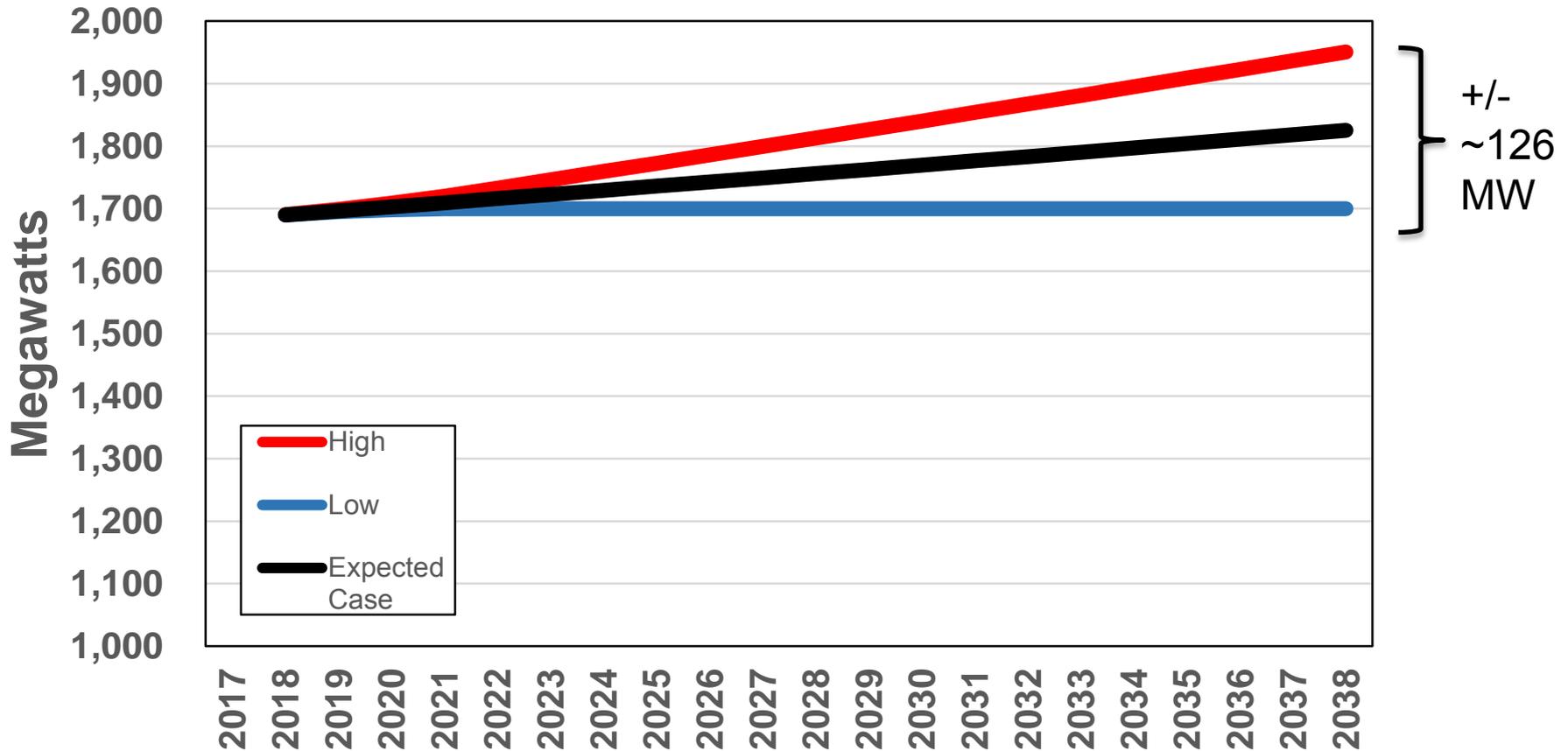
- Palouse Wind's CF since COD is 34.5%, the expected CF is 38%
- If Palouse performance stays low, new renewables will be required in 2026, unless Kettle Falls generation exceeds long term averages



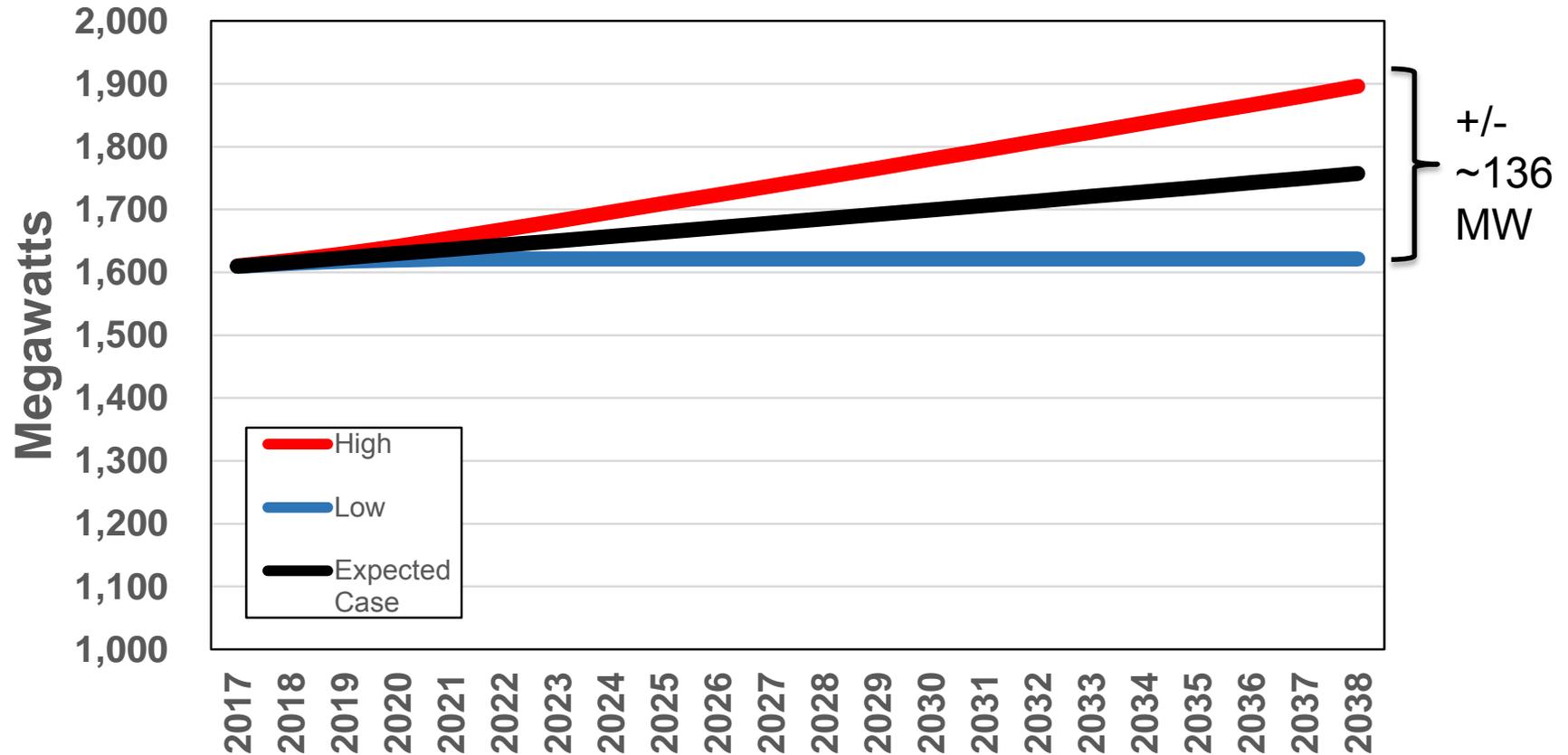
# Growth Scenarios

- High and low load growth scenarios
  - Next two slides show details
- 14 Percent Planning Margin in Summer
  - Increase summer planning margin from the current 7 percent

# January High & Low Load Scenarios



# July High & Low Load Scenarios



# Market Scenarios

- Stochastic Market Scenarios
  - No carbon restrictions
  - Colstrip retires
- Deterministic Market Scenarios
  - 50% reduction from 1990 GHG levels by 2035 (Western Interconnect)

# Resource Tipping Point Analysis

- Estimates the cost reduction needed for a resource to be selected in the Preferred Resource Strategy
  - Solar
  - Storage
  - Demand response
  - Wind with capacity credit

*2017 Electric Integrated Resource Plan*  
**Technical Advisory Committee Meeting No. 5 Agenda**  
Tuesday, March 28, 2017  
Conference Room 130

<b>Topic</b>	<b>Time</b>	<b>Staff</b>
Introduction and TAC 4 Recap	9:00	Lyons
Updated Electric Price Forecast	9:10	Gall
Energy Storage and Ancillary Services	9:30	Gall
Break	10:15	
Conservation Potential Assessment	10:30	Gifford
Lunch	12:00	
Distribution Planning	1:00	Stone
Break	2:00	
Draft Preferred Resource Strategy	2:10	Gall
Adjourn	3:30	



# 2017 Electric IRP TAC Meeting Expectations and TAC 4 Recap

John Lyons, Ph.D.

Fifth Technical Advisory Committee Meeting

March 28, 2017

# Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington every other year
- Guides resource strategy over the next two years
- Resource procurements over the next 20 years – Preferred Resource Strategy (PRS)
- Snapshot of current and projected load & resource position

# Integrated Resource Planning (Cont)

- Based on significant modeling and many assumptions
  - Fuel prices
  - Economic activity
  - Policy considerations
  - Resource costs
  - Energy efficiency
- Action Items – areas for more research in the next IRP
- This is not an advocacy forum
- Not a forum on a particular resource or resource type
- Supports rate recovery, but not a preapproval process

# Technical Advisory Committee

- The public process piece of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants in all or some of the process
- Open forum, but we need to stay on topic to get through the agenda
- Welcome requests for studies or different assumptions.
  - Time or resources may limit the amount of studies we can do
  - The earlier study requests are made, the more accommodating we can be
  - January 13, 2017 was the final date for study requests
- Planning team is also available by email or phone for questions or comments between the TAC meetings

# TAC #4 Recap

- Introduction and TAC 3 Recap
- Resource Needs Assessment
- Natural Gas Price Forecast
- Electric Price Forecast
- Transmission Planning
- Market and Portfolio Scenario Development

# Today's Agenda

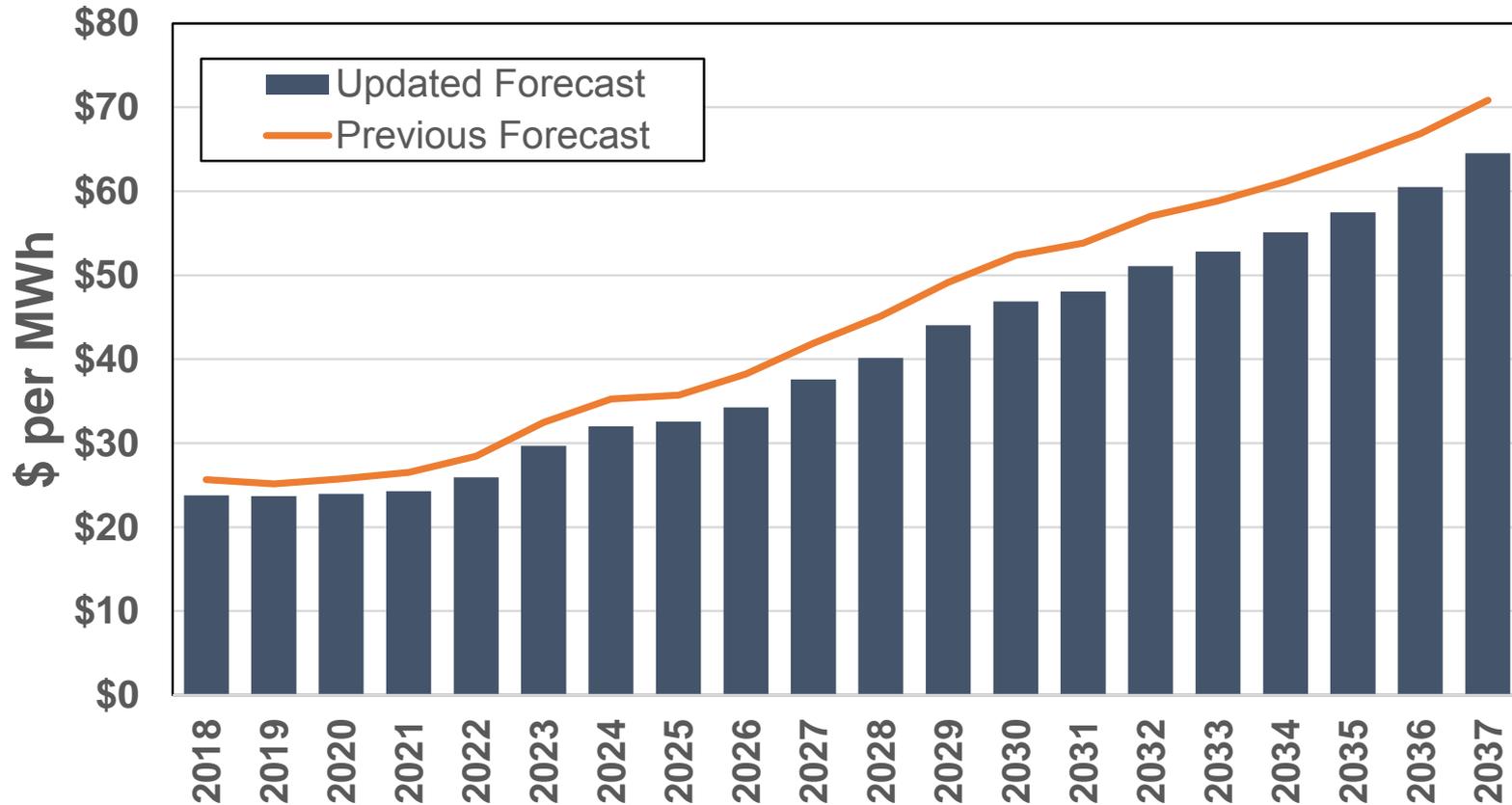
- 9:00 – Introduction and TAC 4 Recap, Lyons
- 9:10 – Updated Electric Price Forecast, Gall
- 9:30 – Energy Storage and Ancillary Services, Gall
- 10:15 – Break
- 11:00 – Conservation Potential Assessment, Gifford
- 12:00 – Lunch
- 1:00 – Distribution Planning, Stone
- 2:00 – Break
- 2:15 – Draft 2017 Preferred Resource Strategy, Gall
- 3:30 – Adjourn



# 2017 IRP Electric Market Price Forecast Update

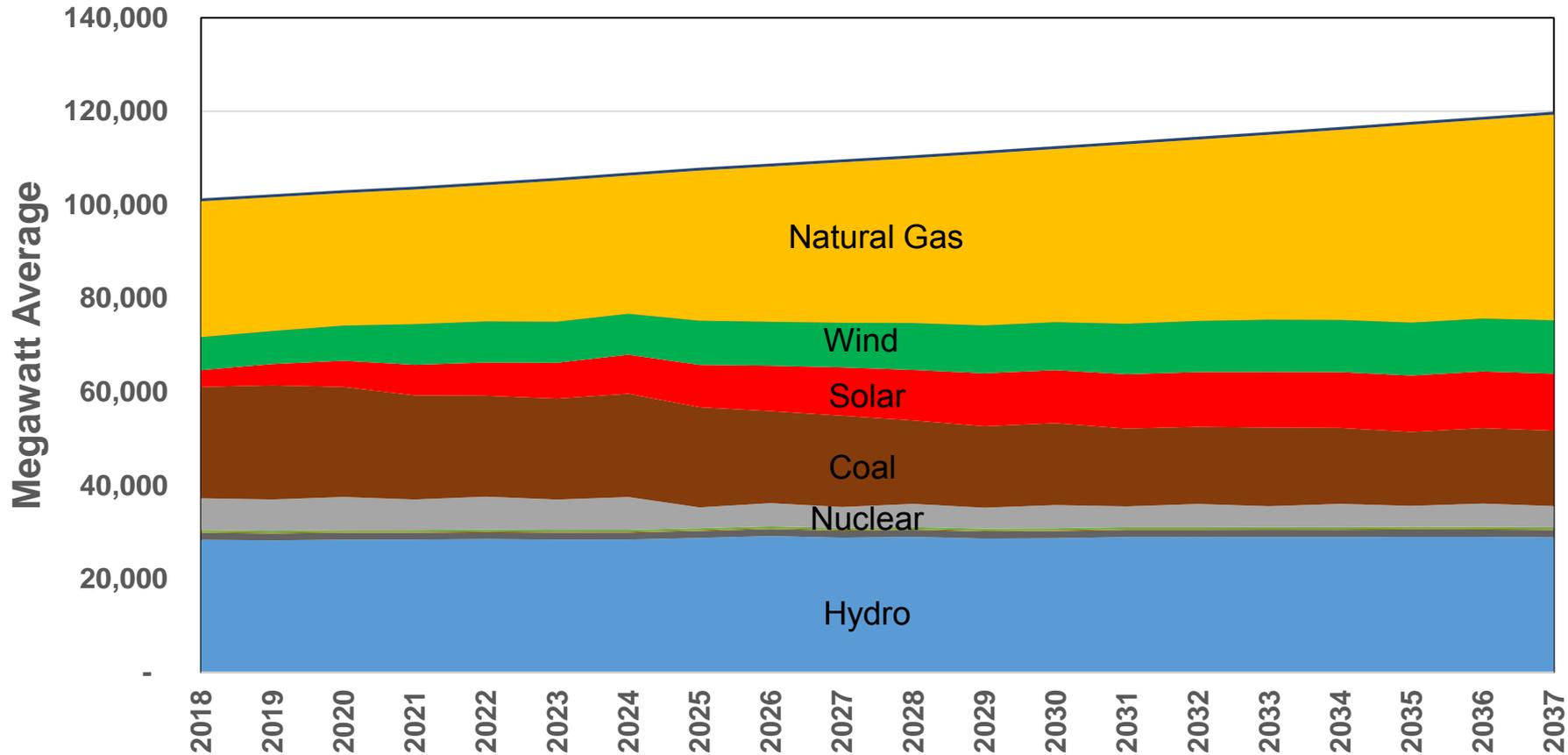
James Gall  
Fifth Technical Advisory Committee Meeting  
March 28, 2017

# Mid-C Price Forecast Comparison



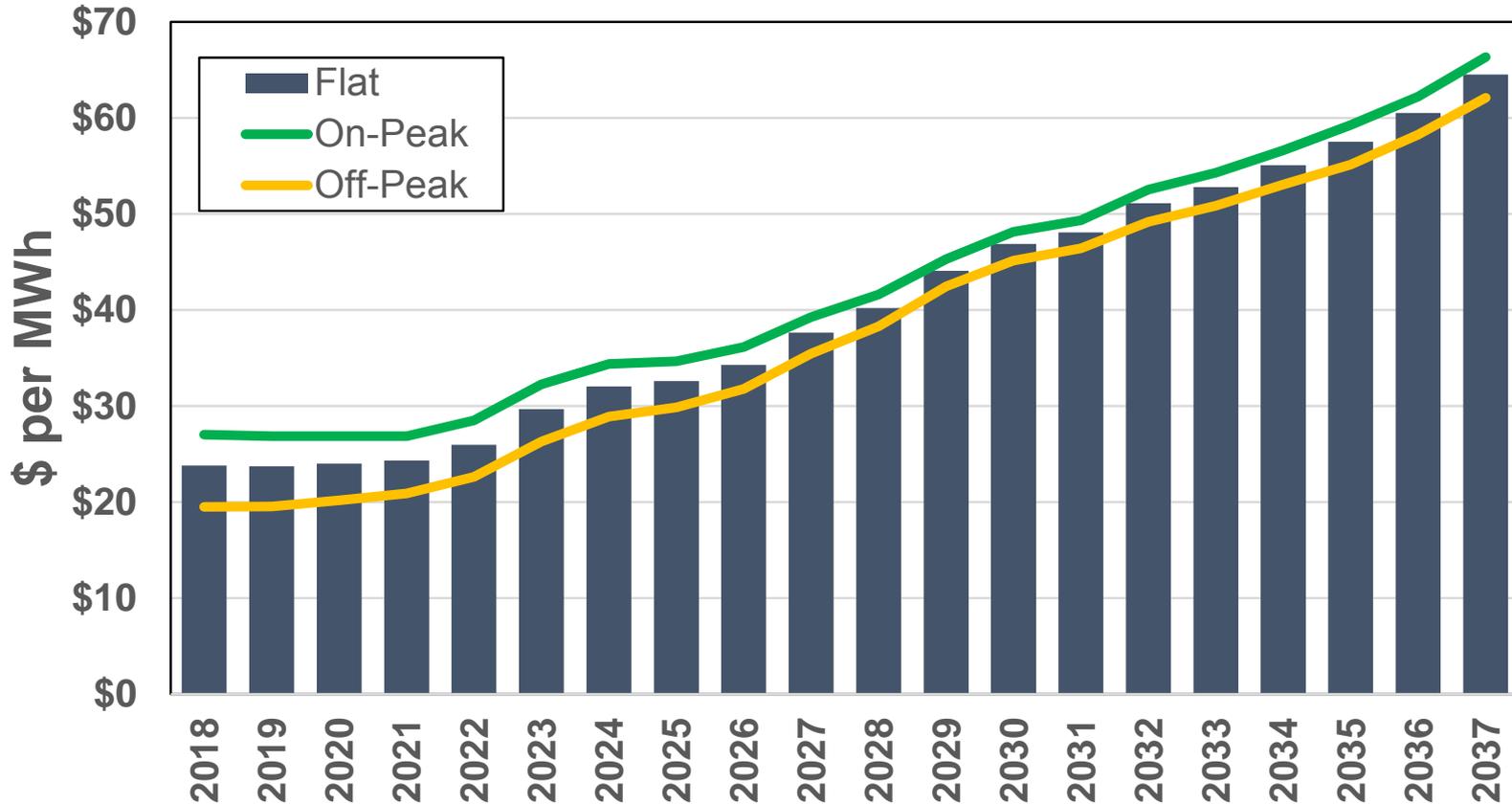
*Levelized Price: \$35.85/MWh compared to \$39.52/MWh*

# Resource Type Mix Forecast (Western Interconnect)



# Mid-Columbia Electric Price Forecast

(Mean of 500 iterations)

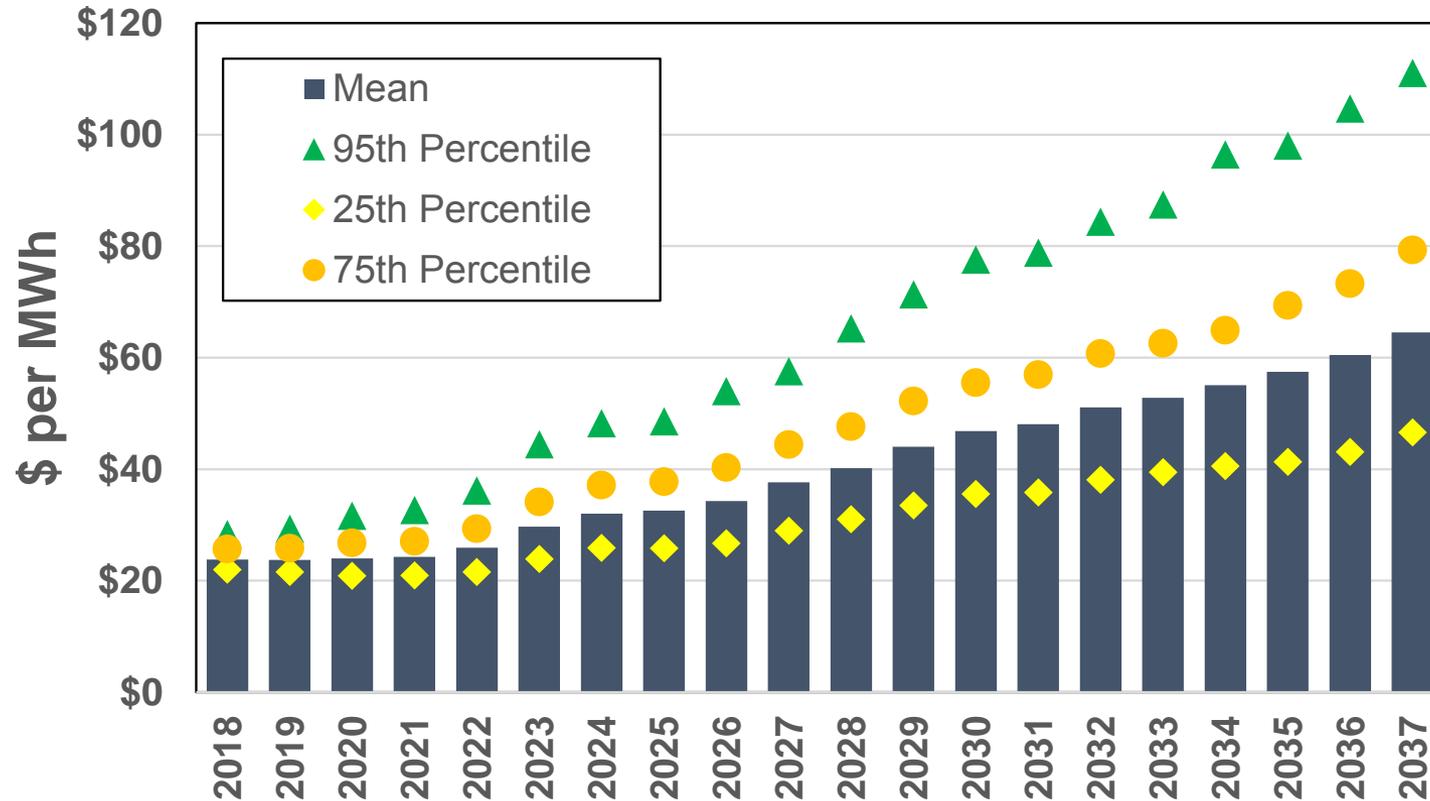


Levelized Prices

Flat: \$35.85/MWh  
 On Peak: \$38.03/MWh  
 Off Peak: \$32.94 /MWh

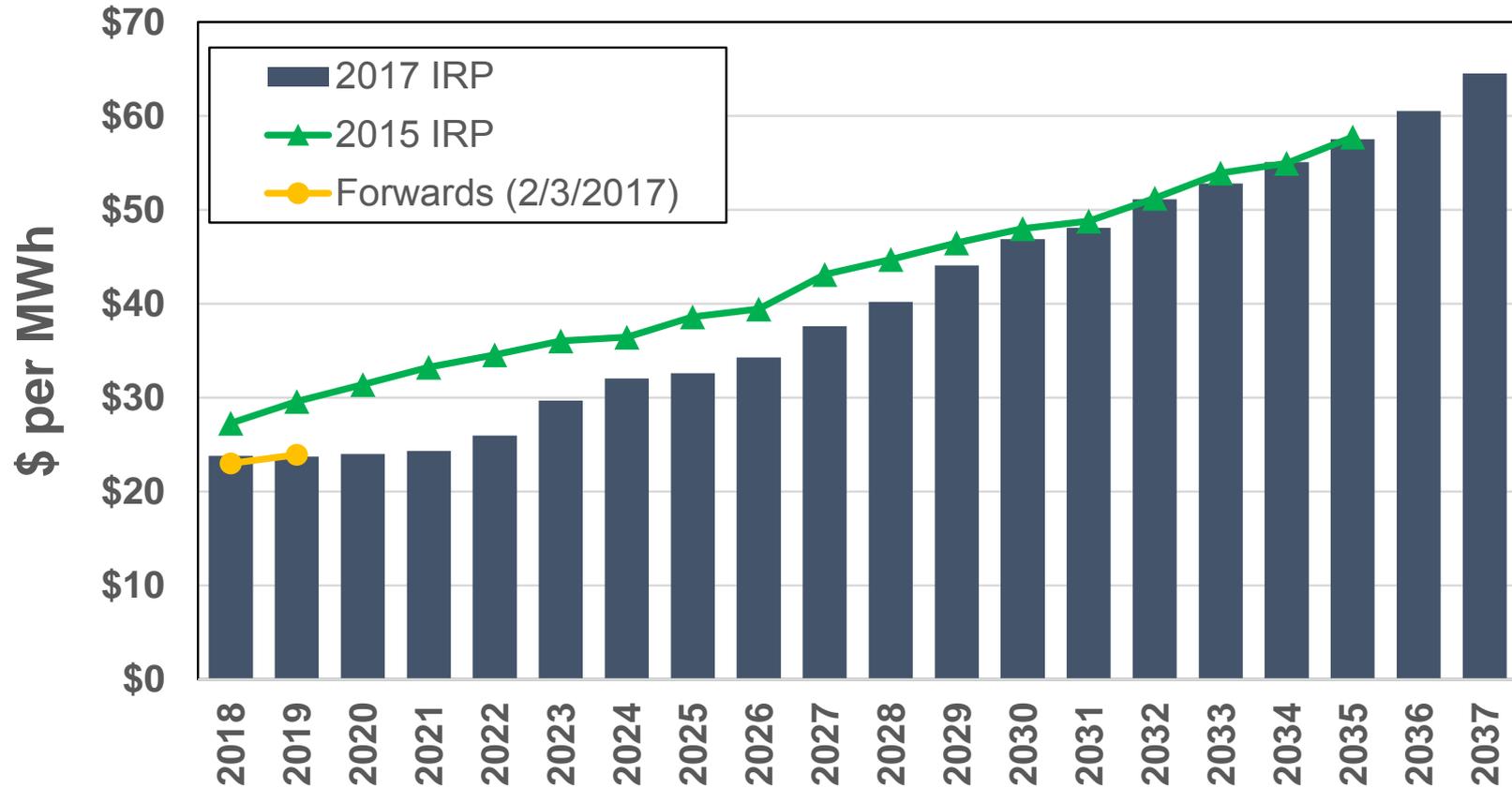
# Mid-Columbia Electric Price Forecast

## (Flat Price Statistics)



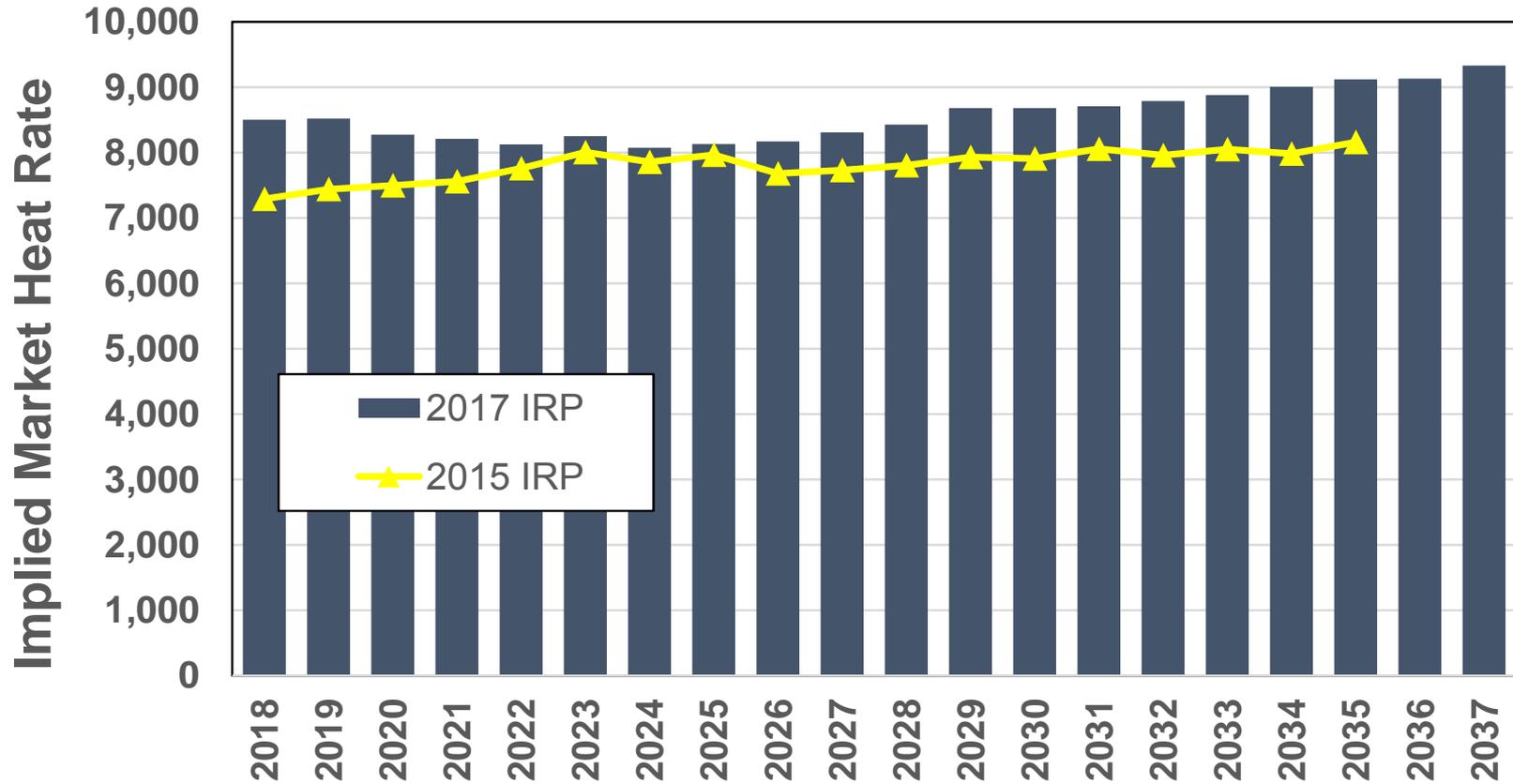
# IRP Price Forecast Comparison (Flat Prices)

349



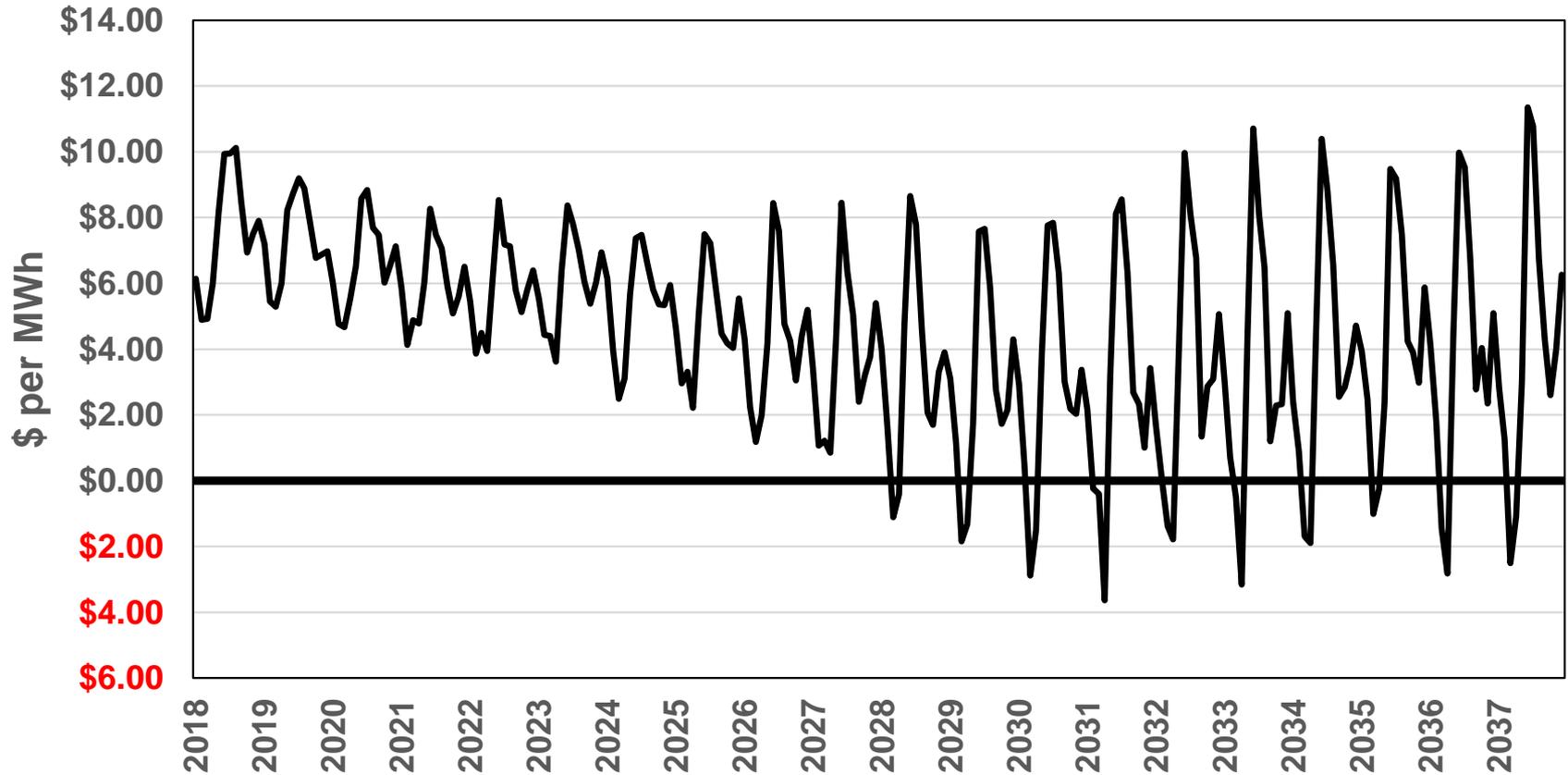
# Implied Market Heat Rate

(Mid-Columbia Electric Price/Stanfield Natural Gas Price x 1,000)

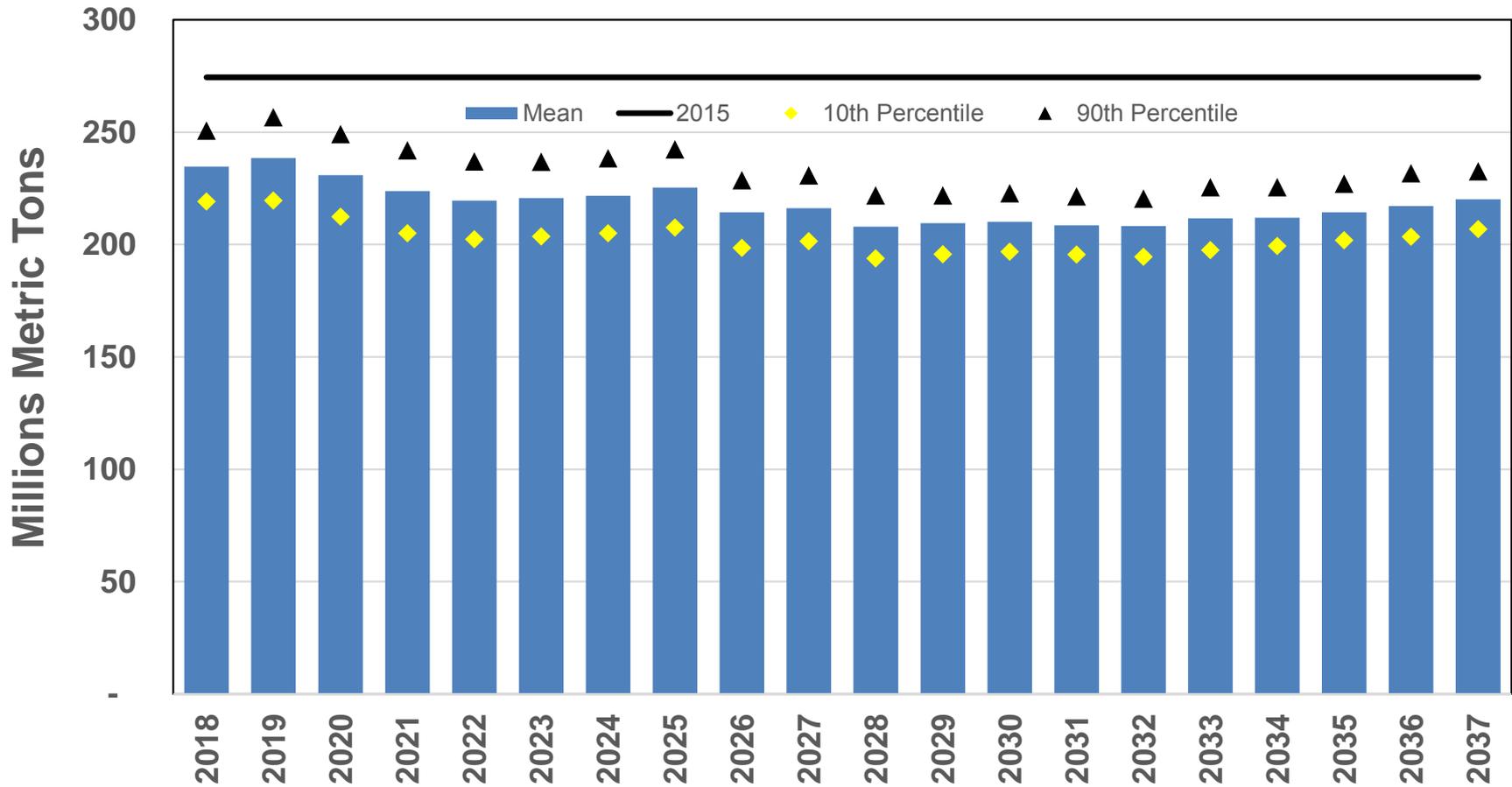


# On/Off Peak Price Spread

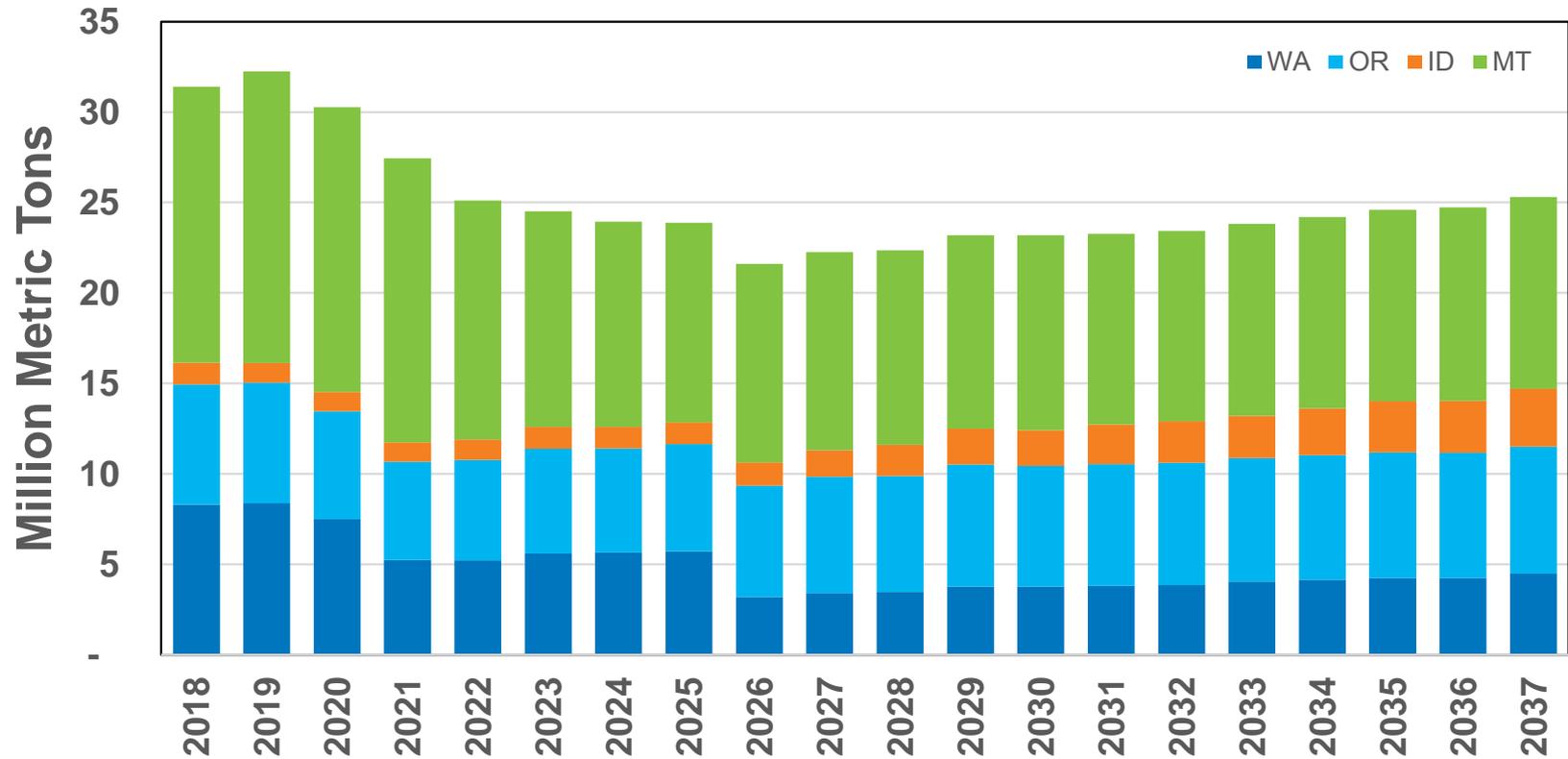
Spring months will have lower prices during the day due to solar



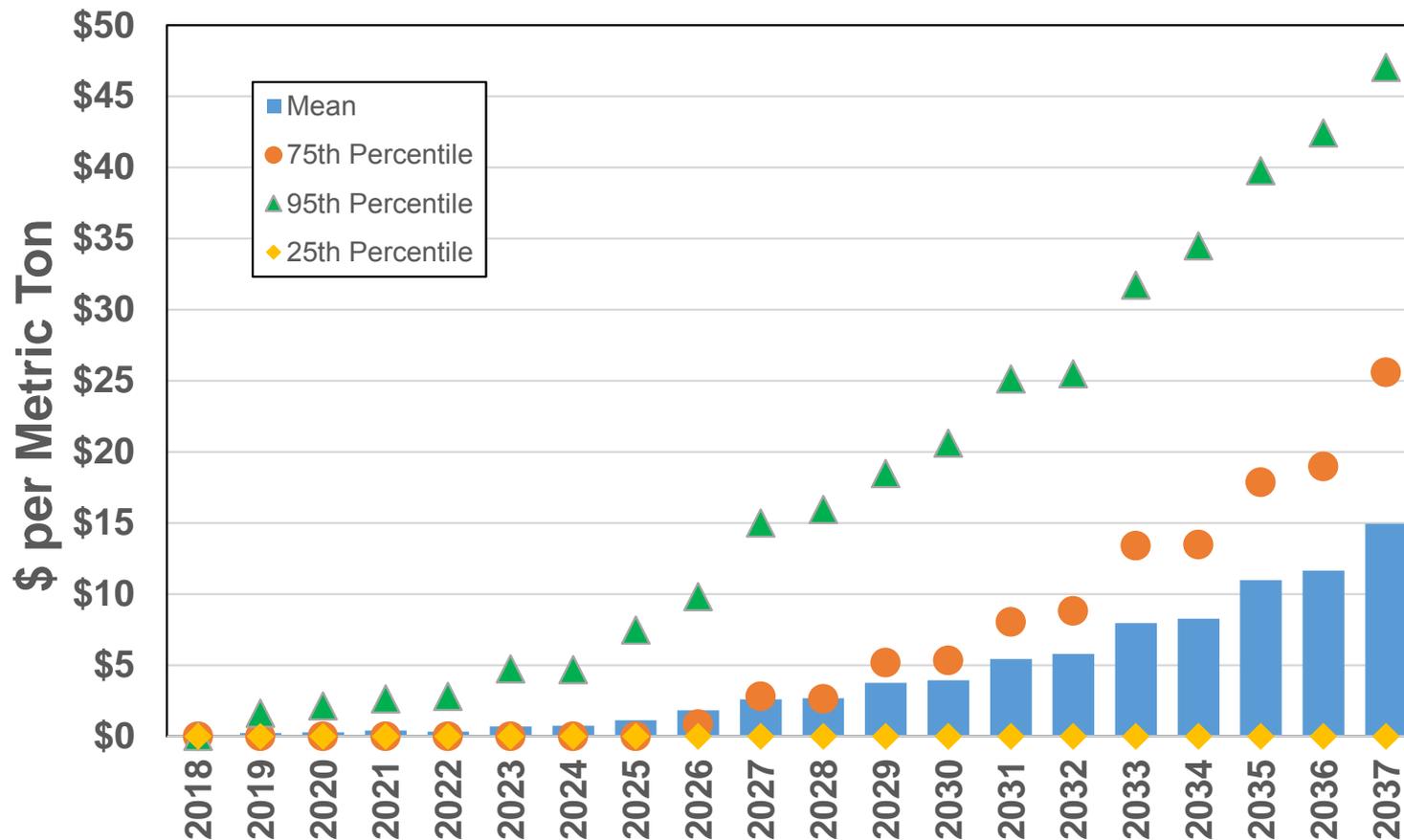
# Greenhouse Gas Emissions Forecast (US Western Interconnect Total)



# Greenhouse Gas Emissions Forecast (Northwest- WA, OR, ID & MT)



# Clean Air Rule Rule Shadow Price





# 2017 IRP Energy Storage

James Gall  
Fifth Technical Advisory Committee Meeting  
March 28, 2017

# Turner Energy Storage

**Technology:** Vanadium flow w/ four quadrant inverter

**Commercial Operation Date:** April 2015

**Capacity:** 1.2 MW

**Energy:** 3.5 MWh

**Capital Cost:** \$6.6 Million or \$1,885/ kWh plus control system costs

**O&M Costs:** ~\$22 per kWh-year

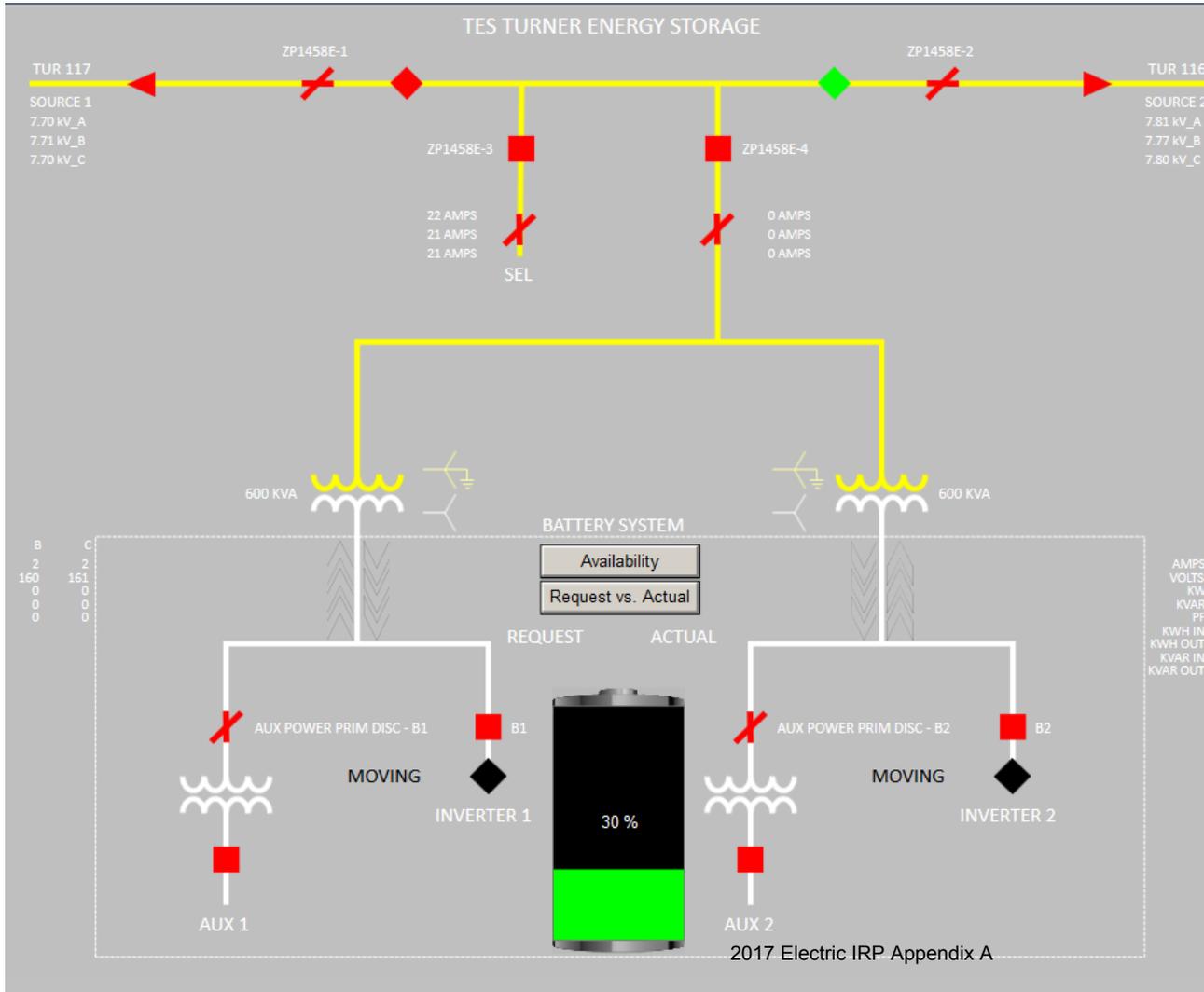
**Efficiency:** 47% - 70%



*Avista is working with PNNL to identify use cases and value streams and studying the potential applications of the system*

2017 Electric IRP Appendix A

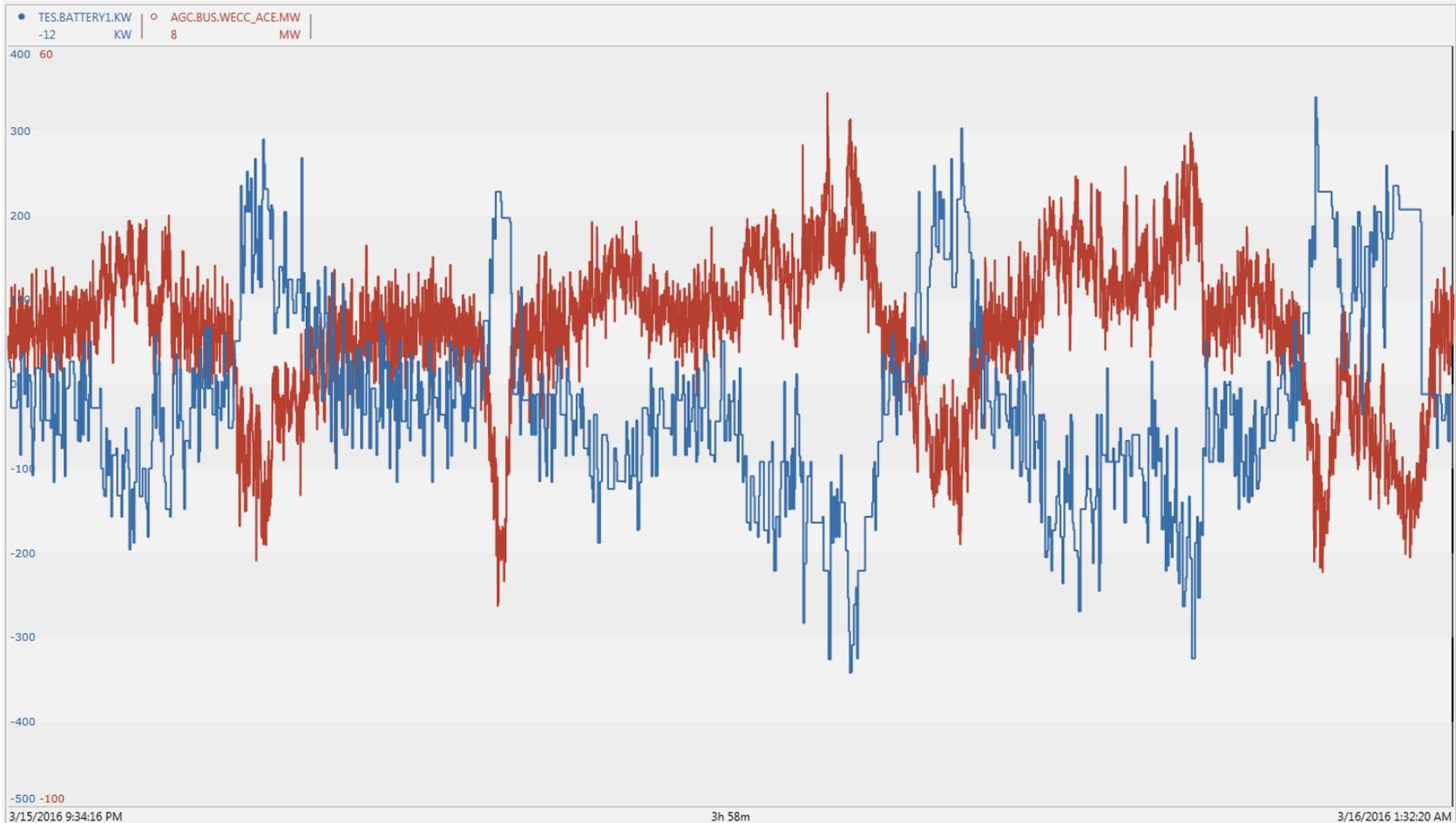
# Turner Energy Storage Snapshot 3/17/2017



Item	Quantity
MWh In	954.1
MWh Out	452.0
kVar In	176,609
kVar Out	508,122

# Turner Storage Facility Usage

## Test Case using the unit to reduce Area Control Error (ACE)



# Clean Energy Funds II Project <sup>359</sup>

- Shared Energy Economy Project
  - 1x4: 0.5 MW, 2.0 MWh vanadium flow storage
  - 1x5: 0.1 MW, 0.5 MWh vanadium flow storage
  - 75 kW roof top solar
  - 125 kW roof top solar
  - Building management systems
  - Microgrid control system



# Current Storage Technologies

## Overview of Selected Energy Storage Technologies (cont'd)

There is a wide variety of energy storage technologies currently available and in development; some technologies are better suited to particular use cases or other operational requirements (e.g., geological considerations for compressed air, heat considerations for lithium-ion and sodium, etc.) than competing technologies

	SELECTED COMPARATIVE ADVANTAGES	SELECTED COMPARATIVE DISADVANTAGES
<b>COMPRESSED AIR</b>	<ul style="list-style-type: none"> <li>Low cost, flexible sizing, relatively large-scale</li> <li>Mature technology and well-developed design</li> <li>Leverages existing gas turbine technologies</li> </ul>	<ul style="list-style-type: none"> <li>Requires suitable geology</li> <li>Relatively difficult to modularize for smaller installations</li> <li>Exposure to natural gas price changes</li> </ul>
<b>FLOW BATTERY‡</b>	<ul style="list-style-type: none"> <li>Power and energy profiles highly and independently scalable (for technologies other than zinc-bromine)</li> <li>Designed in fixed modular blocks for system design (for zinc-bromine technology)</li> <li>No degradation in “energy storage capacity”</li> </ul>	<ul style="list-style-type: none"> <li>Power and energy rating scaled in a fixed manner for zinc-bromine technology</li> <li>Relatively high balance of system costs</li> <li>Reduced efficiency due to rapid charge/discharge</li> </ul>
<b>FLYWHEEL</b>	<ul style="list-style-type: none"> <li>High power density and scalability for short duration technology; low power, higher energy for long-duration technology</li> <li>High depth of discharge capability</li> <li>Compact design with integrated AC motor</li> </ul>	<ul style="list-style-type: none"> <li>Relatively low energy capacity</li> <li>High heat generation</li> <li>Sensitive to vibrations</li> </ul>
<b>LEAD-ACID‡</b>	<ul style="list-style-type: none"> <li>Mature technology with established recycling infrastructure</li> <li>Advanced lead-acid technologies leverage existing technologies</li> </ul>	<ul style="list-style-type: none"> <li>Poor ability to operate in a partially charged state</li> <li>Relatively poor depth of discharge and short lifespan</li> </ul>
<b>LITHIUM-ION‡</b>	<ul style="list-style-type: none"> <li>Multiple chemistries available</li> <li>Rapidly expanding manufacturing base leading to cost reductions</li> <li>Efficient power and energy density</li> </ul>	<ul style="list-style-type: none"> <li>Remains relatively high cost</li> <li>Safety issues from overheating</li> <li>Requires advanced manufacturing capabilities to achieve high performance</li> </ul>
<b>PUMPED HYDRO</b>	<ul style="list-style-type: none"> <li>Mature technology (commercially available; leverages existing hydropower technology)</li> <li>High power capacity solution</li> </ul>	<ul style="list-style-type: none"> <li>Relatively low energy density</li> <li>Limited available sites (i.e., water availability required)</li> </ul>
<b>SODIUM‡</b>	<ul style="list-style-type: none"> <li>High temperature technology: Relatively mature technology (commercially available); high energy capacity and long duration</li> <li>Low temperature technology: Smaller scale design; emerging technology and low cost potential; safer</li> </ul>	<ul style="list-style-type: none"> <li>Although mature, inherently higher costs—low temperature batteries currently have a higher cost with lower efficiency</li> <li>Potential flammability issues for high-temperature batteries</li> </ul>
<b>THERMAL</b>	<ul style="list-style-type: none"> <li>Low cost, flexible sizing, relatively large-scale</li> <li>Power and energy ratings independently scalable</li> <li>Leverages mature industrial cryogenic technology base; can utilize waste industrial heat to improve efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Technology is pre-commercial</li> <li>Difficult to modularize for smaller installations</li> </ul>
<b>ZINC‡</b>	<ul style="list-style-type: none"> <li>Currently quoted as low cost</li> <li>Deep discharge capability</li> </ul>	<ul style="list-style-type: none"> <li>Currently unproven commercially</li> <li>Lower efficiency</li> </ul>

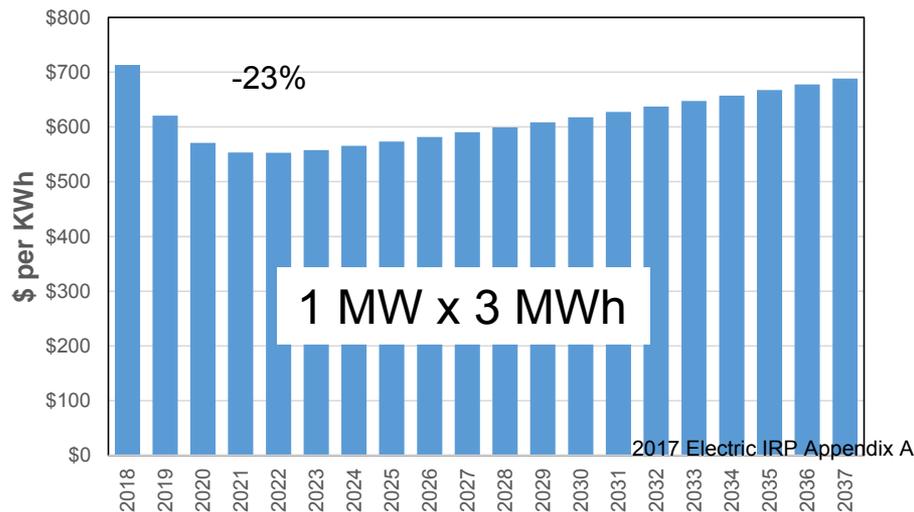
# Avista's Storage Cost Assumptions

Functional instead of technology specific due to infancy of storage technology:

- Capital Cost: 1 x 3: \$713/kWh (\$2018)
- Capital Cost: 1 x 6: \$642/kWh (\$2018)
- Fixed O&M: \$20/kWh-yr (\$2018)
- Efficiency: 80%
- Depreciable life: 20 Years
- Cost Projection:

For storage, we are modeling where we expect the technology to be in the future, not where the technology is today.

As the technology is more proven, the IRP will reflect these new assumptions and more specific technologies.



# Capacity Cost Comparisons

- NW Power Council

- Draft Value of Energy Storage to the Future Power System White Paper
- <https://nwcouncil.app.box.com/s/8fua9h9k4k3na3cra628vvm69klrkvdz>

	Maturity	Overnight System Cost (\$/kWh)	Power (MW)	Discharge Duration	Round Trip Efficiency	Expected Life (Cycles)
<b>Battery: Li-Ion</b>	Deploy	370-900	1-10's	Hours	87-94	10,000
<b>Battery: Flow</b>	Demo	480-1000	1-10's	Hours	65-75	> 10,000
<b>Compressed Air</b>	Mature	130-180	1-100's	Hours	40-45	Indefinite
<b>Flywheels</b>	Demo	550-950	1-10's	Minutes	70-85	Indefinite
<b>Pumped Hydro</b>	Mature	200-300	100's	Hours	80	Indefinite

Table 3: Comparison of typical costs associated with energy storage technologies. These are unsubsidized all-in overnight costs (storage device, power converter, remaining balance of system, EPC) which do not include capital charges.

- Lazard

- Levelized Cost of Storage Analysis 2.0
- <https://www.lazard.com/media/438042/lazard-levelized-cost-of-storage-v20.pdf>



# Avista Storage Value Streams

- Resource capacity
- Deferred T&D investment
- Market arbitrage
- Power Supply Services
  - Regulation
  - Load following
  - Operating reserves
- Network Services
  - Reliability (outage mitigation)
  - Black start
  - Voltage support
  - Frequency response

# Resource Capacity

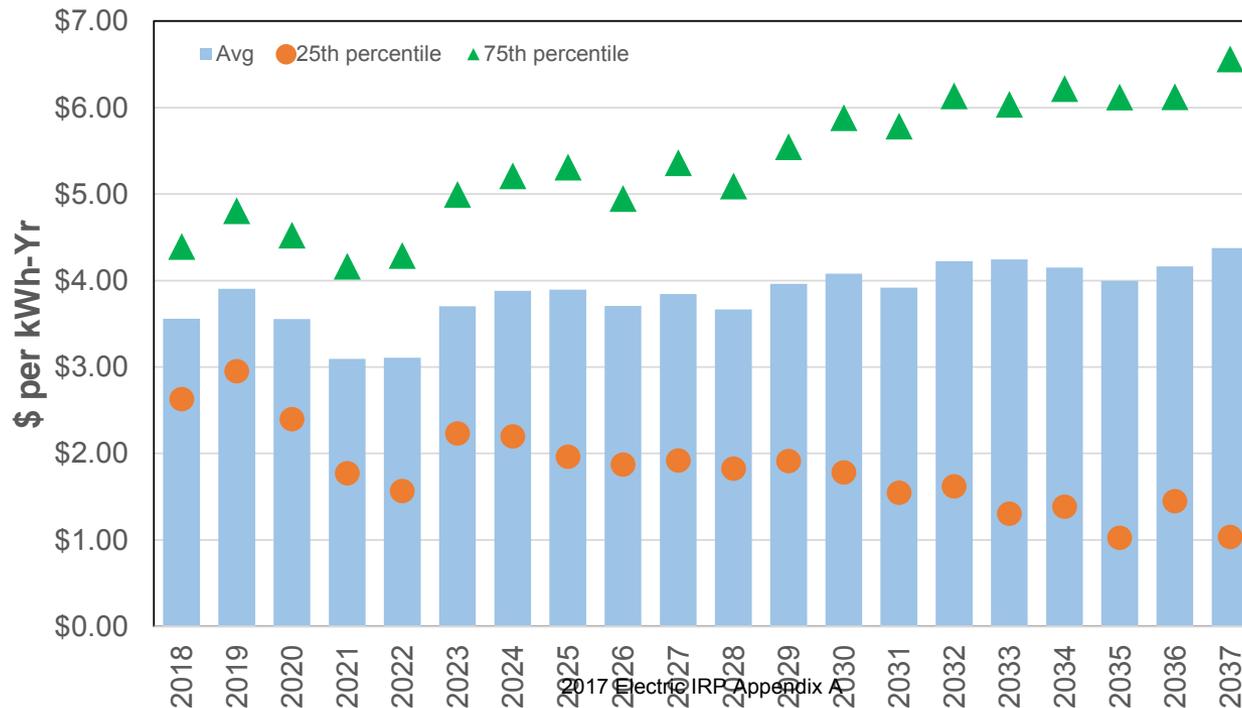
- Storage can help meet system peak load if properly sized
- Avista plans for both single hour and sustained peak loads,
  - 3 hours for winter planning
  - 6 hours for summer planning
- Valuation is based on alternative capacity resources

# Deferred T&D Investment

- Storage could defer the need to upgrade existing feeders, if the system is reliable and has enough energy to reduce feeder load below capacity
- T&D benefit depends on the feeder and its load characteristic
- Avista uses three sample feeders to estimate generic savings for IRP modeling, the value increases closer to the investment requirement
  - Barker Road Substation
    - 3.4 MW, with 9 MWh could defer project 16 years (\$5 – \$16/ kWh-yr)
  - Liberty Lake Substation
    - 6 MW, with 43 MWh could defer project 21 years (\$1 – \$10/ kWh-yr)
  - Hallet & White Substation
    - 1.7 MW, with 10.5 MWh could defer project 9 years (\$10 – \$19/ kWh-yr)
- This IRP assumes \$10 /kWh-yr (\$2018) as a generic investment offset

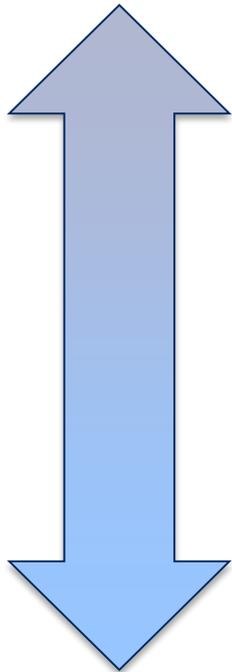
# Market Arbitrage

- AURORA dispatches storage resource options to optimize dispatch and charging
- The chart below is the arbitrage value based on the 1 x 3 storage project, net of charging losses



# Power Supply Services

Instantaneous



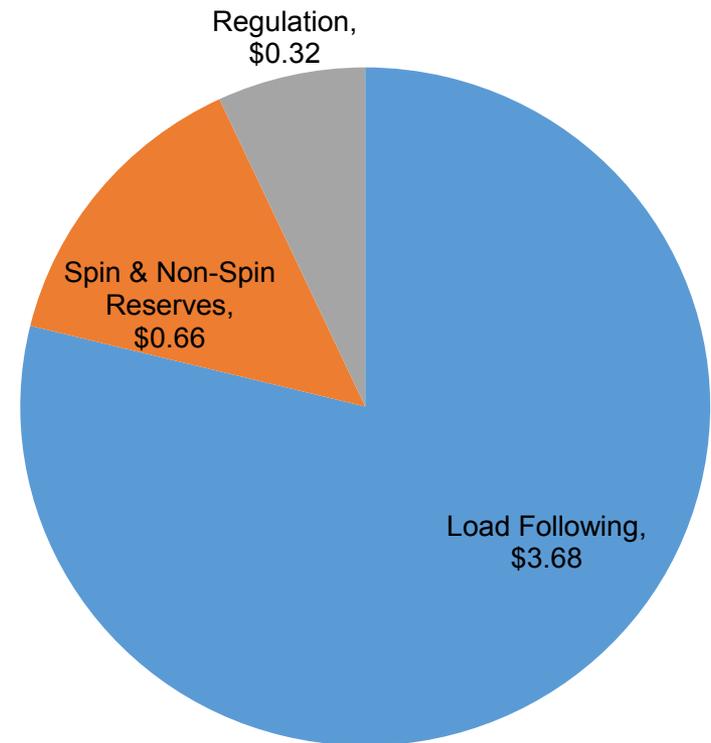
Regulation

Load Following

Operating Reserves

One Hour

2015 IRP Value per kWh-yr



# Network Services

- Valuation of network services is in progress as part of the evaluation process of the Clean Energy Funds with PNNL.
  - Reliability & Black start (outage mitigation)
  - Voltage support
  - Frequency response
- Report completed in spring 2018

# Cost & Benefit Example

- For a 2018, 1 MW and 3 MWh facility
- Nominal Levelized Cost, \$/kWh-yr

Item	\$/kWh- Yr
Capital Recovery	85
Fixed O&M	23
<b>Total Cost</b>	<b>108</b>
Capacity Value	37
Distribution Deferment	10
Arbitrage Value	4
Power Supply Services	7
Network Services	TBD
<b>Total Benefit</b>	<b>58</b>

# 2019 IRP Action Items

- Continue to follow storage technology growth and development
  - Storage analysis is evolving and will take time.
- Model more specific technologies.
  - Consider specific efficiency, degradation, life expectancy, and energy/capacity ratios of the most likely storage technologies.
- Include “network services” benefit based on learnings from PNNL study.
- Refresh “power supply services” benefits, using intra-hour modeling.
- Continue to work with T&D planning for potential locational benefits and network services benefits.
- Learn from Shared Energy Economy Project
- Solar Plus, three year DOE funded research project to determine distribution value streams for solar & storage



# AVISTA ELECTRIC CPA METHODOLOGY

MARCH 28, 2017

# AGENDA

- Overview of Analysis Approach
  - Market characterization
  - Baseline projection
  - Measure screening
  - Ramp rate development
- Potential Results
  - Overall – Washington and Idaho
  - Washington by sector
  - Idaho by sector
- Consistency with Council Methodology



# OVERVIEW OF ANALYSIS APPROACH

# WHY DO A POTENTIAL STUDY?

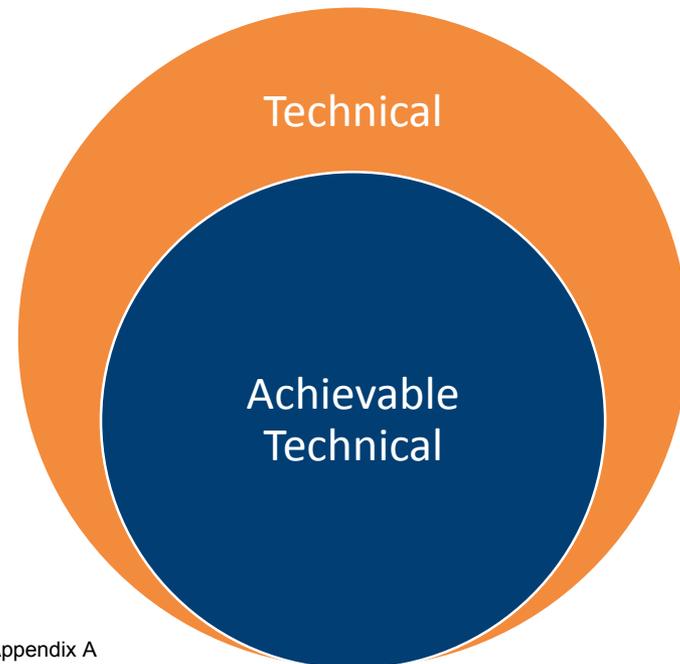
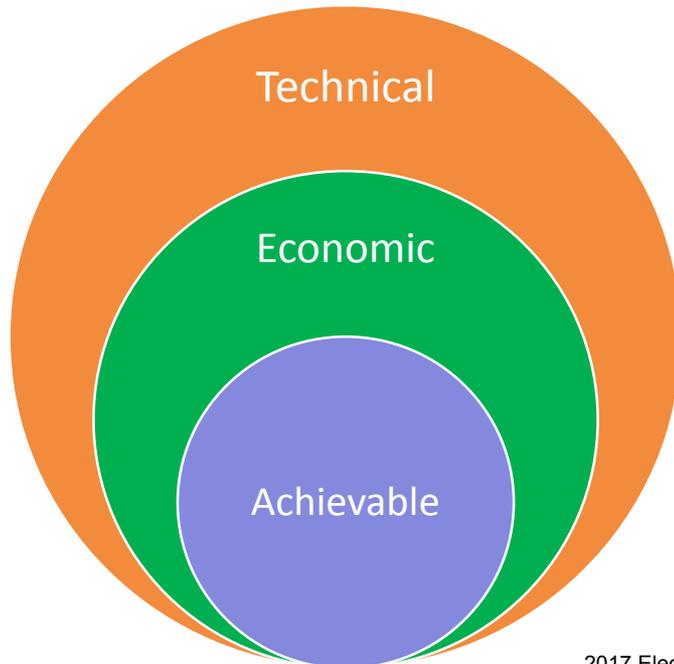
- Primary objectives for a potential study
  - Meet legislative or regulatory requirements
  - Support integrated resource planning
  - Identify opportunities for savings; key measures in target segments
  
- Secondary outcomes
  - Communication among groups within an organization
  - A story about how customers use energy today and how (and why) they are likely to use energy in the future

## CHANGES SINCE PREVIOUS STUDY

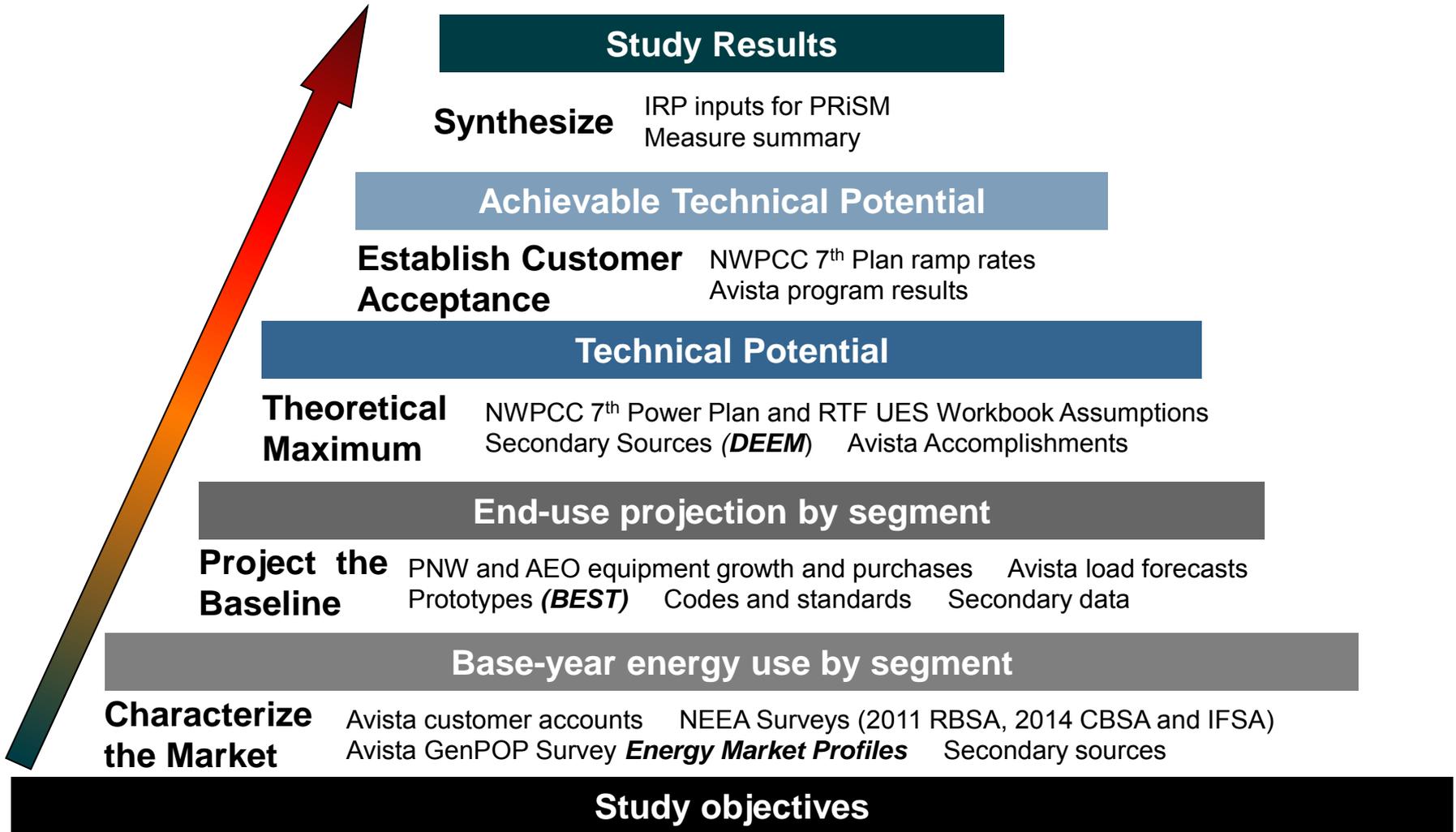
- AEG completed Avista's 2014 electric CPA, informing the 2015 IRP
  - Bottom-up approach to estimating potential at the equipment level
  - Covered Avista's electric service territory in Washington and Idaho
  - Estimated three levels of potential: technical, economic, and achievable
  - Delivered conservation inputs to 2015 IRP and line-by-line measure summary file
  - Utilized 6th Plan measure ramp rates
- Current study informs the 2017 IRP model
  - Complete update to the previous study – updated from base year of 2013 to 2015
  - Incorporates information from the Commercial Building Stock Assessment (CBSA) data
  - Incorporates the NWPCC's 7th Power Plan measure data
  - Uses NWPCC's 7th Plan ramp rates
  - Estimates two levels of potential: technical and achievable technical

# COMPARISON OF APPROACHES

- The previous CPA studies developed three levels of potential.
- An economic screen was performed as part of the CPA analysis and ramp rates are applied to economic.
- Results were provided to the IRP model.
- In this study, we are developing estimates of achievable technical potential, where ramp rates are applied to technical potential.
- The estimated achievable technical potential, along with associated costs feed into the IRP model, which will select cost-effective measures.



# ANALYSIS APPROACH



# LOADMAP™ ANALYSIS TOOL

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The screenshot shows the LoadMAP software interface. At the top is a menu bar with options: LoadMAP, Home, Insert, Page Layout, Formulas, Data, Review, View. Below the menu bar is a ribbon with several groups of tools:

- Model Controls:** Run Calibration, Run Economics, Run Forecast, Run Equipment, Run Measures, Update Final Results.
- Base-Year Data:** Market Profiles, Market Size, Saturations, UECs and EUIs, Vintage Data.
- Forecasting:** Customer Growth, End-Use Saturation, Technology Data.

The main workspace shows a spreadsheet grid. In cell A1, there is a dropdown menu set to "Residential : Single Family : Electric". Below it is a checkbox "Overwrite future year saturations." and two buttons: "Load" and "Save". To the right, a "Currently Viewing:" section shows "Residential : Single Family : Electric" and "Total Households: 2,947,284".

Below this is a table titled "Average Market Profiles":

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)
Cooling	Central AC	45.6%	4,877.74	2,222.51
Cooling	Room AC	13.9%	1,777.88	246.54
Combined Heating/Cooling	Air-Source Heat Pump	36.1%	7,140.50	2,578.23
Combined Heating/Cooling	Geothermal Heat Pump	0.8%	6,309.83	47.46
Space Heating	Electric Resistance	1.6%	6,847.50	106.18
Space Heating	Electric Furnace	9.2%	6,162.75	569.82
Water Heating	Water Heater	68.6%	4,200.03	2,881.77
Interior Lighting	Screw-in	100.0%	1,391.63	1,391.63
Interior Lighting	Linear Fluorescent	100.0%	127.98	127.98
Exterior Lighting	Screw-in	100.0%	325.38	325.38
Appliances	Clothes Washer	96.3%	132.76	127.87
Appliances	Clothes Dryer	92.4%	997.15	920.88
Appliances	Dishwasher	73.1%	504.86	369.02
Appliances	Refrigerator	99.9%	950.01	949.27
Appliances	Freezer	55.3%	744.38	411.54
Appliances	Second Refrigerator	31.2%	1,106.58	345.27
Appliances	Stove	85.3%	570.08	486.54
Appliances	Microwave	97.1%	162.46	157.73
Electronics	Personal Computer	134.4%	2017.1	157.73

- LoadMAP stands for Load Management, Analysis and Planning
- LoadMAP modeling features:
  - Embodies principles of rigorous end-use models (like REEPS and COMMEND)
  - Integrated framework for estimating potential and forecasting
  - Uses stock-accounting
  - Isolates new construction
  - Excel-based, not a black box
  - Flexible outputs and reporting
  - Delivered to clients for their ongoing use



# MARKET CHARACTERIZATION

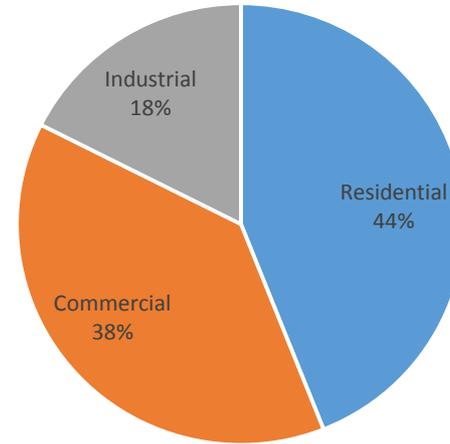
# OVERALL BASELINE ENERGY USE

## HIGH-LEVEL CHARACTERIZATION BY SECTOR AND STATE

### Washington

Sector	Current Study, 2015 (GWh)	Prior Study, 2013 (GWh)	% Difference
Residential	2,458	2546	-3.5%
Commercial	2,148	2086	3.0%
Industrial	982	922	6.5%
<b>Total</b>	<b>5,588</b>	<b>5,554</b>	<b>0.6%</b>

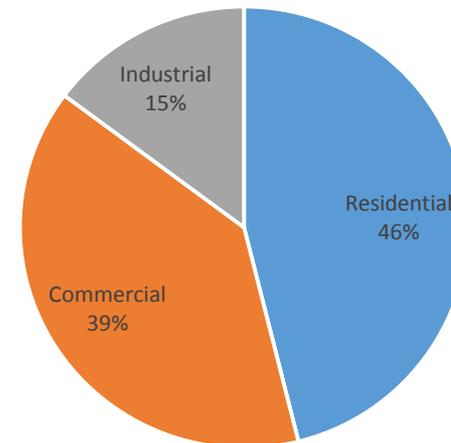
### WA Energy Distribution, Current Study



### Idaho

Sector	Current Study, 2015 (GWh)	Prior Study, 2013 (GWh)	% Difference
Residential	1,161	1207	-3.8%
Commercial	985	976	0.9%
Industrial	373	343	8.7%
<b>Total</b>	<b>2,519</b>	<b>2,526</b>	<b>-0.3%</b>

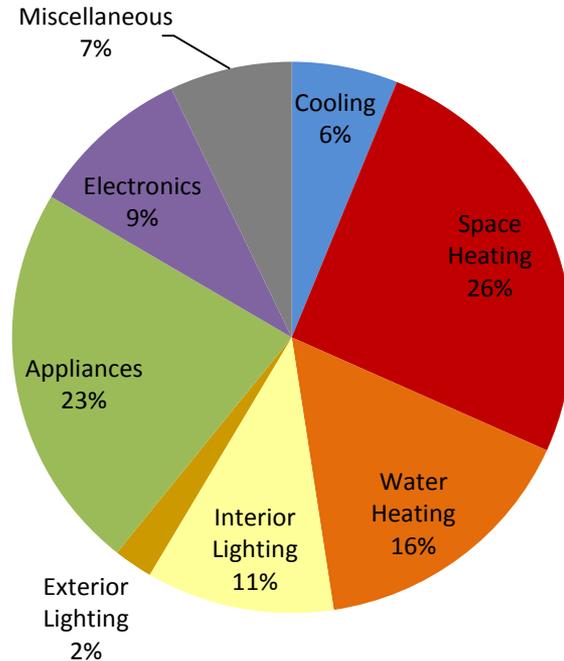
### ID Energy Distribution, Current Study



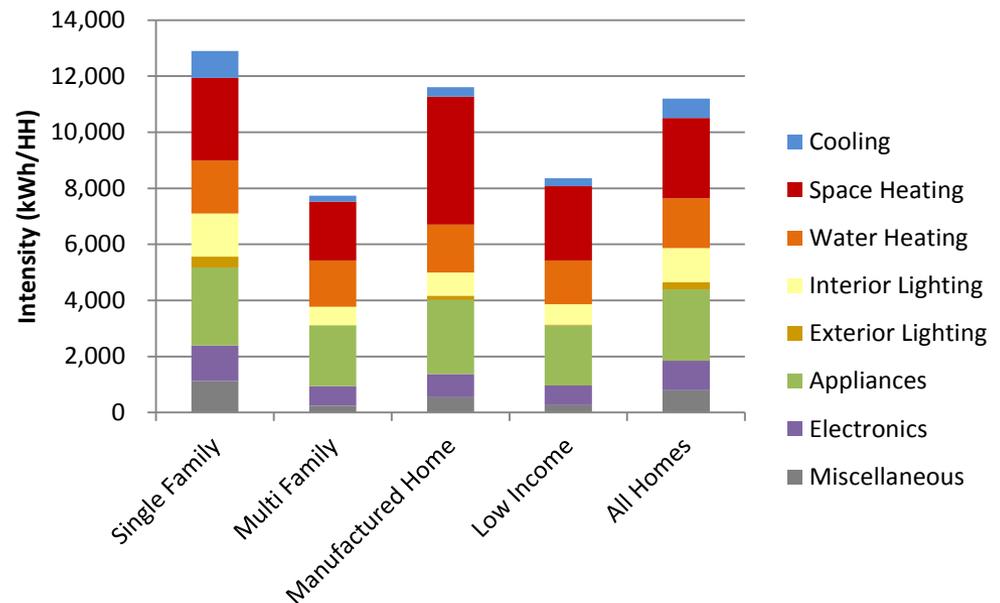
# MARKET PROFILES BY STATE, SECTOR AND SEGMENT

## BASE-YEAR ANNUAL ENERGY USE BY SEGMENT AND END USE

**Washington 2015 Residential Sales by End Use**



**Annual Intensity for Average WA Household**



### Data Sources:

- Avista billing data
- GenPop residential appliance saturation survey
- Residential Building Stock Assessment (NEEA)
- Commercial Building Stock Assessment (NEEA)
- Secondary data as needed to fill gaps

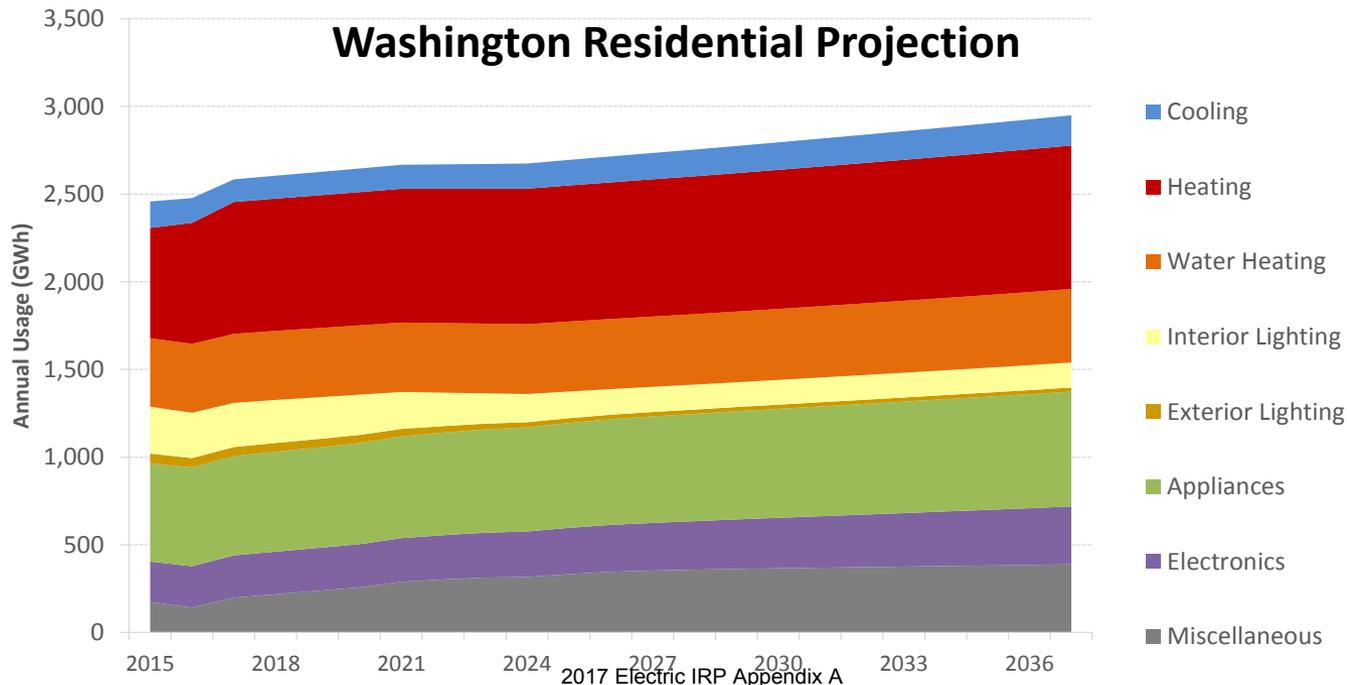


# **BASELINE PROJECTION**

# BASELINE PROJECTION BY STATE AND SECTOR

## BY END USE

- Provides the foundation for estimating future savings from conservation initiatives
- Baseline projection includes the effects of appliance standards and EISA lighting standard
- New construction differences from existing dwellings
- No future utility programs
- Market size growth assumptions from Avista



\* Change from 2015 to 2017 reflects the change from actual weather in 2015 to normal weather in 2017. 2016 was a mild year compared to normal weather



# MEASURE SCREENING

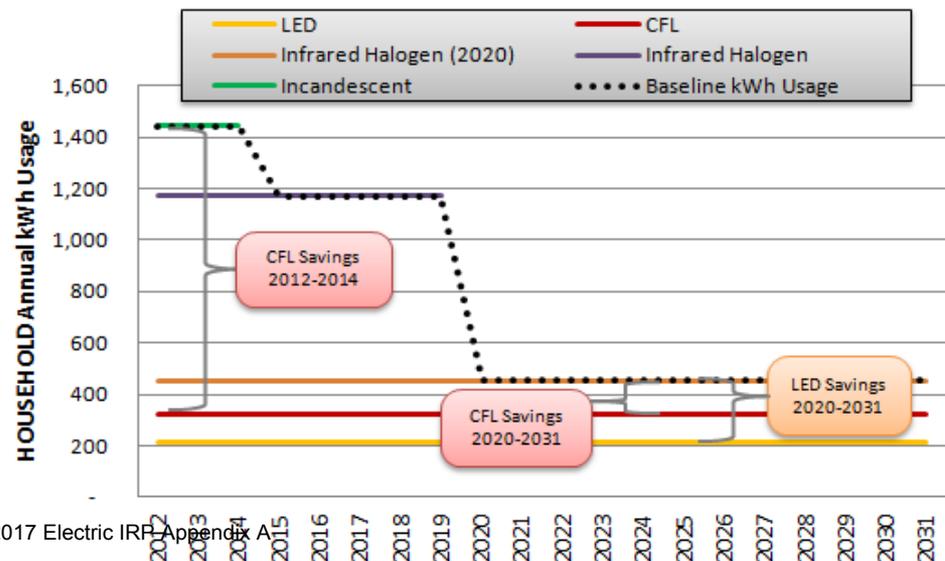
# CHARACTERIZE MEASURES

- Develop measure list
  - 348 measures
  - 4,096 permutations in various market segments
- Characterize measures
  - Description
  - Costs
  - Savings
  - Applicability
  - Lifetime
- Data sources
  - Avista program data
  - Northwest Regional Technical Forum (RTF)
  - AEG DEEM database

### Count of Conservation Measures in Avista Study

Sector	Equipment Measures	Non-Equipment Measures	Total Measures	Measure Permutations w/ 2 Vintages	Number of Segments	Measure Permutations All Segments
Residential	76	44	120	240	4	960
Commercial	77	57	134	268	11	2,948
Industrial	49	45	94	188	1	188
<b>TOTAL</b>	<b>202</b>	<b>146</b>	<b>348</b>	<b>696</b>	<b>16</b>	<b>4,096</b>

### Example of Measure Savings Over Time



# ESTIMATE POTENTIAL FUTURE SAVINGS

USE LOADMAP MODEL TO ESTIMATE POTENTIAL

## Technical Potential

Theoretical upper limit of conservation, where all efficiency measures are phased in regardless of cost

## Achievable Technical Potential

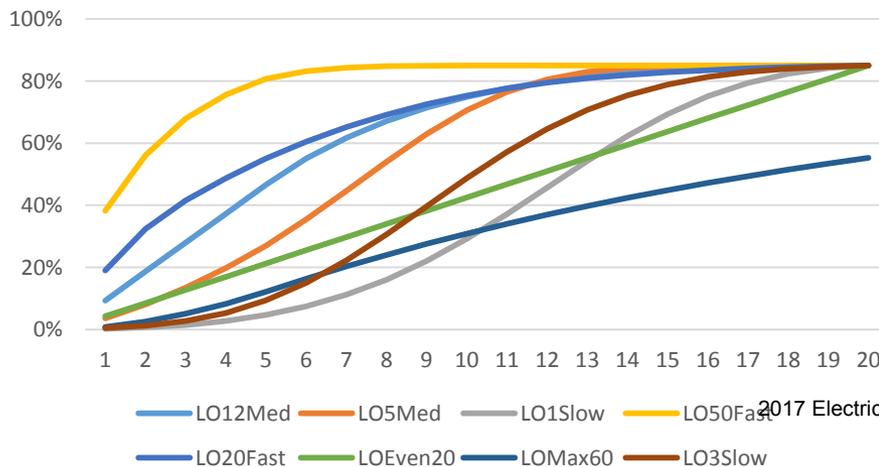
Conservation potential that can be realistically achieved by utilities, accounting for customer adoption rates and how quickly programs can be implemented, but does not consider cost-effectiveness of measures

# ESTABLISH CUSTOMER ACCEPTANCE

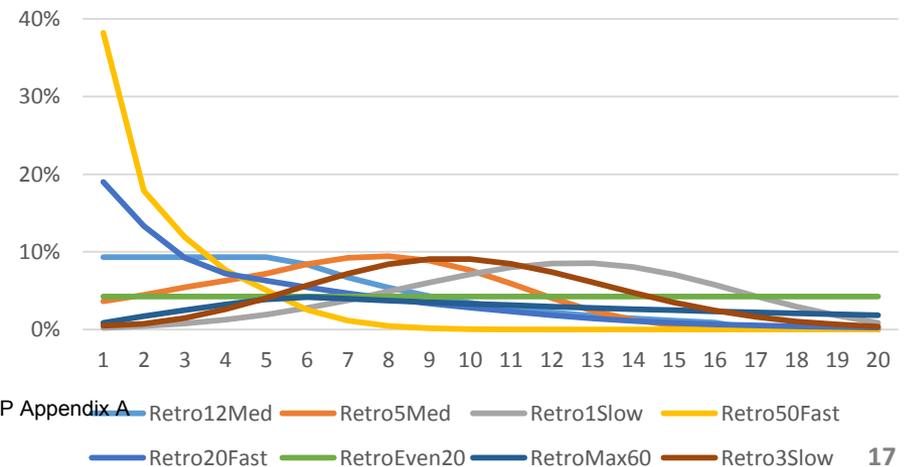
## 7<sup>TH</sup> PLAN RAMP RATES APPLIED TO TECHNICAL POTENTIAL

- As part of the 7<sup>th</sup> Plan update, the Council introduced new achievability ramp rates
  - Simplified from more customized residential and business rates to a suite of 8 discretionary and lost opportunity, based off initial achievability and speed of reaching full values.
  - Now mapped to loose “S” curves rather than linear
    - Most begin after the middle inflection of the “S”, being faster overall
  - Common example: LO12Med
    - Starts at close to 12% achievability, ramps up to 85% over 10 to 15 years
    - Retrofit version, Retro12Med is the incremental differences between years in the LO version

7th Plan Lost Opportunity Ramp Rates



7th Plan Discretionary Ramp Rates



# SEVENTH PLAN RAMP RATES

- Weatherization measures come online faster
- HVAC equipment, lighting equipment, and water heating non-equipment all slow down early
- Water heating equipment (HPWHs) taken off the emerging technology ramp rate, but still low early on
- Since lighting equipment traditionally shows early-year potential (general service lighting), this has a large impact on potential

Residential Measures	Prior Study Rates	Current Study Rates	First-Year Ramp Rates	
			6 <sup>th</sup> Plan	7 <sup>th</sup> Plan
HVAC Equipment	Res_LostOp_15yr	LO5Med	17.00%	3.62%
Lighting Equipment	Res_LostOp_5yr	LO20Fast	42.50%	19.02%
Water Heat Equipment	Res_LostOp_EmergTech	LO3Slow	0.65%	0.47%
Weatherization	Res_NonLostOp_15yr	Retro12Med	5.70%	9.33%
Water Heat Non-Equipment	Res_NonLostOp_5yr	Retro12Med	17.00%	9.33%

C&I Measures	Prior Study Rates	Current Study Rates	6th Plan	7th Plan
HVAC Equipment	Bus_LO Fast	LO20Fast	45.00%	19.02%
Lighting Equipment	Bus_LO Fast	LO20Fast	45.00%	19.02%
Desktops and Monitors	Bus_LO Slow	LO50Fast	5.00%	38.22%
Lighting Controls	Bus_Retro in 10	Retro20Fast	8.50%	19.02%
Energy Management	Bus_Retro in 20	Retro12Med	4.25%	9.33%
Controlled Atmosphere	Bus_Retro in 20	Retro12Med	4.25%	9.33%

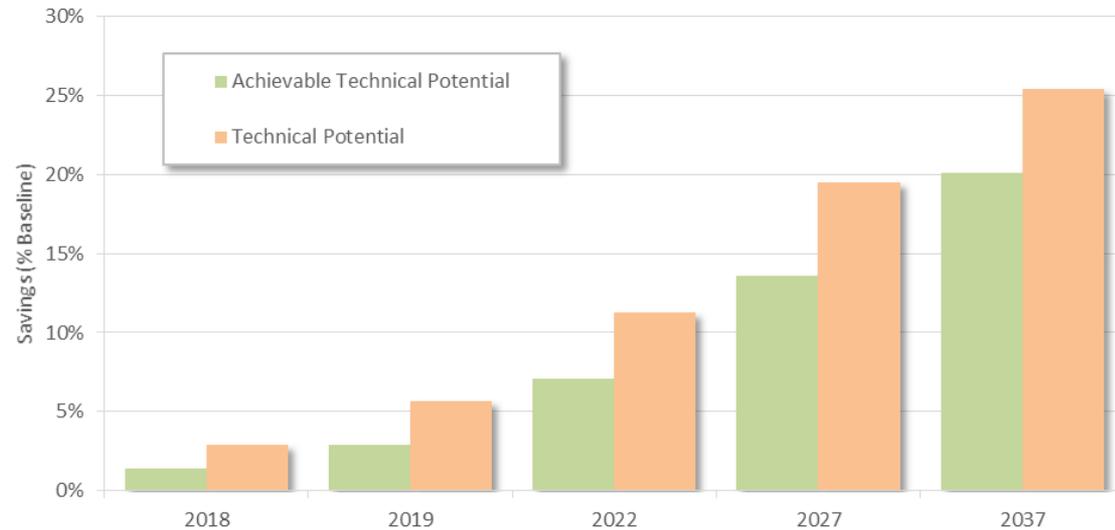
2017 Electric IRP Appendix A



# **SUMMARY OF POTENTIAL SAVINGS – ALL SECTORS COMBINED**

# OVERALL CONSERVATION POTENTIAL - WASHINGTON

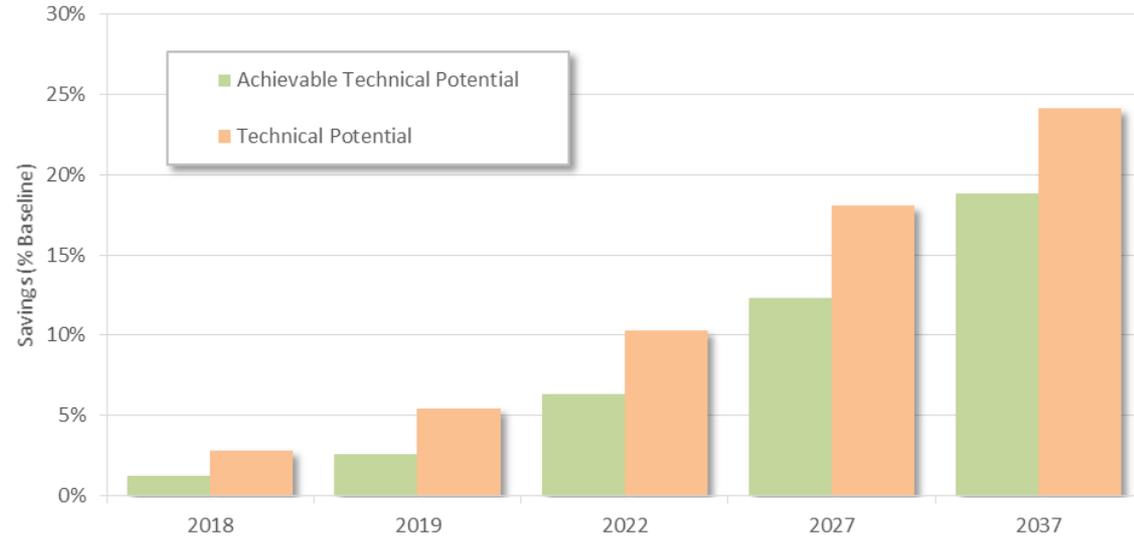
- In 2018, Achievable Technical Potential savings are 79 GWh (1.4% of baseline)
- Achievable Technical Potential is about half of the Technical Potential in 2018



Energy Summary	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	5,692	5,730	5,811	5,932	6,323
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	79	167	412	807	1,272
Technical Potential	164	325	655	1,158	1,606
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	9.0	19.0	47.0	92.2	145.2
Technical Potential	18.8	37.1	74.7	132.2	183.4
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.4%	2.9%	7.1%	13.6%	20.1%
Technical Potential	2.9%	5.7%	11.3%	19.5%	25.4%

# OVERALL CONSERVATION POTENTIAL - IDAHO

- In 2018, Achievable Technical Potential savings are 32 GWh (1.2% of baseline)
- Achievable Technical Potential is 44% of the Technical Potential in 2018

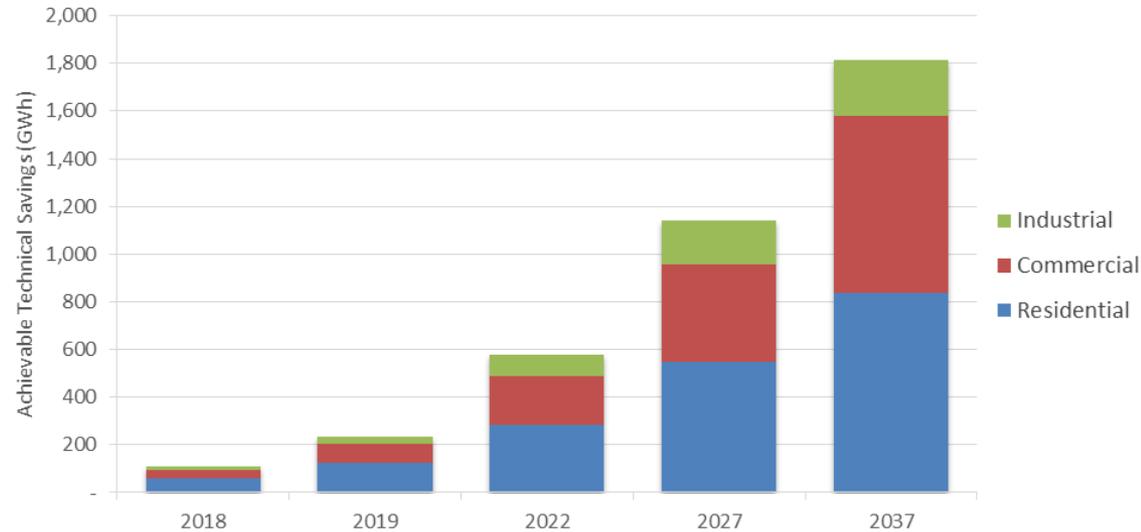


Energy Summary	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	<b>2,606</b>	<b>2,618</b>	<b>2,647</b>	<b>2,702</b>	<b>2,882</b>
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	32	69	167	333	543
Technical Potential	73	142	273	488	695
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	3.7	7.8	19.0	38.0	62.0
Technical Potential	8.3	16.2	31.2	55.8	79.3
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.2%	2.6%	6.3%	12.3%	18.8%
Technical Potential	2.8%	5.4%	10.3%	18.1%	24.1%

# OVERALL ENERGY EFFICIENCY POTENTIAL BY SECTOR

## Washington and Idaho

- About 53% of achievable technical savings potential comes from the residential sector in 2018
- By 2022, the commercial and industrial sectors account for more than half the savings.



Savings	2018	2019	2022	2027	2037
<b>Cumulative Savings (GWh)</b>					
Residential	59	122	285	549	837
Commercial	37	82	205	408	741
Industrial	15	32	89	183	238
<b>Total</b>	<b>111</b>	<b>236</b>	<b>579</b>	<b>1,140</b>	<b>1,815</b>
<b>Cumulative Savings (aMW)</b>					
Residential	6.8	14.0	32.6	62.6	95.6
Commercial	4.2	9.3	23.4	46.6	84.5
Industrial	1.7	3.6	10.1	20.9	27.2
<b>Total</b>	<b>12.7</b>	<b>26.9</b>	<b>66.1</b>	<b>130.1</b>	<b>207.2</b>



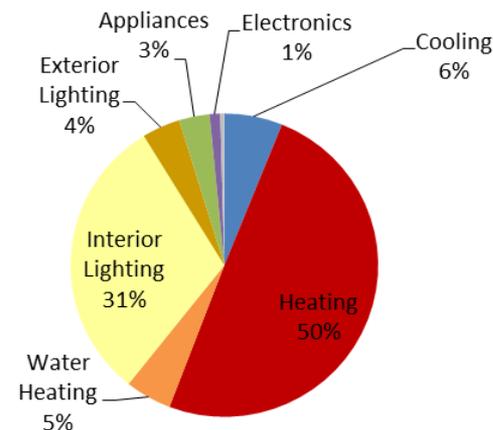
# WASHINGTON

# RESIDENTIAL TOP MEASURES - WASHINGTON

## TOP MEASURES IN 2018, ACHIEVABLE TECHNICAL POTENTIAL

Rank	Measure / Technology	2018 Achievable Technical Potential Savings (MWh)	% of Total
1	Windows - High Efficiency/ENERGY STAR	3,711	9.4%
2	Interior Lighting - General Service CFLs	3,399	8.6%
3	Interior Lighting - General Service Lighting (LED)	3,060	7.7%
4	Insulation - Wall Cavity Installation	3,060	7.7%
5	Interior Lighting - Occupancy Sensors	2,623	6.6%
6	Building Shell - Infiltration Control	2,336	5.9%
7	Ductless Mini Split Heat Pump (Ducted Forced Air)	2,090	5.3%
8	Insulation - Ceiling Installation	1,651	4.2%
9	Windows - Install Reflective Film	1,602	4.1%
10	Interior Lighting - Exempted CFLs	1,494	3.8%
11	Interior Lighting - Exempted Lighting	1,455	3.7%
12	Ducting - Repair and Sealing	1,401	3.5%
13	Ductless Mini Split Heat Pump (Zonal)	1,092	2.8%
14	Insulation - Radiant Barrier	1,076	2.7%
15	Thermostat - WiFi/Interactive	848	2.1%
16	Water Heater - Low-Flow Showerheads	828	2.1%
17	Exterior Lighting - Screw-In	806	2.0%
18	Freezer - Decommissioning and Recycling	790	2.0%
19	Insulation - Ducting	640	1.6%
20	Doors - Storm and Thermal	444	1.1%
	<b>Total</b>	<b>34,406</b>	<b>87.0%</b>
	<b>Total cumulative savings in 2018</b>	<b>39,547</b>	<b>100.0%</b>

End Use Share of Savings, 2018



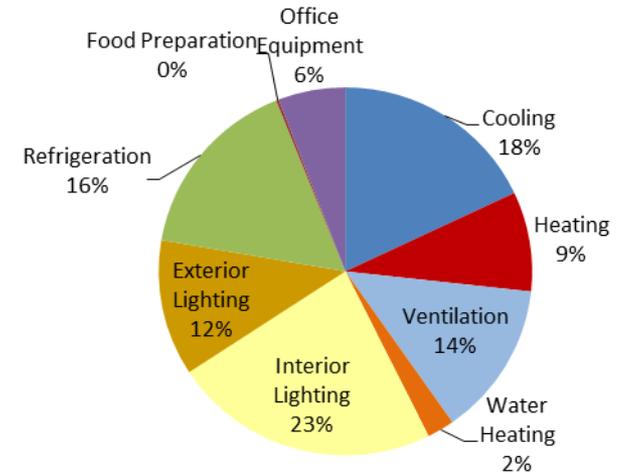
- The most savings are possible for the heating end use with savings from ENERGY STAR windows, insulation, ductless heat pumps, thermostats, and other building shell measures
- General Service CFLs are a part of the 7<sup>th</sup> Plan so that utilities can continue to claim savings until 2020
- Note that achievable technical savings do not screen for cost-effectiveness and some measures are expected to be screened out during the IRP process.

# COMMERCIAL TOP MEASURES - WASHINGTON

## TOP MEASURES IN 2018, ACHIEVABLE TECHNICAL POTENTIAL

Rank	Measure / Technology	2018 Achievable Technical Potential Savings (MWh)	% of Total
1	Retrocommissioning	3,696	12.9%
2	Interior Lighting - Screw-In (LED)	2,684	9.3%
3	Ventilation - Variable Speed Control	2,087	7.3%
4	Insulation - Ceiling	1,294	4.5%
5	Refrigeration - Variable Speed Compressor	1,156	4.0%
6	Interior Lighting - Linear Lighting (LED)	1,067	3.7%
7	Office Equipment - Desktop Computer	1,026	3.6%
8	Exterior Lighting - Screw-In (LED)	1,005	3.5%
9	Strategic Energy Management	988	3.4%
10	Refrigeration - Floating Head Pressure	898	3.1%
11	Chiller - Chilled Water Variable-Flow System	804	2.8%
12	Exterior Lighting - Bi-Level Fixture	741	2.6%
13	Refrigeration - Demand Defrost	716	2.5%
14	HVAC - Economizer	654	2.3%
15	Commissioning	580	2.0%
16	Exterior Lighting - Photovoltaic Installation	550	1.9%
17	Grocery - Open Display Case - Night Covers	532	1.9%
18	Water-Cooled Chiller - Condenser Water Reset	510	1.8%
19	Destratification Fans (HVLS)	507	1.8%
20	Ductless Mini Split Heat Pump	503	1.8%
	<b>Total</b>	<b>21,995</b>	<b>76.6%</b>
	<b>Total cumulative savings in 2018</b>	<b>28,719</b>	<b>100.0%</b>

Share of End Use Savings, 2018



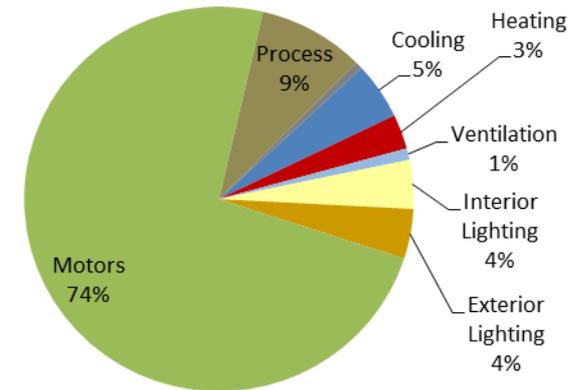
- LED lighting provides the most savings including interior screw-in lighting, linear lighting and exterior lighting
- Retrocommissioning is the top measure, accounting for almost 13% of the potential savings
- Note that achievable technical savings do not screen for cost-effectiveness and some measures are expected to be screened out during the IRP process.

# INDUSTRIAL TOP MEASURES - WASHINGTON

## TOP MEASURES IN 2018, ACHIEVABLE TECHNICAL POTENTIAL

Rank	Measure / Technology	2018 Achievable Technical Potential Savings (MWh)	% of Total
1	Compressed Air - Equipment Upgrade	1,332	12.4%
2	Material Handling - Variable Speed Drive	1,173	10.9%
3	Pumping System - Equipment Upgrade	801	7.4%
4	Compressed Air - Leak Management Program	675	6.3%
5	Retrocommissioning	627	5.8%
6	Compressed Air - Variable Speed Drive	574	5.3%
7	Pumping System - System Optimization	518	4.8%
8	Pumping System - Variable Speed Drive	465	4.3%
9	Fan System - Variable Speed Drive	362	3.4%
10	Compressed Air - System Controls	303	2.8%
11	Destratification Fans (HVLS)	255	2.4%
12	Refrigeration - System Optimization	245	2.3%
13	Motors - Synchronous Belts	214	2.0%
14	Fan System - Flow Optimization	208	1.9%
15	HVAC - Economizer	197	1.8%
16	Refrigeration - Floating Head Pressure	153	1.4%
17	Switch from Belt Drive to Direct Drive	148	1.4%
18	Kraft: Efficient Agitator	137	1.3%
19	Exterior Lighting - Enhanced Controls	135	1.3%
20	Transformer - High Efficiency	124	1.2%
	<b>Total</b>	<b>8,648</b>	<b>80.3%</b>
	<b>Total cumulative savings in 2018</b>	<b>10,769</b>	<b>100.0%</b>

End Use Share of Savings, 2018



- Measures that apply to motors dominate the savings opportunities
- Compressed air equipment upgrades and variable speed drives on material handling equipment provide the most opportunity in the industrial sector
- Note that achievable technical savings do not screen for cost-effectiveness and some measures are expected to be screened out during the IRP process.



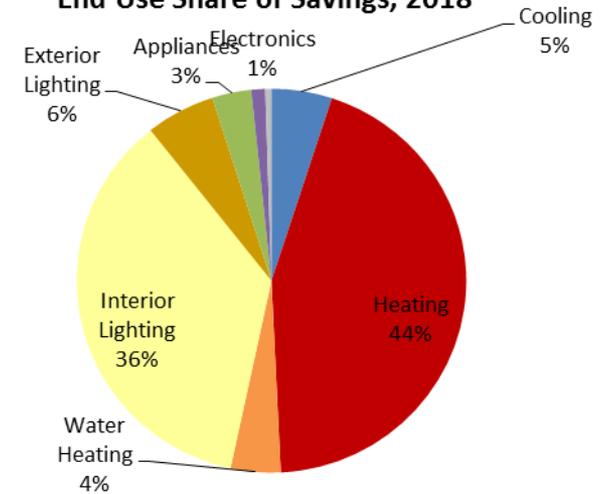
# IDAHO

# RESIDENTIAL TOP MEASURES - IDAHO

## TOP MEASURES IN 2018, ACHIEVABLE TECHNICAL POTENTIAL

Rank	Measure / Technology	2018 Achievable Technical Potential Savings (MWh)	% of Total
1	Interior Lighting - General Service CFLs	1,982	10.1%
2	Windows - High Efficiency/ENERGY STAR	1,842	9.4%
3	Interior Lighting - General Service Lighting (LED)	1,635	8.3%
4	Insulation - Wall Cavity Installation	1,530	7.8%
5	Interior Lighting - Occupancy Sensors	1,382	7.0%
6	Building Shell - Infiltration Control	1,171	5.9%
7	Ductless Mini Split Heat Pump (Ducted Forced Air)	972	4.9%
8	Insulation - Ceiling Installation	835	4.2%
9	Windows - Install Reflective Film	776	3.9%
10	Interior Lighting - Exempted CFLs	659	3.3%
11	Ductless Mini Split Heat Pump (Zonal)	629	3.2%
12	Ducting - Repair and Sealing	623	3.2%
13	Interior Lighting - Exempted Lighting (LED)	586	3.0%
14	Insulation - Radiant Barrier	526	2.7%
15	Exterior Lighting - Screw-In	458	2.3%
16	Thermostat - WiFi/Interactive	417	2.1%
17	Water Heater - Low-Flow Showerheads	389	2.0%
18	Freezer - Decommissioning and Recycling	357	1.8%
19	Insulation - Ducting	279	1.4%
20	Doors - Storm and Thermal	226	1.1%
	<b>Total</b>	<b>17,270</b>	<b>87.7%</b>
	<b>Total cumulative savings in 2018</b>	<b>19,689</b>	<b>100.0%</b>

End Use Share of Savings, 2018

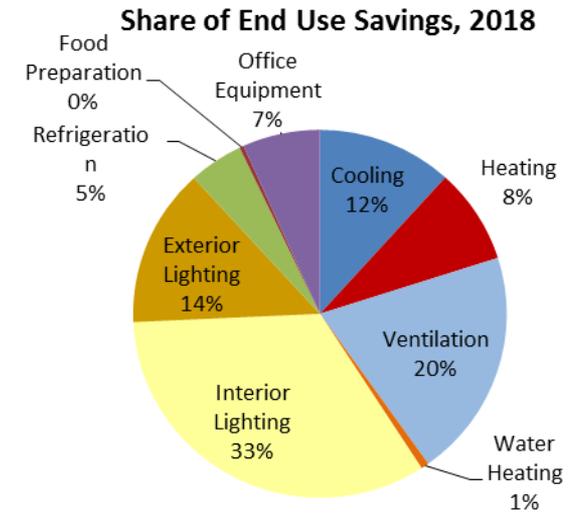


- The most savings are possible for the heating end use with savings from ENERGY STAR windows, insulation, ductless heat pumps, thermostats, and other building shell measures
- Lighting also provides significant opportunities through CFLs, LEDs, and occupancy sensors
- General Service CFLs are a part of the 7<sup>th</sup> Plan so that utilities can continue to claim savings until 2020
- Note that achievable technical savings do not screen for cost-effectiveness and some measures are expected to be screened out during the IRP process.

# COMMERCIAL TOP MEASURES - IDAHO

## TOP MEASURES IN 2018, ACHIEVABLE TECHNICAL POTENTIAL

Rank	Measure / Technology	2018 Achievable Technical Potential Savings	
		(MWh)	% of Total
1	Retrocommissioning	1,714	20.5%
2	Interior Lighting - Screw-In	1,296	15.5%
3	Ventilation - Variable Speed Control	941	11.3%
4	Insulation - Ceiling	542	6.5%
5	Exterior Lighting - Screw-In	516	6.2%
6	Strategic Energy Management	489	5.9%
7	Interior Lighting - Linear Lighting	479	5.7%
8	Office Equipment - Desktop Computer	469	5.6%
9	Commissioning	269	3.2%
10	Exterior Lighting - Area Lighting	239	2.9%
11	Interior Lighting - High-Bay Fixtures	200	2.4%
12	Interior Lighting - Interior Lighting - Networked Fixture Controls	163	2.0%
13	Cooling - Water-Cooled Chiller	159	1.9%
14	Exterior Lighting - Linear Lighting	127	1.5%
15	Interior Lighting - Interior Lighting - Embedded Fixture Controls	116	1.4%
16	Ventilation - Demand Controlled	112	1.3%
17	Ventilation - Ventilation	84	1.0%
18	Ventilation - ECM on VAV Boxes	75	0.9%
19	Cooling - Air-Cooled Chiller	51	0.6%
20	Exterior Lighting - Bi-Level Fixture	51	0.6%
<b>Total</b>		<b>8,091</b>	<b>96.9%</b>
<b>Total cumulative savings in 2018</b>		<b>8,347</b>	<b>100.0%</b>



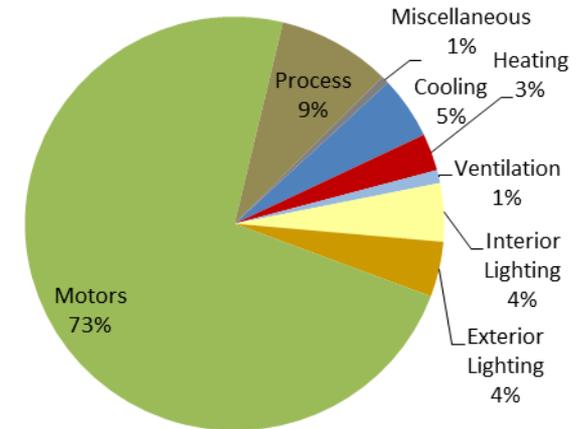
- LED lighting provides the most savings including interior lighting, linear lighting and exterior lighting
- Retrocommissioning is the second highest measure, accounting for over 20% of the potential savings
- Note that achievable technical savings do not screen for cost-effectiveness and some measures are expected to be screened out during the IRP process.

# INDUSTRIAL TOP MEASURES - IDAHO

## TOP MEASURES IN 2018, ACHIEVABLE TECHNICAL POTENTIAL

Rank	Measure / Technology	2018 Achievable Technical Potential Savings (MWh)	% of Total
1	Compressed Air - Equipment Upgrade	537	12.3%
2	Material Handling - Variable Speed Drive	470	10.8%
3	Pumping System - Equipment Upgrade	319	7.3%
4	Compressed Air - Leak Management Program	272	6.2%
5	Retrocommissioning	246	5.7%
6	Compressed Air - Variable Speed Drive	228	5.2%
7	Pumping System - System Optimization	211	4.8%
8	Pumping System - Variable Speed Drive	187	4.3%
9	Fan System - Variable Speed Drive	144	3.3%
10	Compressed Air - System Controls	122	2.8%
11	Destratification Fans (HVLS)	103	2.4%
12	Refrigeration - System Optimization	98	2.3%
13	Motors - Synchronous Belts	86	2.0%
14	Fan System - Flow Optimization	83	1.9%
15	HVAC - Economizer	80	1.8%
16	Refrigeration - Floating Head Pressure	61	1.4%
17	Switch from Belt Drive to Direct Drive	60	1.4%
18	Kraft: Efficient Agitator	54	1.2%
19	Interior Lighting - High-Bay Fixtures	54	1.2%
20	Exterior Lighting - Enhanced Controls	53	1.2%
	<b>Total</b>	<b>3,470</b>	<b>79.6%</b>
	<b>Total cumulative savings in 2018</b>	<b>4,359</b>	<b>100.0%</b>

End Use Share of Savings, 2018



- Measures that apply to motors dominate the savings opportunities
- Compressed air equipment upgrades and variable speed drives on material handling equipment provide the most opportunity in the industrial sector
- Note that achievable technical savings do not screen for cost-effectiveness and some measures are expected to be screened out during the IRP process.

# CONSISTENCY WITH COUNCIL METHODOLOGY

- End-use model – bottom up approach
  - Building characteristics, fuel and equipment saturations
  - Stock accounting based on measure life
  - Codes and standards that have been enacted are included in the baseline
  - Lost- and non-lost opportunities are treated differently
- Measures – comprehensive list
  - Incorporates RTF measure workbooks
  - AEG databases, which draw upon same sources used by RTF
- Measure adoption rates – ramp rates
  - Based on Seventh Plan ramp rates



# Thank You!

**Ingrid Rohmund**, Vice President

**Bridget Kester**, Senior Project Manager

**Kurtis Kolnowski**, Project Manager



# **ADDITIONAL SLIDES**

# MARKET PROFILES BY STATE, SECTOR AND SEGMENT

## BASE-YEAR ANNUAL ENERGY USE BY SEGMENT AND END USE

Market profiles characterize how customers use electricity in the base year (2015)

Basic equation:

$$Energy = \sum_e (N \times Sat_e \times UEC_e)$$

where

Energy =	annual energy use
e =	equipment technology
N =	number of homes
Sat <sub>e</sub> =	saturation of homes with the equipment
UEC <sub>e</sub> =	unit energy consumption in homes with the equipment

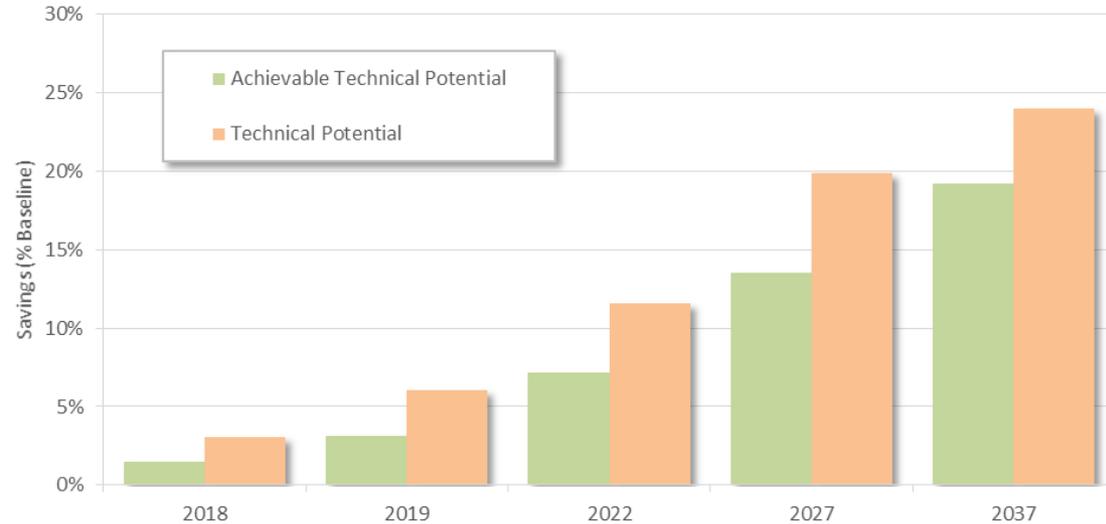
### Average Market Profiles - Electricity

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	37.3%	1,303	486	107
Cooling	Room AC	26.2%	384	101	22
Cooling	Air-Source Heat Pump	6.7%	1,298	87	19
Cooling	Geothermal Heat Pump	0.2%	1,384	3	1
Cooling	Evaporative AC	1.2%	844	10	2
Space Heating	Electric Room Heat	24.3%	4,746	1,153	253
Space Heating	Electric Furnace	13.3%	8,139	1,082	238
Space Heating	Air-Source Heat Pump	6.7%	9,232	621	136
Space Heating	Geothermal Heat Pump	0.2%	5,007	9	2
Water Heating	Water Heater (<= 55 Gal)	51.4%	3,033	1,560	342
Water Heating	Water Heater (> 55 Gal)	6.8%	3,189	217	48
Interior Lighting	General Service Screw-In	100.0%	868	868	191
Interior Lighting	Linear Lighting	100.0%	90	90	20
Interior Lighting	Exempted Screw-In	100.0%	261	261	57
Exterior Lighting	Screw-in	100.0%	253	253	56
Appliances	Clothes Washer	92.5%	91	84	18
Appliances	Clothes Dryer	50.6%	745	377	83
Appliances	Dishwasher	78.4%	414	325	71
Appliances	Refrigerator	100.0%	771	771	169
Appliances	Freezer	55.6%	620	344	76
Appliances	Second Refrigerator	20.8%	940	195	43
Appliances	Stove/Oven	70.9%	452	320	70
Appliances	Microwave	97.2%	138	134	29
Electronics	Personal Computers	65.0%	192	125	27
Electronics	Monitor	77.1%	81	62	14
Electronics	Laptops	91.6%	50	46	10
Electronics	TVs	180.6%	255	460	101
Electronics	Printer/Fax/Copier	73.4%	65	47	10
Electronics	Set-top Boxes/DVRs	166.8%	119	199	44
Electronics	Devices and Gadgets	100.0%	112	112	25
Miscellaneous	Electric Vehicles	0.2%	4,324	8	2
Miscellaneous	Pool Pump	1.9%	2,514	49	11
Miscellaneous	Pool Heater	0.5%	4,025	19	4
Miscellaneous	Furnace Fan	59.0%	187	111	24
Miscellaneous	Miscellaneous	9.3%	642	60	13
Miscellaneous	Miscellaneous	100.0%	547	547	120
<b>Total</b>				<b>11,197</b>	<b>2,458</b>

# RESIDENTIAL CONSERVATION POTENTIAL

## Washington

- In 2018, Realistic Achievable Potential savings are 40 GWh (1.5% of baseline)
- In 2037, cumulative achievable technical potential savings reach 566 GWh, or 19.2% of the baseline.

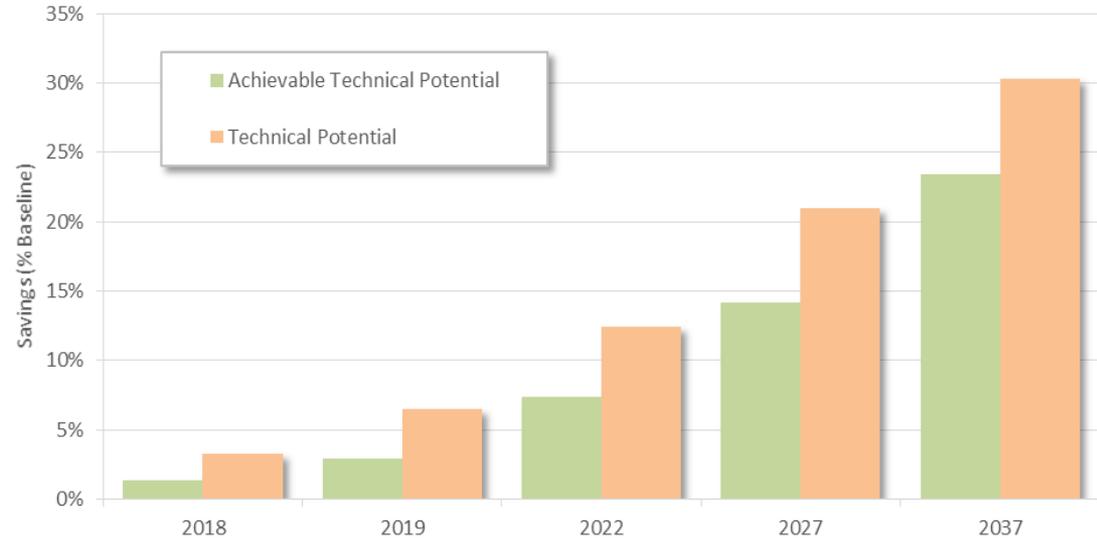


	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	2,605	2,625	2,670	2,735	2,950
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	40	82	192	370	566
Technical Potential	80	158	310	544	708
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	4.5	9.3	21.9	42.3	64.7
Technical Potential	9.1	18.0	35.4	62.1	80.8
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.5%	3.1%	7.2%	13.5%	19.2%
Technical Potential	3.1%	6.0%	11.6%	19.9%	24.0%

# COMMERCIAL CONSERVATION POTENTIAL

## Washington

- In 2018, Realistic Achievable Potential savings are 29 GWh (1.4% of baseline)
- In 2037, cumulative achievable technical potential savings reach 535 GWh, or 23.2% of the baseline.

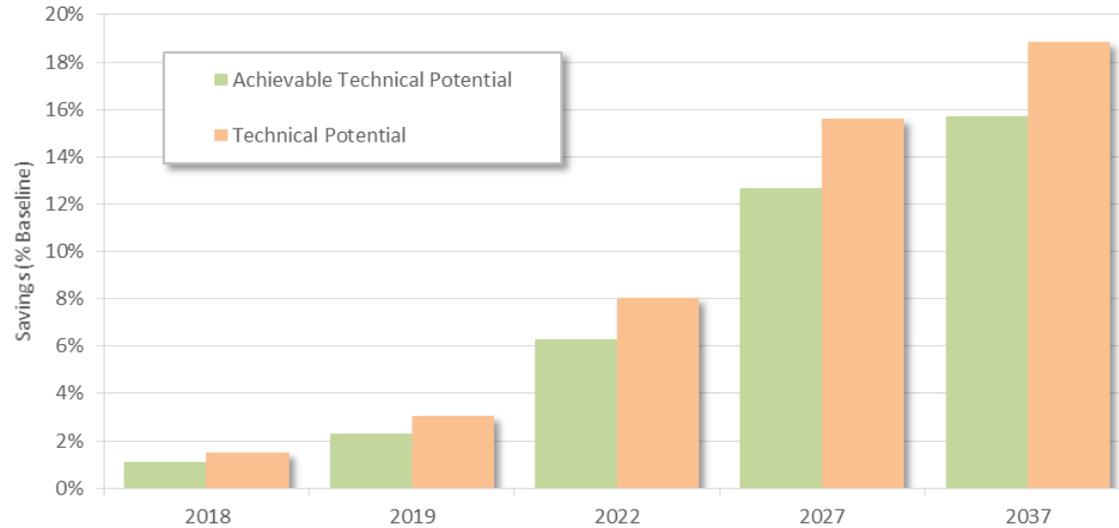


	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	2,118	2,121	2,128	2,158	2,282
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	29	62	156	305	535
Technical Potential	70	137	264	452	692
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	3.3	7.1	17.8	34.8	61.0
Technical Potential	7.9	15.6	30.1	51.6	79.0
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.4%	2.9%	7.3%	14.1%	23.4%
Technical Potential	3.3%	6.5%	12.4%	20.9%	30.3%

# INDUSTRIAL CONSERVATION POTENTIAL

## Washington

- In 2018, Realistic Achievable Potential savings are 11 GWh (1.1% of baseline)
- In 2037, cumulative achievable technical potential savings reach 171 GWh, or 19.6% of the baseline.

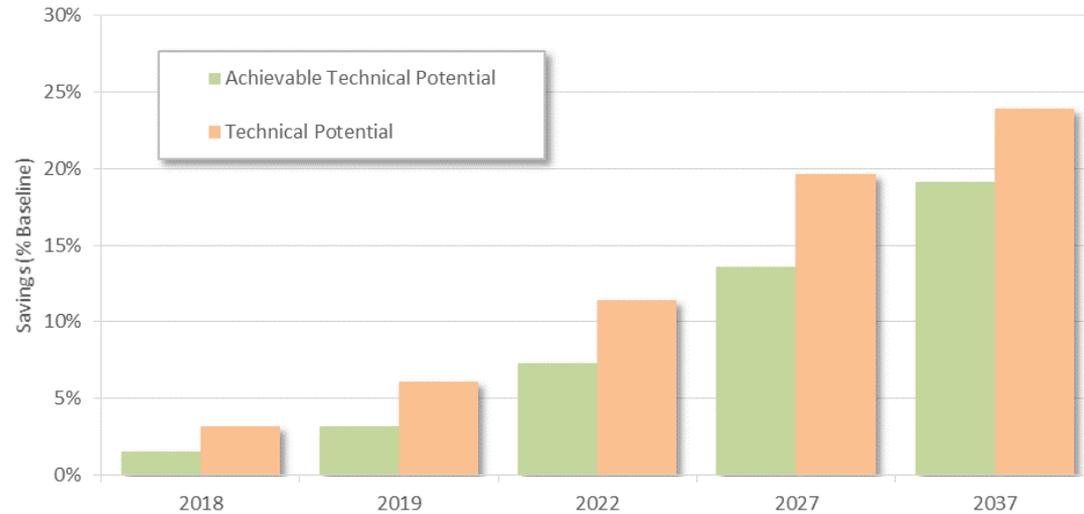


	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	969	984	1,014	1,039	1,092
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	11	23	64	132	171
Technical Potential	15	30	81	162	206
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	1.2	2.6	7.3	15.0	19.6
Technical Potential	1.7	3.4	9.3	18.5	23.5
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.1%	2.3%	6.3%	12.7%	15.7%
Technical Potential	1.5%	3.1%	8.0%	15.6%	18.9%

# RESIDENTIAL CONSERVATION POTENTIAL

## Idaho

- In 2018, Realistic Achievable Potential savings are 20 GWh (1.6% of baseline)
- In 2037, cumulative achievable technical potential savings reach 271 GWh, or 19.1% of the baseline.

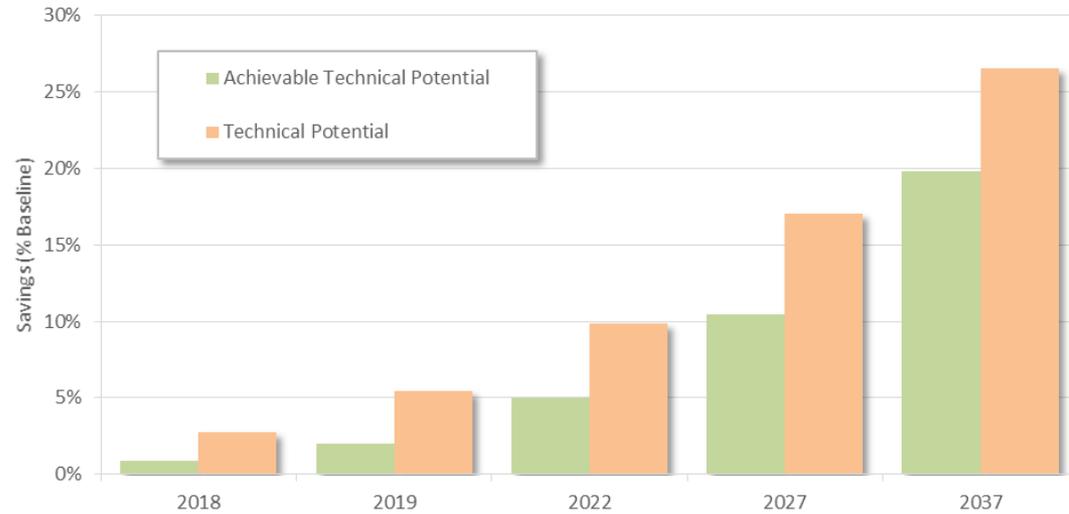


	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	1,244	1,256	1,283	1,314	1,417
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	20	41	93	178	271
Technical Potential	40	77	146	258	338
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	2.2	4.6	10.7	20.4	30.9
Technical Potential	4.5	8.8	16.7	29.4	38.6
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.6%	3.2%	7.3%	13.6%	19.1%
Technical Potential	3.2%	6.1%	11.4%	19.6%	23.9%

# COMMERCIAL CONSERVATION POTENTIAL

## Idaho

- In 2018, Realistic Achievable Potential savings are 8 GWh (0.9% of baseline)
- In 2037, cumulative achievable technical potential savings reach 206 GWh, or 19.8% of the baseline.

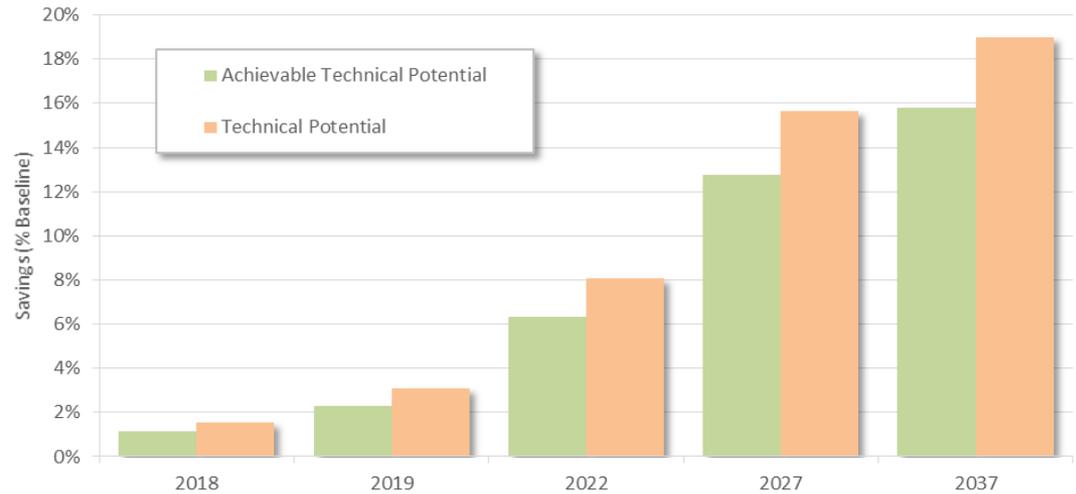


	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	973	973	972	986	1,042
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	8	19	49	103	206
Technical Potential	27	53	96	168	276
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	1.0	2.2	5.5	11.8	23.5
Technical Potential	3.1	6.1	10.9	19.2	31.5
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	0.9%	2.0%	5.0%	10.5%	19.8%
Technical Potential	2.8%	5.5%	9.8%	17.0%	26.5%

# INDUSTRIAL CONSERVATION POTENTIAL

## Idaho

- In 2018, Realistic Achievable Potential savings are 4 GWh (1.1% of baseline)
- In 2037, cumulative achievable technical potential savings reach 67 GWh, or 15.8% of the baseline.



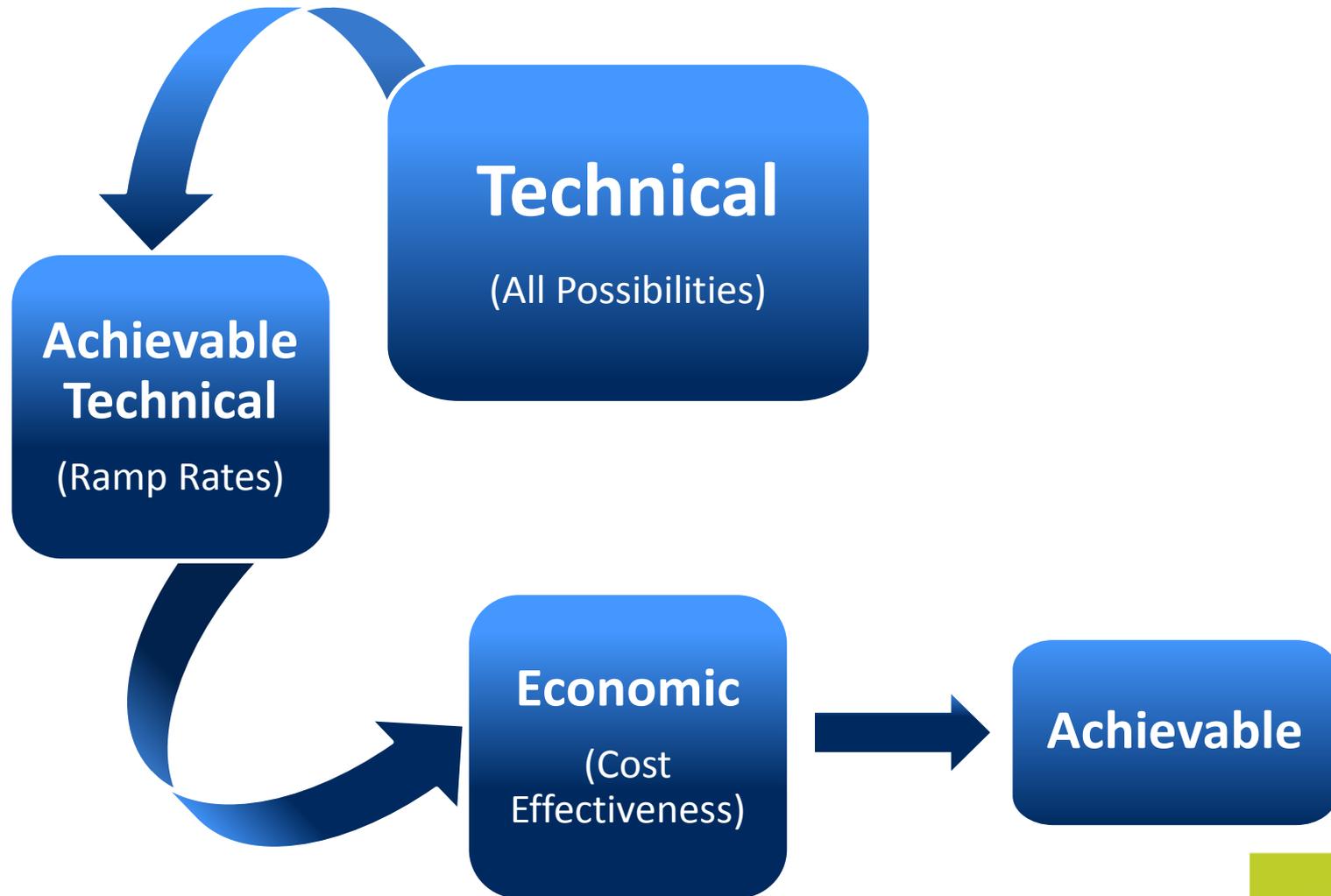
	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	389	389	392	402	422
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	4	9	25	51	67
Technical Potential	6	12	32	63	80
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	0.5	1.0	2.8	5.8	7.6
Technical Potential	0.7	1.4	3.6	7.2	9.2
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.1%	2.3%	6.3%	12.7%	15.8%
Technical Potential	1.6%	3.1%	8.0%	15.6%	19.0%



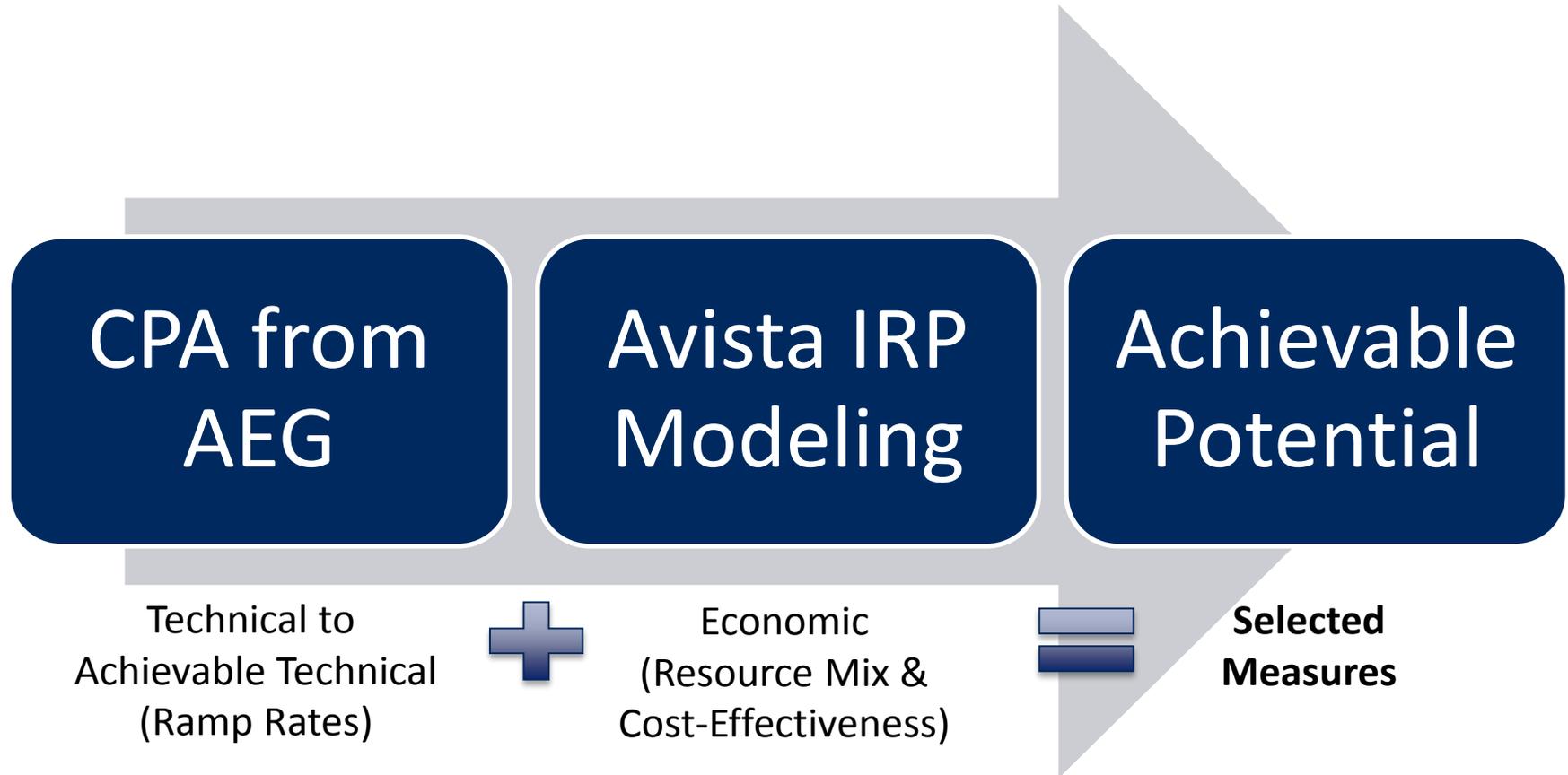
# 2017 IRP Energy Efficiency

Amber Gifford & Ryan Finesilver  
Fifth Technical Advisory Committee Meeting  
March 28, 2017

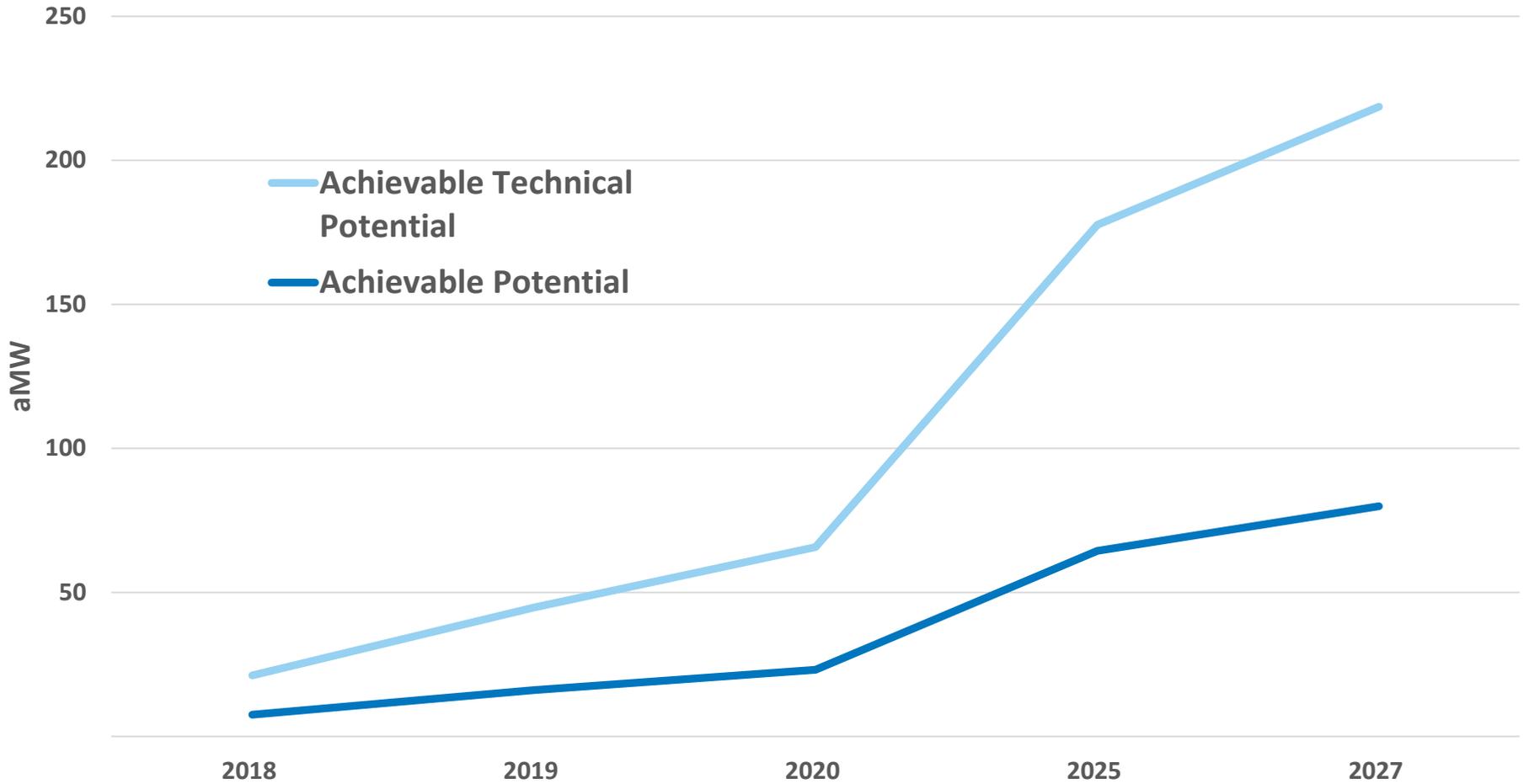
# Levels of Potential



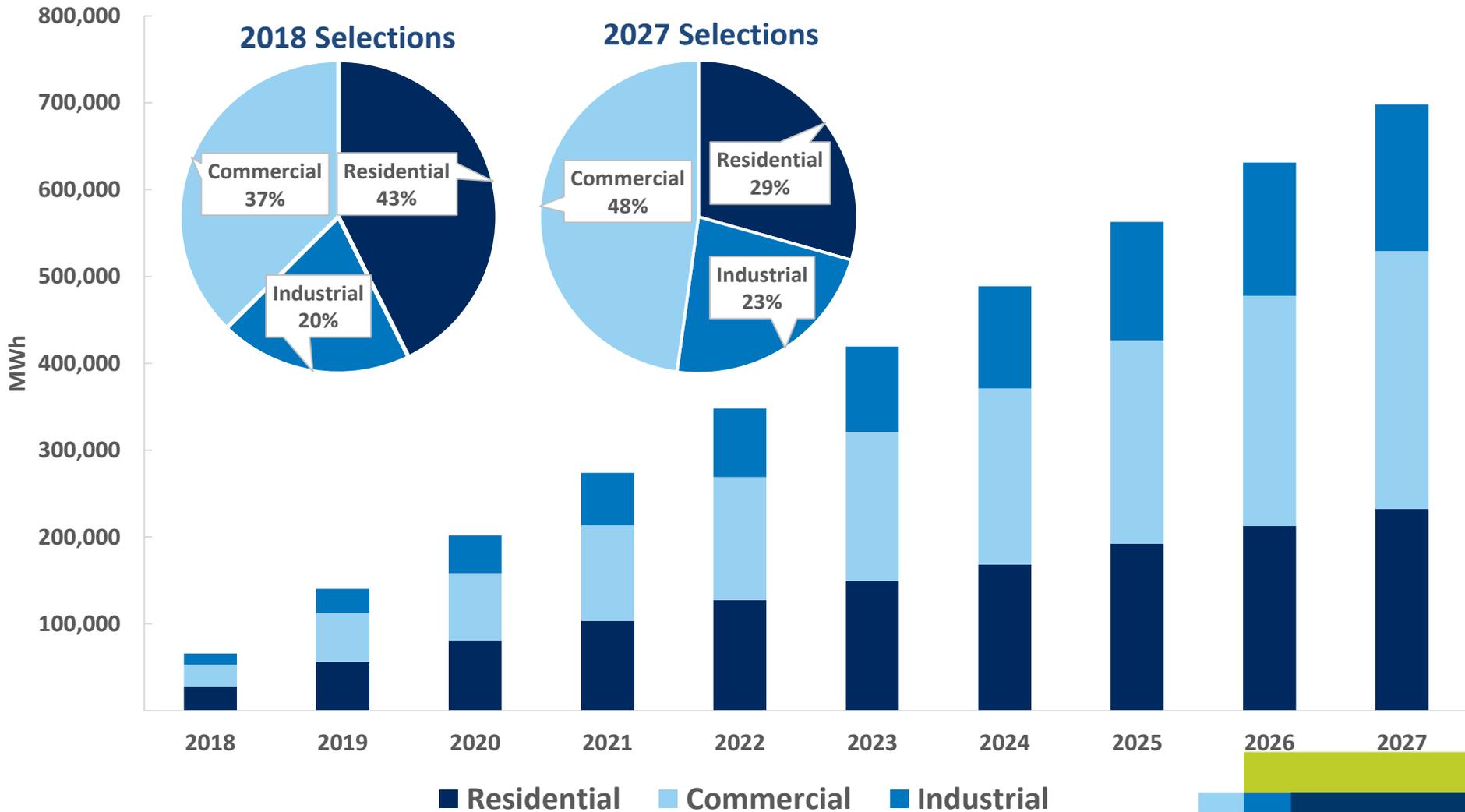
# CPA to Avista Process



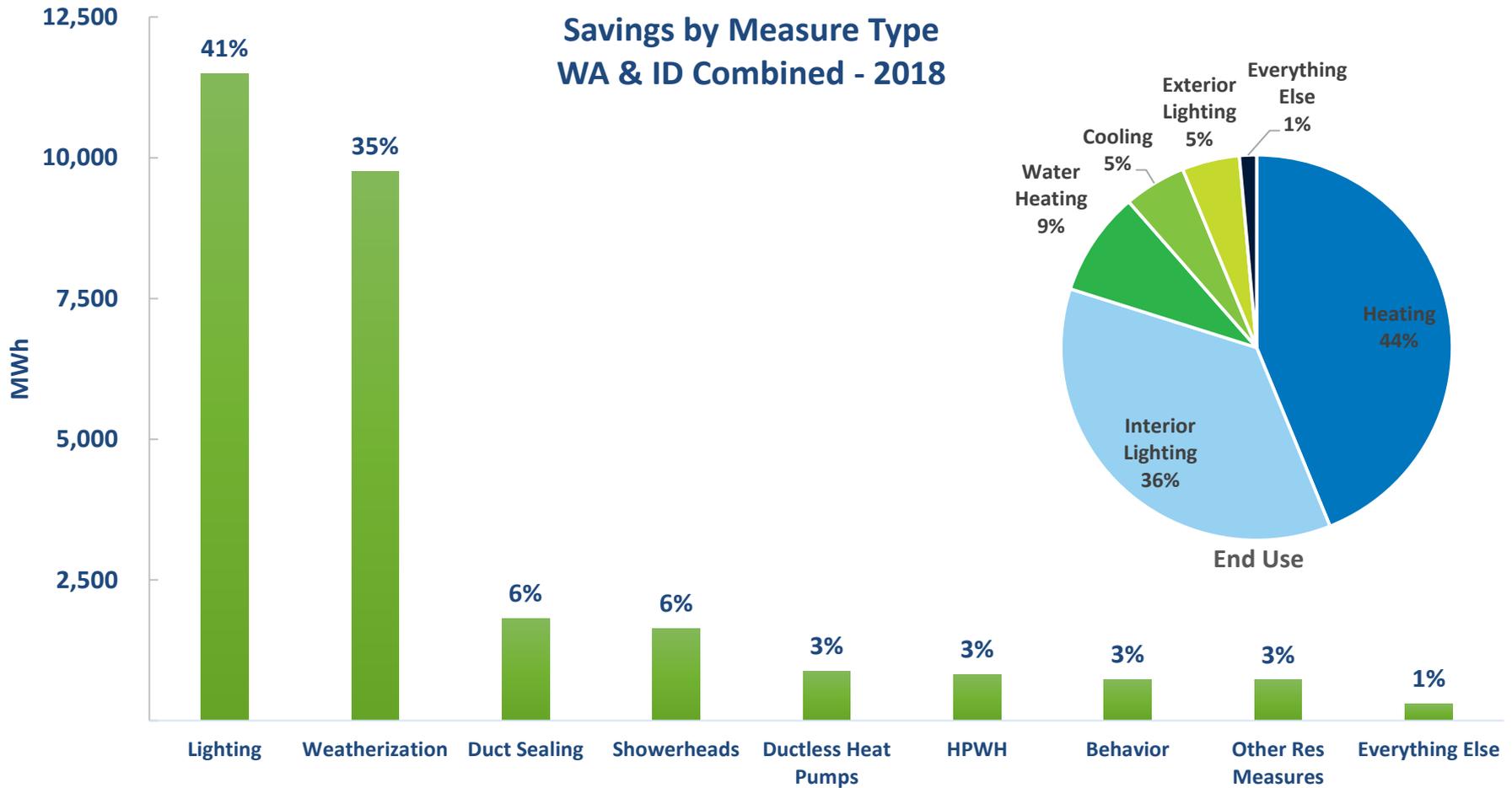
# Achievable Technical vs. Achievable



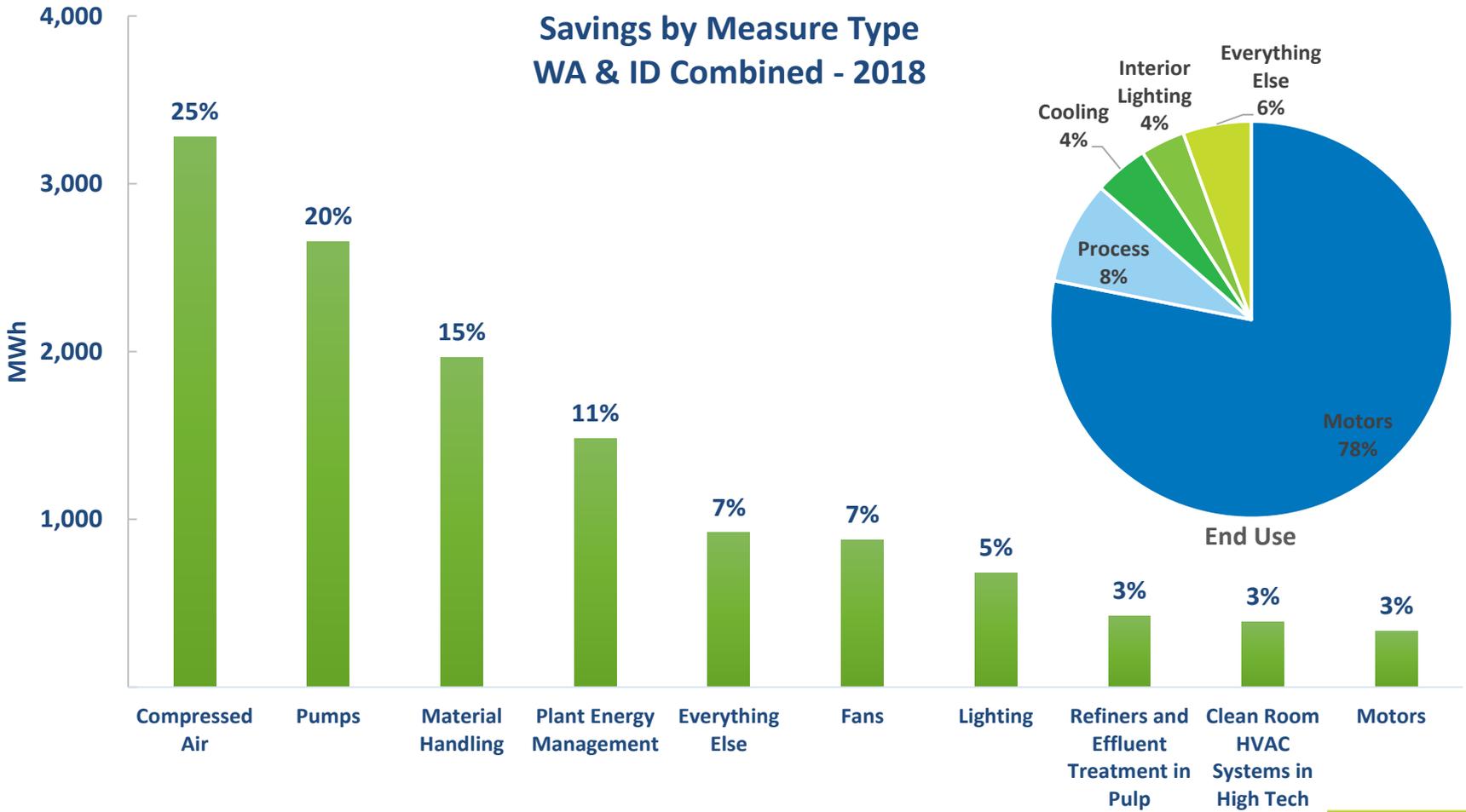
# Cumulative Achievable Potential by Sector



# Residential Achievable Potential

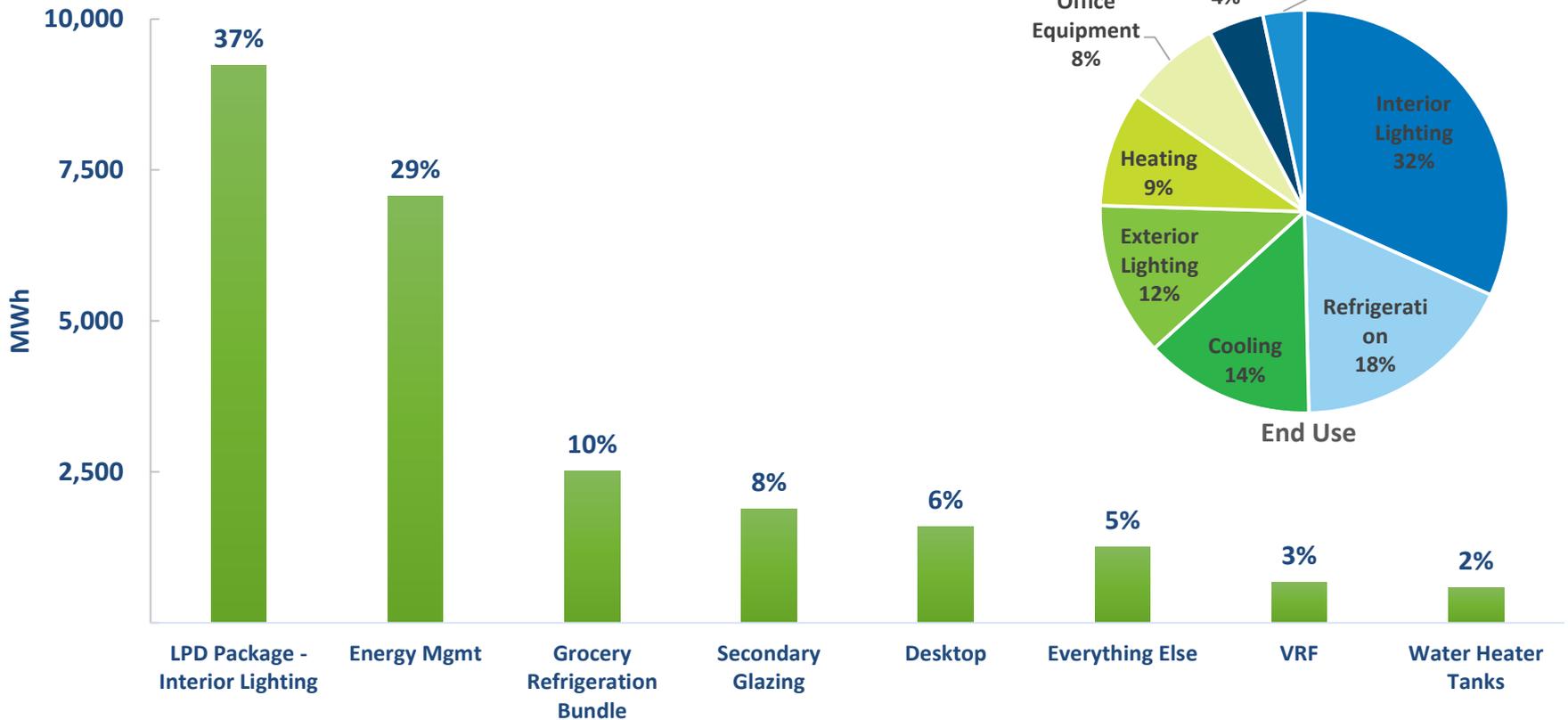


# Industrial Achievable Potential

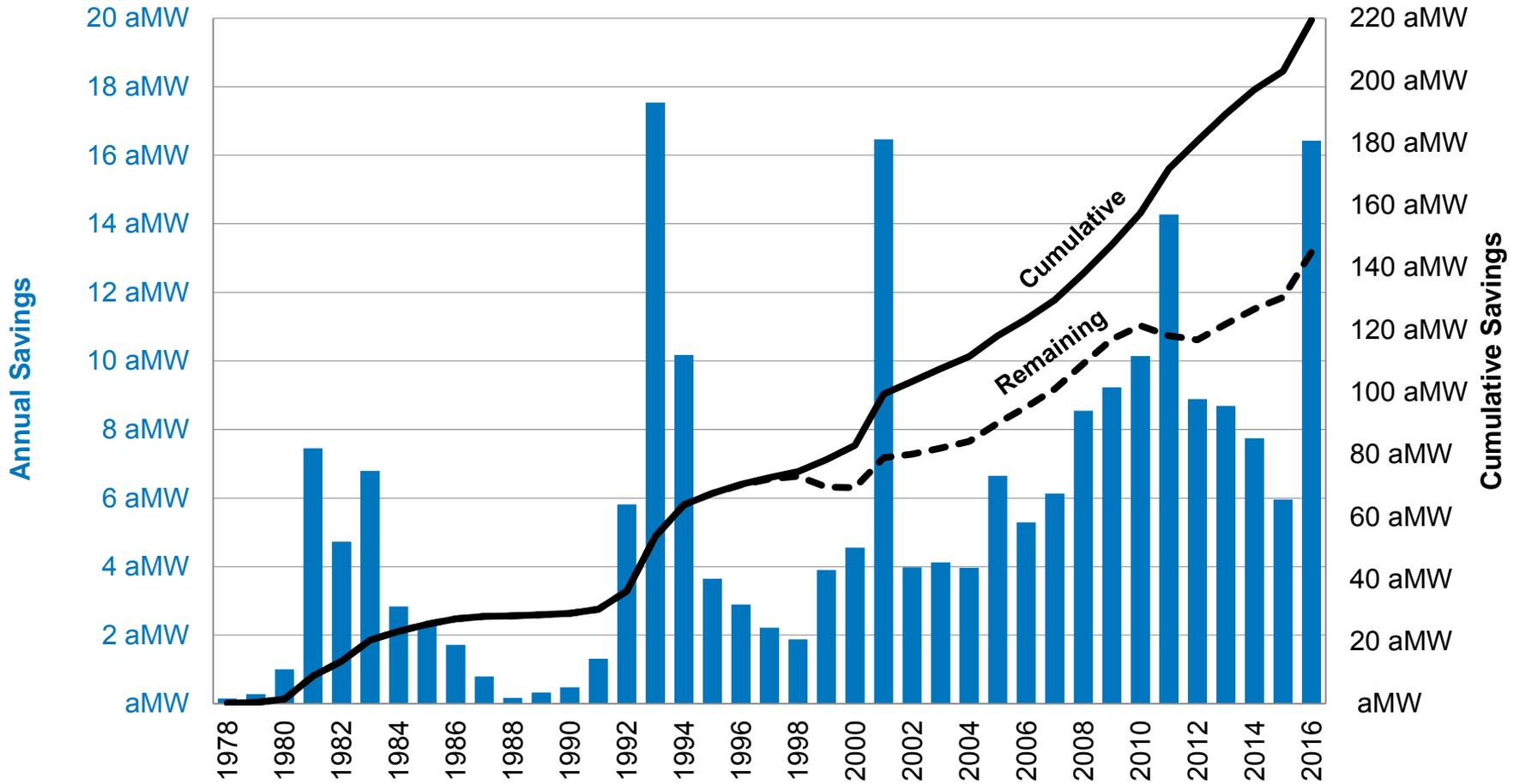


# Commercial Achievable Potential

### Savings by Measure Type WA & ID Combined - 2018



# Historical Conservation Savings





# Avista vs. 7<sup>th</sup> Power Plan

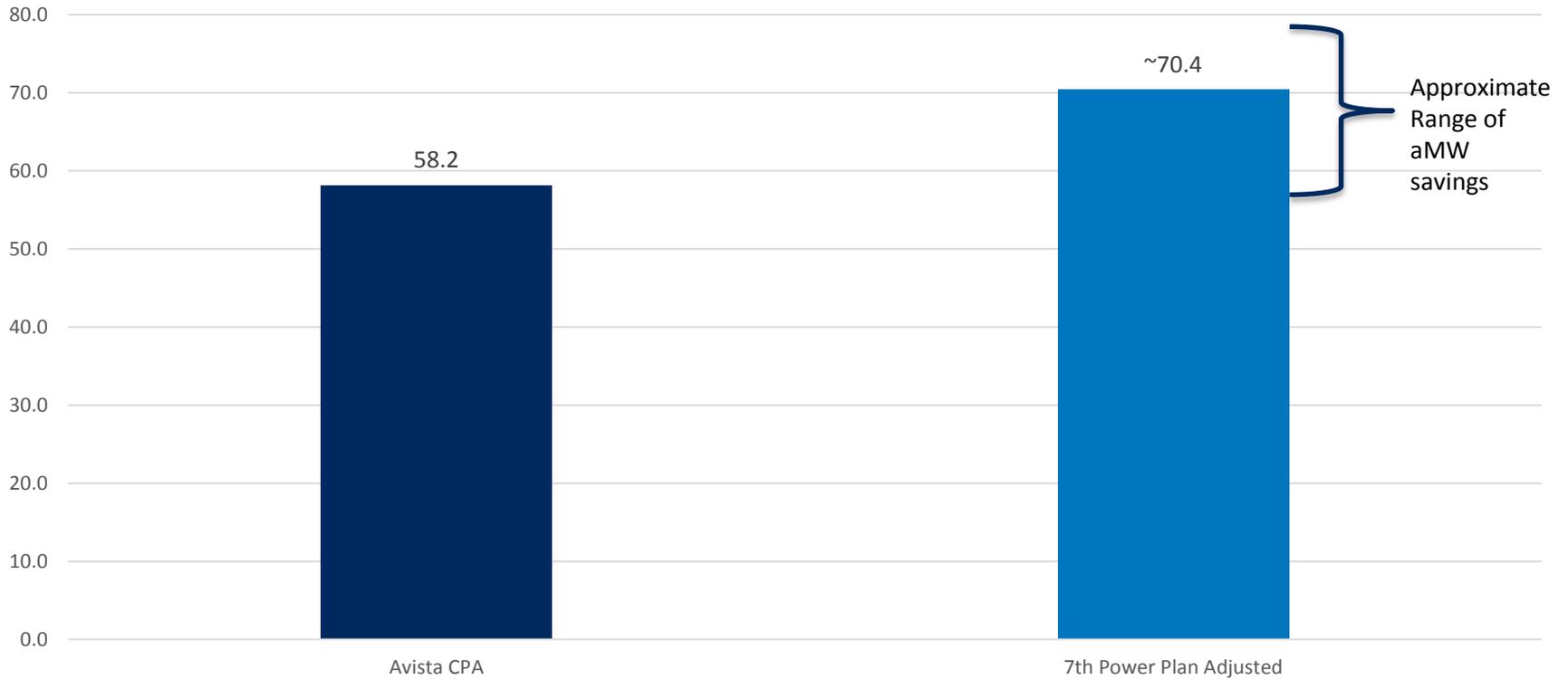
Comparison of Achievable Potential

# Analysis Caveats

- Avista Washington portion based off of the 6<sup>th</sup> Plan Calculator (~3.5% of region)
- Numbers are the 10 year cumulative savings
- 7<sup>th</sup> Power Plan published 2026 aMW. Added 2027 increment based on Council workpapers.

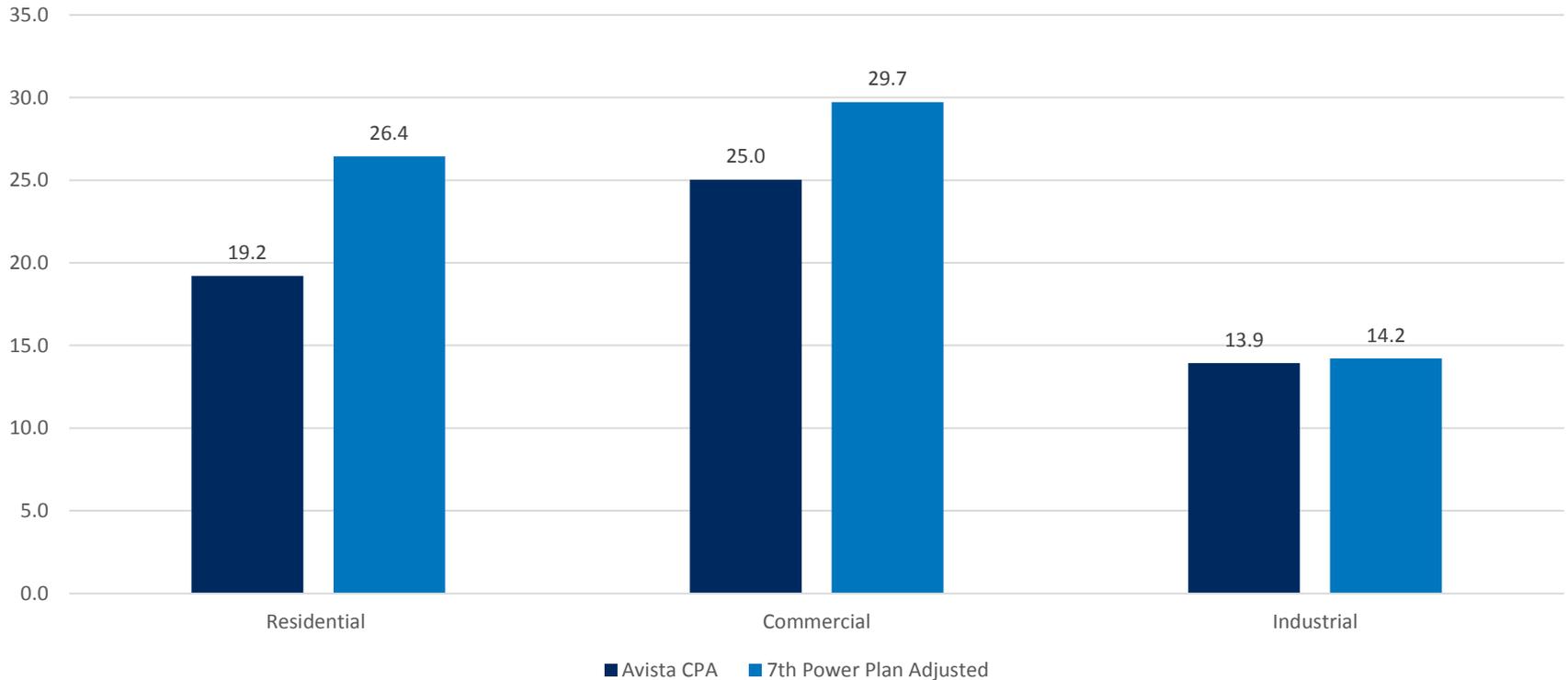
# 2027 AVA WA CPA vs. 7<sup>th</sup> Power Plan Adjusted Savings

2027 Cumulative Conservation (aMW)



# 2027 AVA WA CPA vs. 7<sup>th</sup> Power Plan Adjusted Savings

## 2027 Cumulative Conservation (aMW) by Sector



# Adjustments to 7<sup>th</sup> Power Plan

- Reduce space & water heating measure to 40%
- Reduce data center number to 5%
- Removed 2016-2017 increments from 7<sup>th</sup> Power Plan for comparison.



**QUESTIONS?**



# Electric Distribution Planning Overview

Will Stone, Distribution Planning Engineer  
Fifth Technical Advisory Committee Meeting  
March 28, 2017

# Goals of Electric Distribution Planning

- Ensure electric distribution infrastructure to serve customers now and in the future with a focus on:
  - Capacity
  - Reliability
  - Level of service
    - Voltage, Power Quality, etc.
  - Operational flexibility
  - Efficiency
  - Corporate/Regulatory goals
    - Potentially “Disruptive” Technology



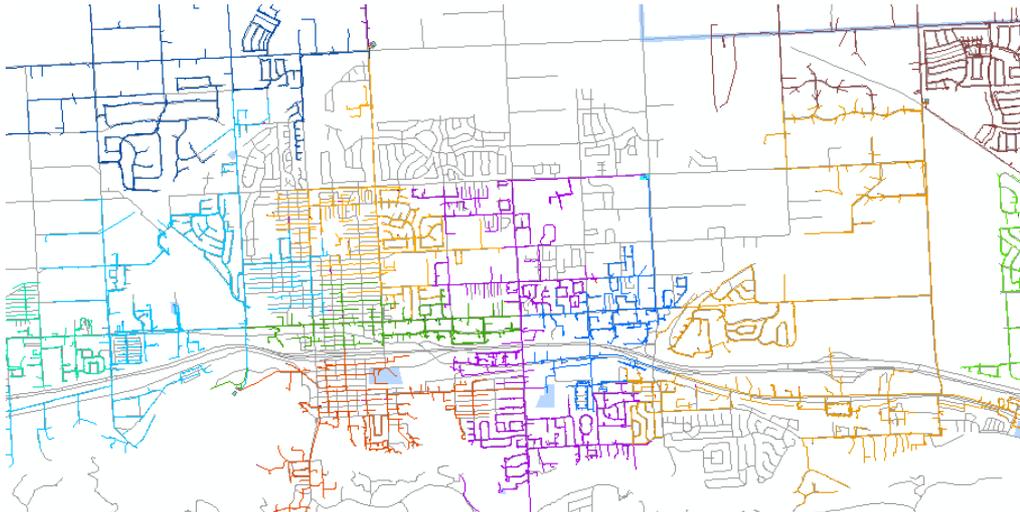
# Data Needs

- Current Infrastructure
- Historic and current load
- Known load additions
- Forecasted additional load



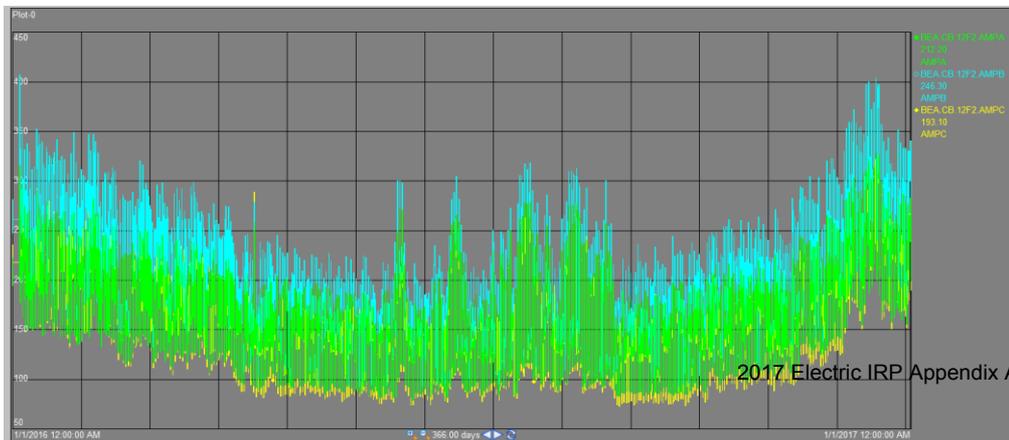
# Current Infrastructure

- GIS
- SCADA Variable Limits
- Substation drafting records
- Distribution engineering standards



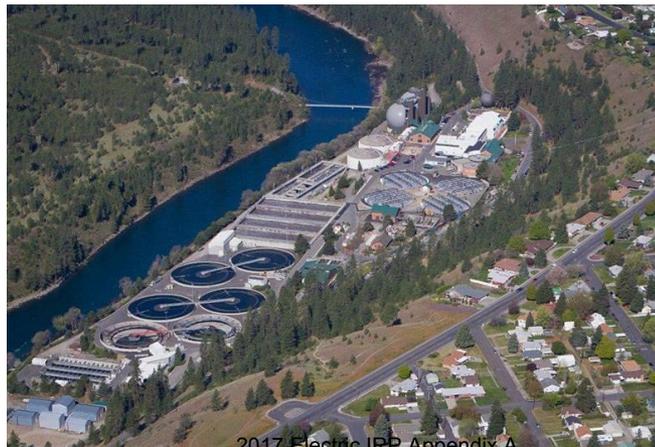
# Historic and current load

- SCADA where available
  - 3 phase on 195/347 circuits
- MAXIMO
- CSS
- Archival info



# Known load additions

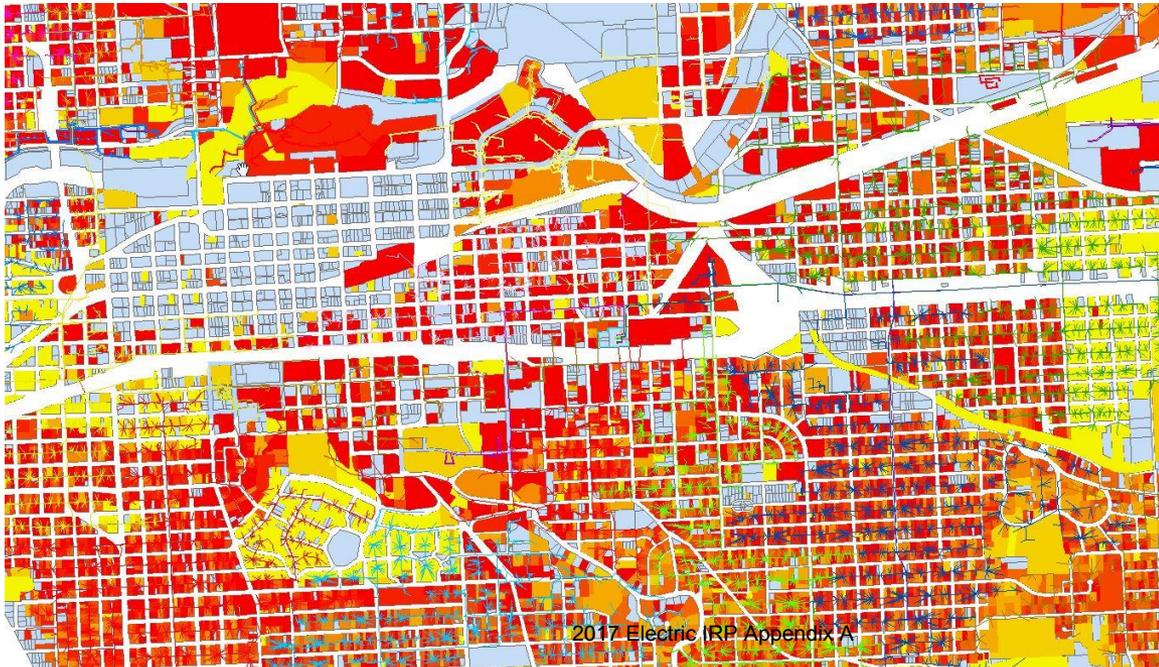
- Working closely with Operating Engineers, Identify new large load additions
  - Industrial customer expansions
  - Large scale new development
  - New delivery points 1MW and above
  - Potential demand response?



2017 Electric IRP Appendix A

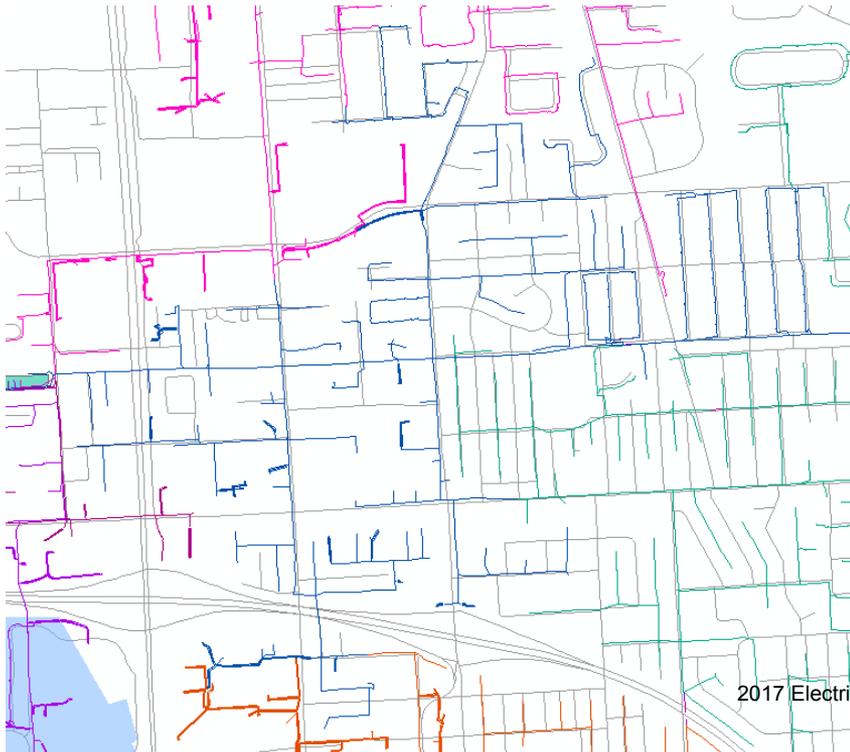
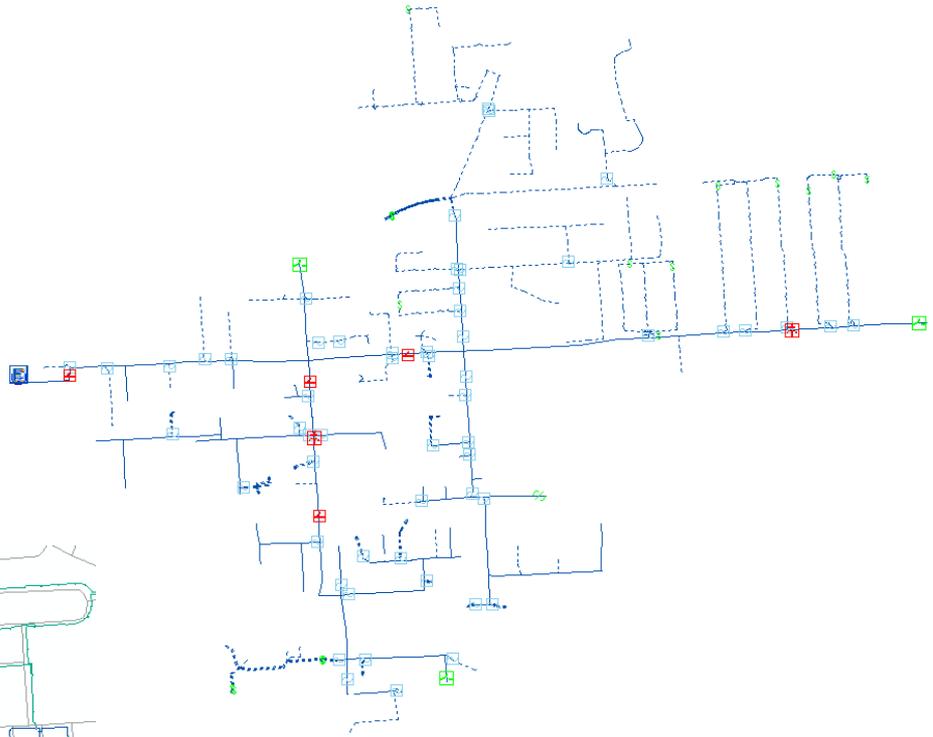
# Forecasted load

- Spatial Load Analytics
  - Based on past and present load, municipality parcel information and zoning, and urban growth boundaries, project potential build out scenario



# Tools

- Spreadsheets
- SynerGi Electric
- ArcGIS



# AVA Distribution Planning Process

- Annually analyze entire system and identify constraints
- List alternative solutions, identify course of action, input to 5 year budget
- Analytics are shared
  - Dx Planning, Rates, IRP



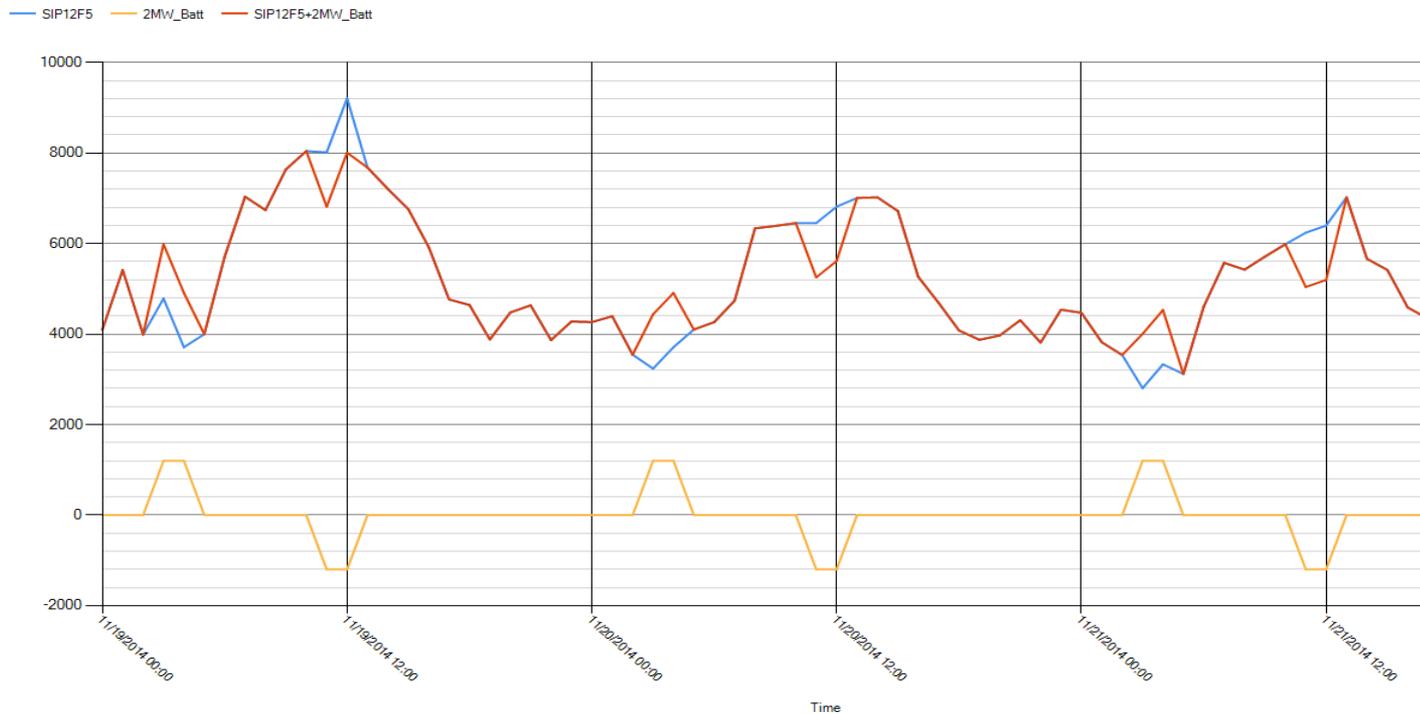
# “Disruptive” Technologies

- Same data and tools support analytics on other load shaping variables
  - EV, Solar, TOU rates, Distributed Storage, MicroGrid
- “Disruptive” isn’t disruptive – just new demands on the grid to ensure capability to handle new loads and load shaping techniques



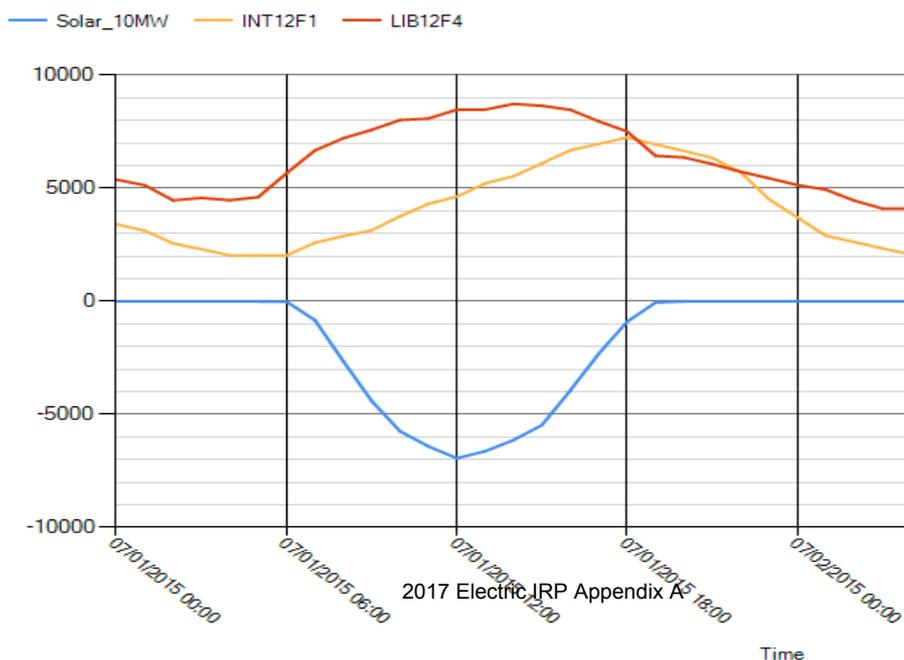
# SIP12F5 – 2MW Battery Storage

- Hypothetical daily battery load curve discharges 1.2 MW over 2 hours to shave the peak to below 8MW.



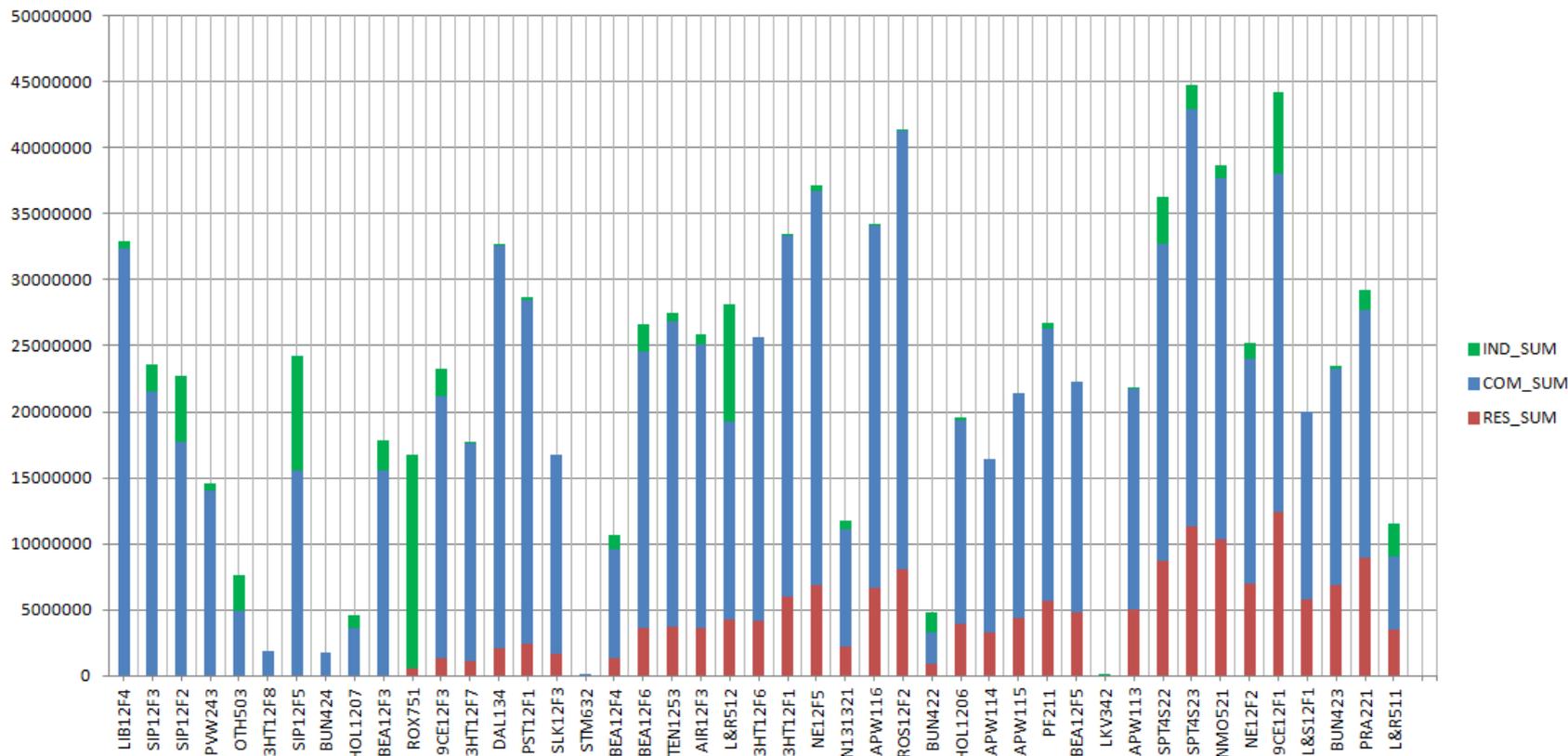
# Location Identification – Solar DER

- Residential loads are generally not coincident with solar insolation curves.
- Commercial loads are ‘more’ coincident with solar insolation curves.
- Therefore, feeders with commercial customers may provide better economics.



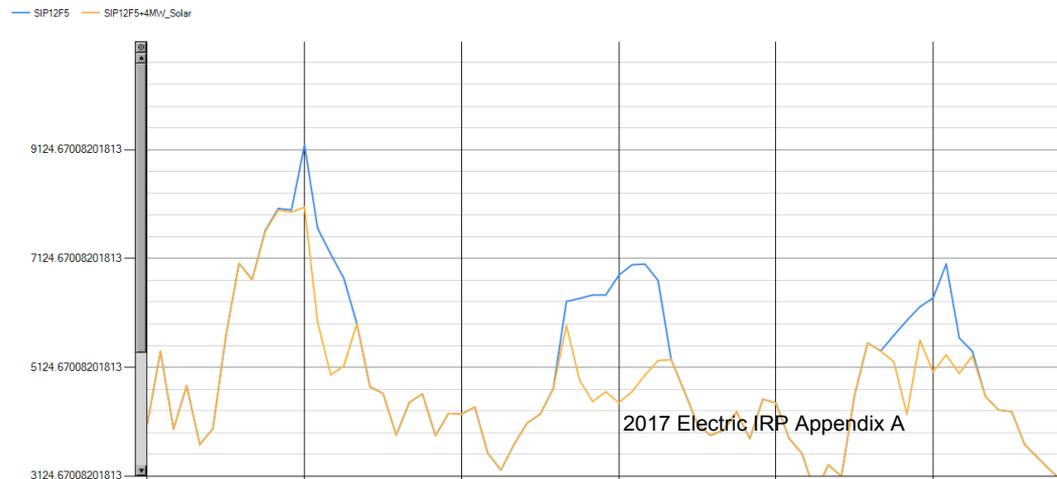
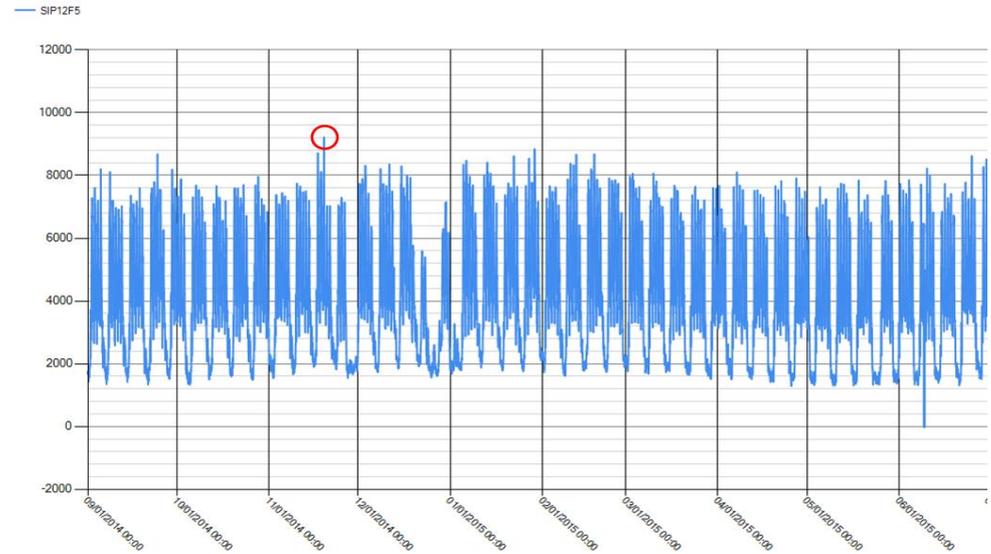
# Feeder Identification – Solar DER <sup>438</sup>

Feeder load type characterization by rate class & aggregate consumption in past year (billing data)



# Solar DER - SIP12F5

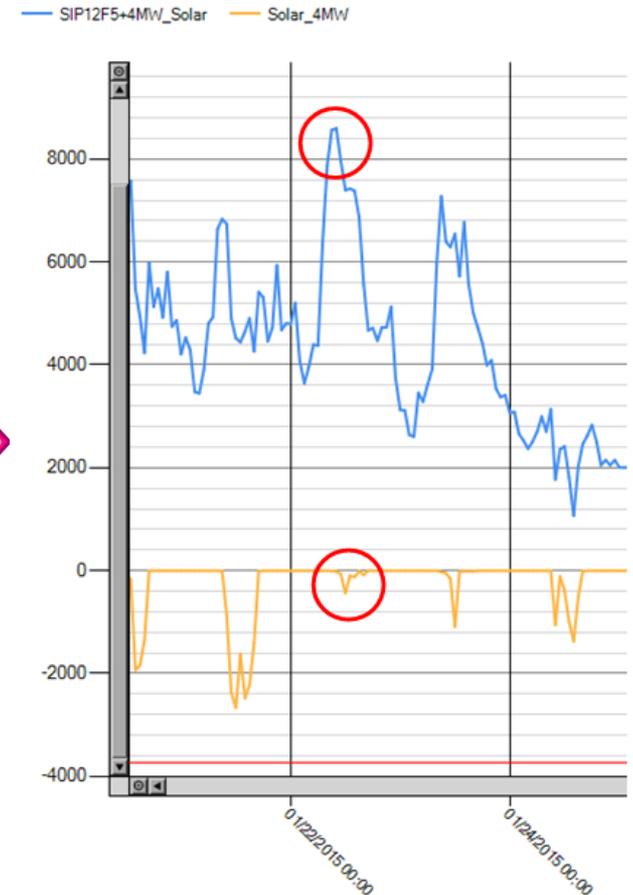
Identify potential peak shaving at summer peak on heavy commercial feeder – 4MW solar sheds 1.1MW (9.2MW-8.1MW)



2017 Electric IRP Appendix A

# SIP12F5 With 4MW Solar<sup>440</sup>

Feeder is dual peaking though – the same 4MW sheds little some days in winter, cloud variation (Winter peak now, 8.8MW)



# Questions?





**DRAFT**

# 2017 IRP Preferred Resource Strategy

James Gall  
Fifth Technical Advisory Committee Meeting  
March 28, 2017

# Introduction

- Avista's Portfolio Modeling Approach
- Resource Options
- Resource Needs Assessment
- Conservation Modeling Methodology & Avoided Cost
- Efficient Frontier
- Draft Preferred Resource Strategy (PRS)
- Detailed PRS Results

# Avista's Portfolio Approach

- Best Practice- Efficient Frontier developed using a Mixed Integer Program (MIP)
- Each portfolio is the least cost “best” portfolio for each level of risk
- No need to build arbitrary portfolios
- Ensures the optimal portfolios are developed
- Allows for explicit and comprehensive measure of risk vs. cost
- Still does not pick the “ideal” portfolio

Efficient Frontier Video

<http://www.investopedia.com/terms/e/efficientfrontier.asp>

Alternate: <http://www.investopedia.com/video/play/explaining-efficient-frontier/>

# Avista's Portfolio Approach, Cont.

- Mixed Integer Program (MIP)
  - Lindo System's What's Best software using Gurobi solver
    - *Superior speed improvement allowing more complex modeling*
  - Solves for least cost mix to meet Avista's resource shortfall
    - *NPV of power supply for next 25 years along with a small weighting of costs beyond 25 years*
  - New generating resources, resource upgrades, conservation, demand response all compete to meet the resource shortfall
    - *Options are treated as integers, therefore no partial units (including conservation)*
  - Model can solve to reduce power supply risk by selecting different resource strategies, while adhering to resource sizes
  - Can still test “arbitrary” portfolios to illustrate concepts

# Resource Options

- NG Peakers:
  - Simple cycle CTs
  - Hybrid
  - Reciprocating engines
- NG combined cycle CT
  - 1x1 “F” class
  - 2x1 “G” class
- Wind
  - E Washington
  - Montana
- Solar
  - Single axis tracking
  - Fixed angle
- Storage
  - 1 x 3
  - 1 x 6
- Upgrades to existing thermal resources
- Upgrades to existing hydro resources
- Demand response (C&I)
  - Load control
  - Curtailment
  - Peak pricing
  - Stand by generation
- Conservation
  - 8,400 measures

# 2015 IRP- Preferred Resource Strategy

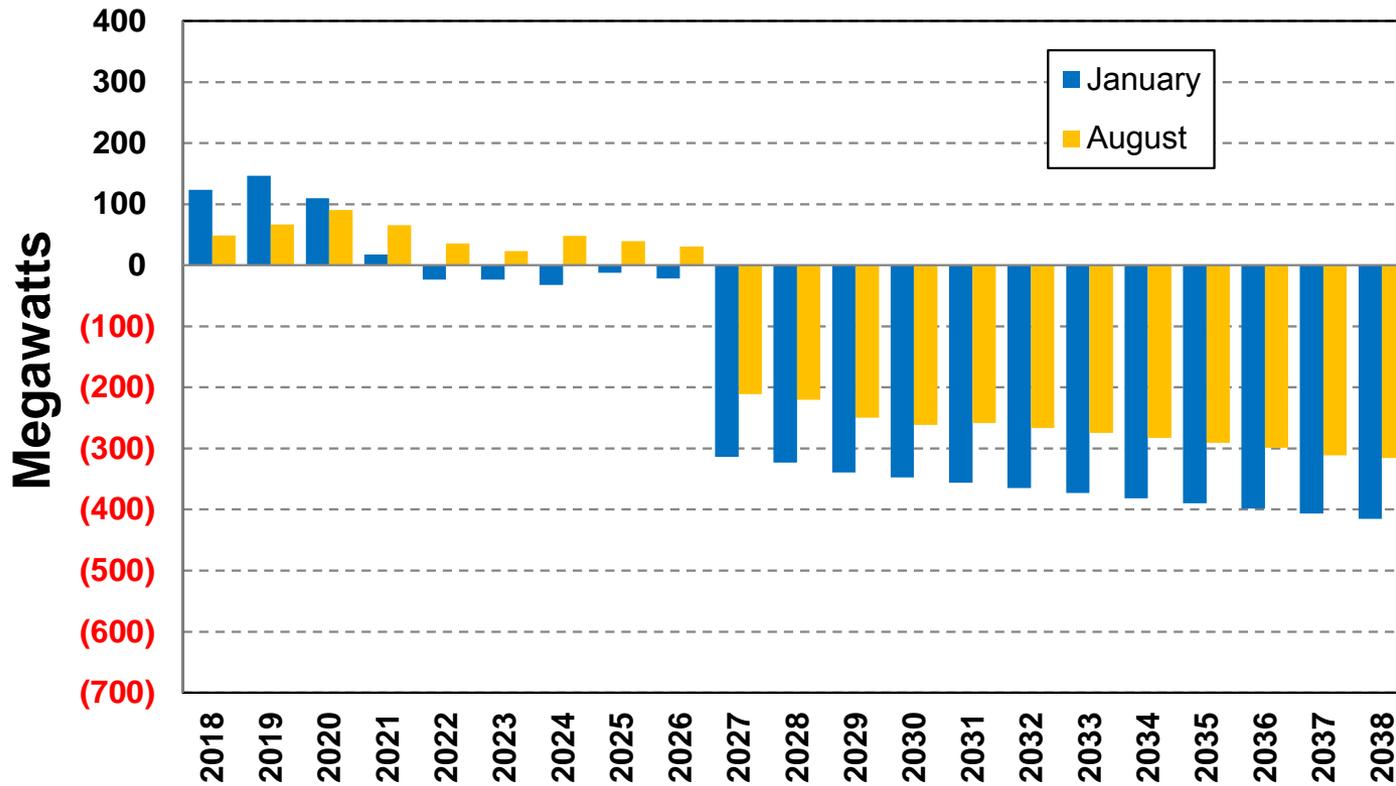
## 2016-2035

Resource	By End of Year	ISO Conditions (MW)	Winter Capacity (MW)	Energy (aMW)
Natural Gas Peaker	2020	96	102	89
Thermal Upgrades	2021-2025	38	38	35
Combined Cycle CT	2026	286	306	265
Natural Gas Peaker	2027	96	102	89
Thermal Upgrades	2033	3	3	3
Natural Gas Peaker	2034	47	47	43
<b>Total</b>		<b>565</b>	<b>597</b>	<b>524</b>
Efficiency/Demand-Side	Acquisition Range		Winter Peak Reduction	Energy (aMW)
Energy Efficiency			193	132
Demand Response			0	0
Distribution Efficiencies			<1	<1
<b>Total</b>			<b>193</b>	<b>132</b>

# Resource Needs

Winter 1-hour Peak Position is the Main Driver of New Capacity Requirements

## 1 Hour Peak Load & Resource Position



# Conservation Modeling

- Load forecast adjusted higher to evaluate portfolio without conservation
- Conservation measures are considered as resource options
  - 8,740 individual programs are included
- PRiSM may chose conservation program or generation resource to fill resource deficits
  - PRiSM looks at the added energy, winter, and summer capacity for each program compared to its cost and energy savings
  - When valuing the energy savings, the Power Act 10% premium is included
- Programs are either on/off. A program cannot start and end unless its life cycle is complete
- For Washington, the final conservation estimates will reflect the 10 year average conservation acquisition in each of the first 10 years

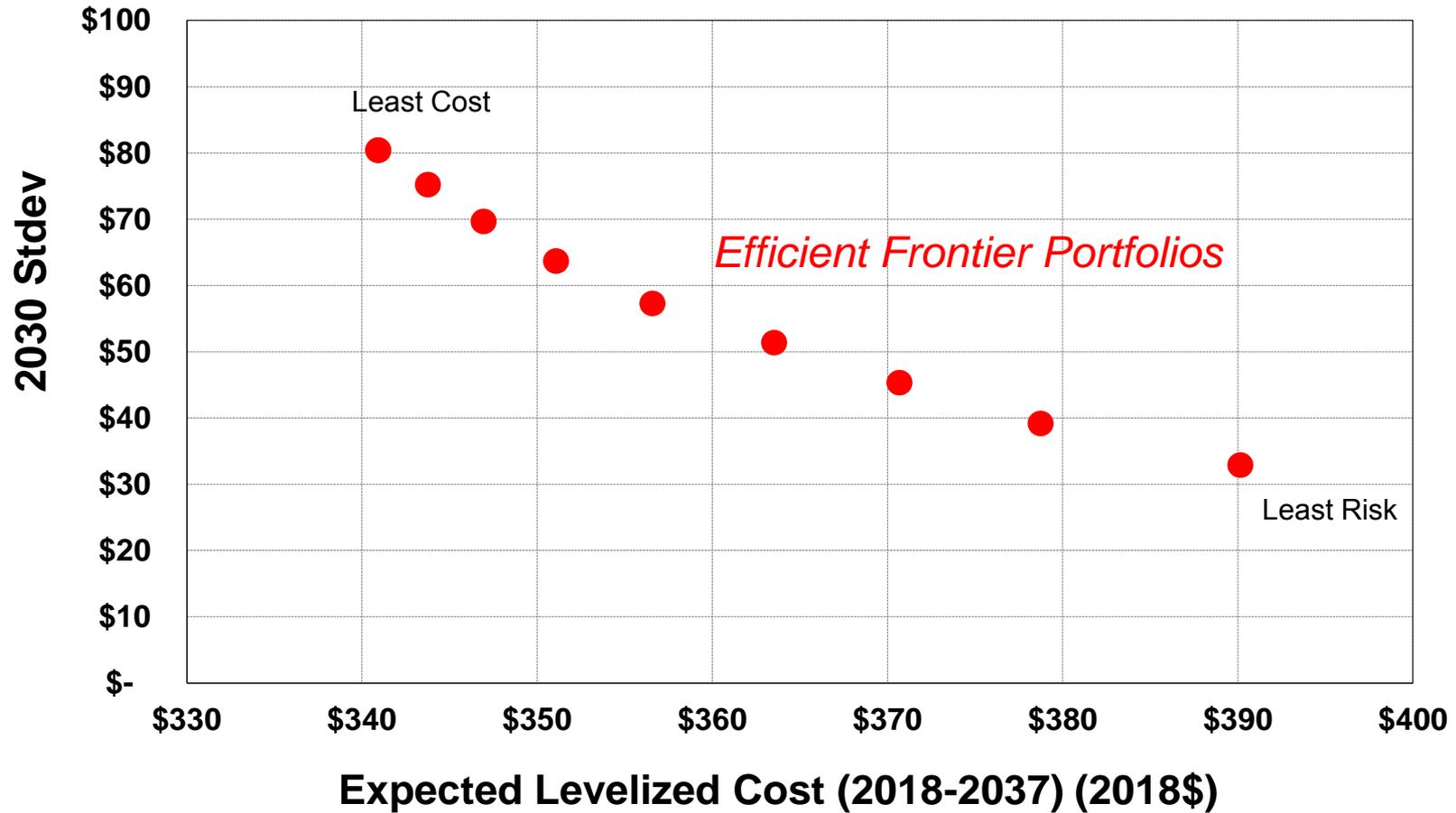
# Conservation Avoided Cost

(2018 Nominal Levelized Costs with Flat Delivery Over All Hours)

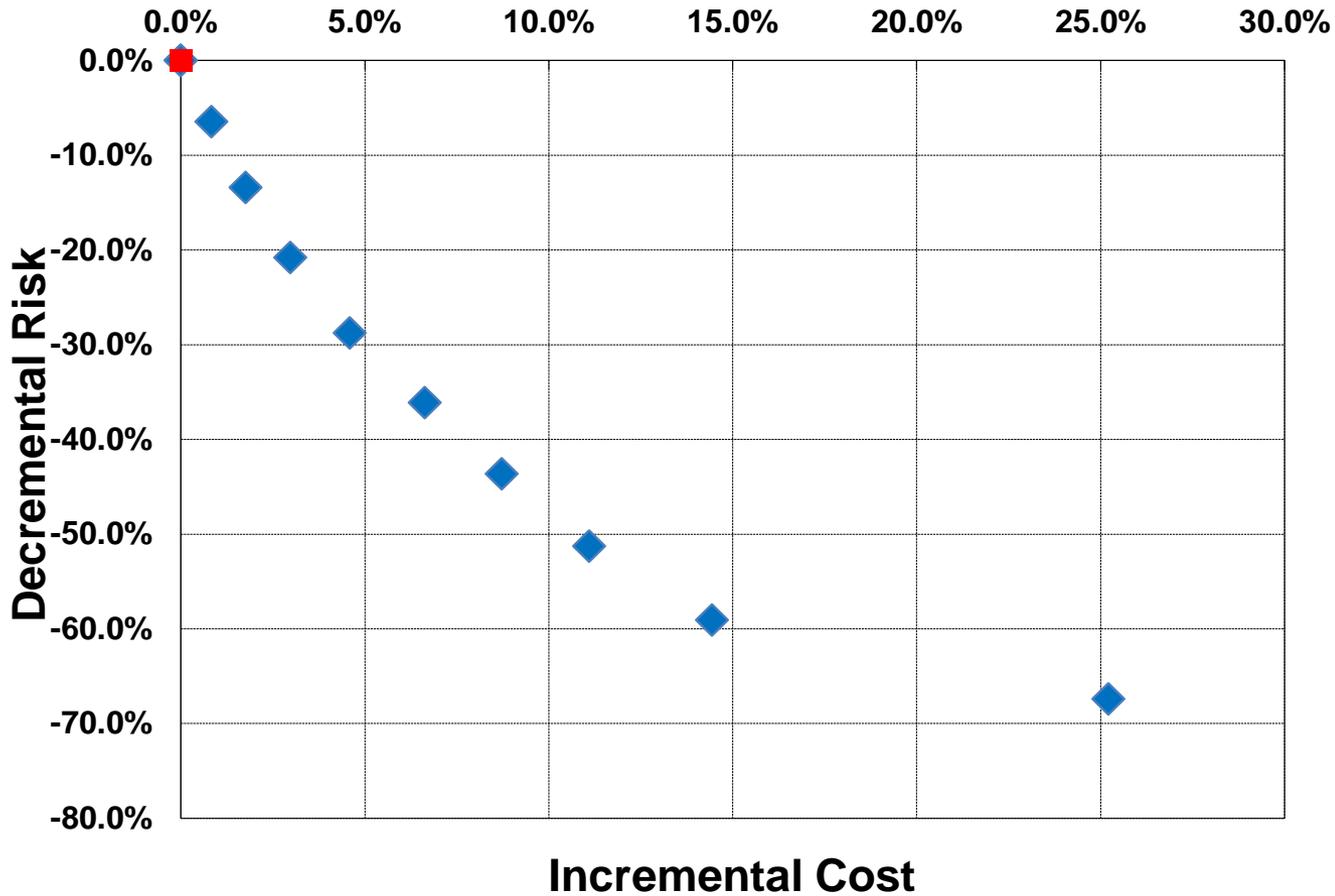
- Energy: \$35.85/ MWh **PLUS**
- Capacity & Risk: \$97.60/ kW-year (winter peak) **PLUS**
- T&D Capacity: \$16.66/ kW-year (winter peak) **PLUS**
- T&D Losses: 6.0% **PLUS**
- Power Act Adder: 10% added to energy & loss values

# Efficient Frontier

(Millions of dollars)

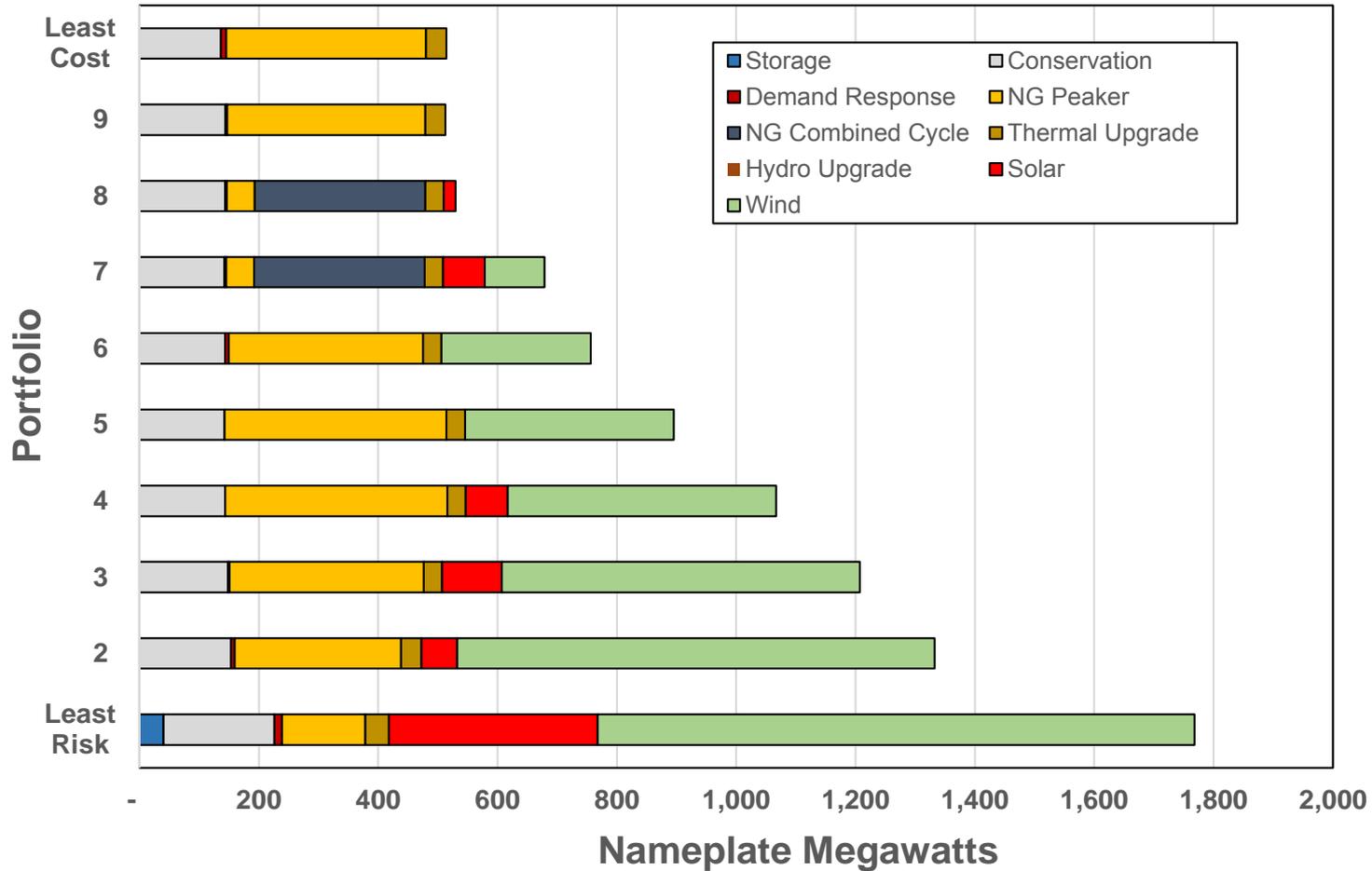


# Risk & Reward Tradeoffs from PRS



# Efficient Frontier New Resources

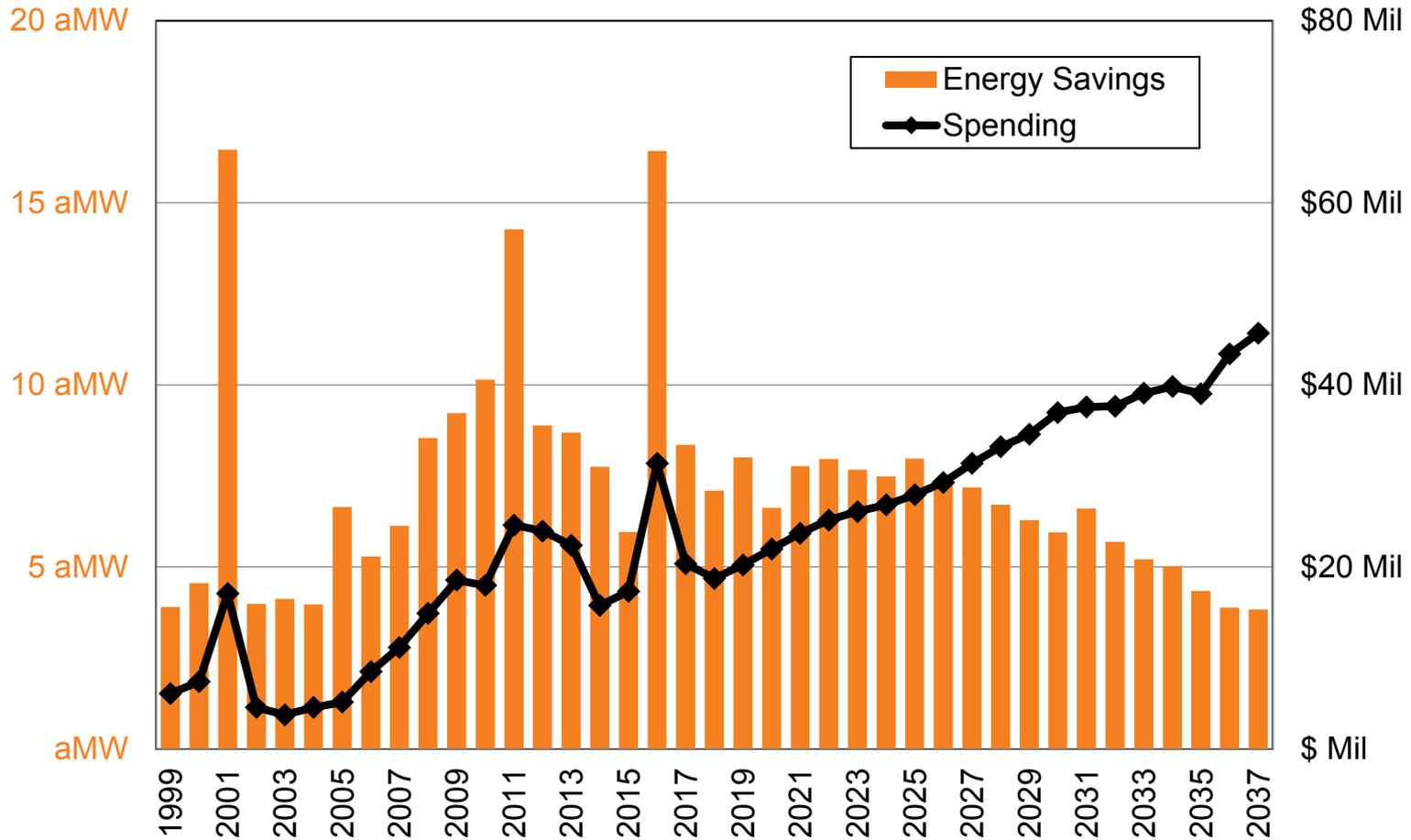
Organized by 2030 Portfolio Standard Deviation



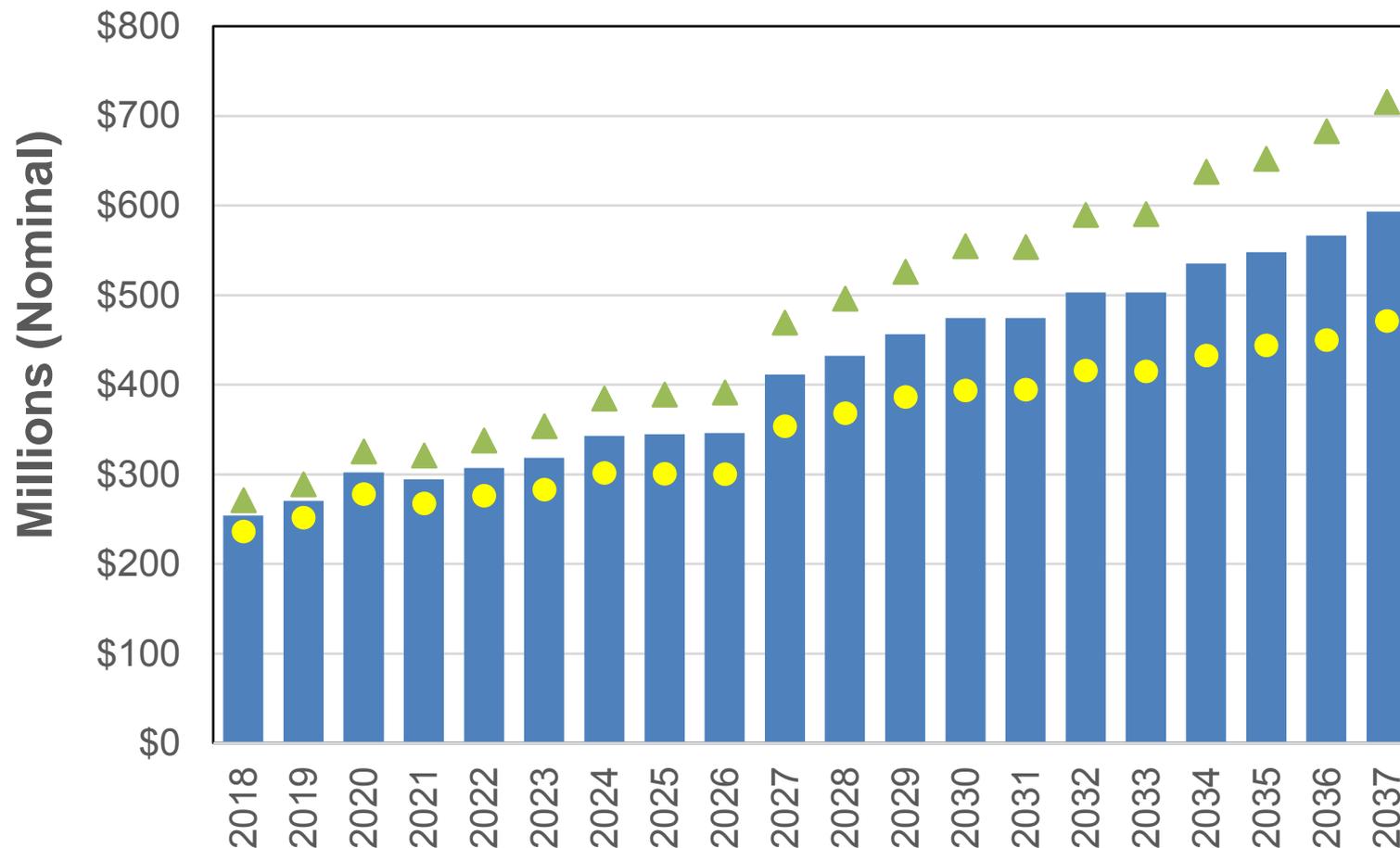
# Draft Preferred Resource Strategy

Resource	By End of Year	ISO Conditions (MW)	Winter Capacity (MW)	Energy (aMW)
Thermal Upgrades	2022-2030	34.0	34.0	31.0
Natural Gas Peaker	2026	288.3	305.6	267.4
Natural Gas Peaker	2033	46.5	46.5	43.1
<b>Total</b>		<b>368.8</b>	<b>386.1</b>	<b>341.5</b>
Efficiency/Demand-Side	Acquisition Range		Winter Peak Reduction	Energy (aMW)
Energy Efficiency	2018-2037		250.9	136.4
Demand Response	2029+		40.0	0
Distribution Efficiencies			<1	<1
<b>Total</b>			<b>290.9</b>	<b>136.4</b>

# Conservation Acquisition Forecast

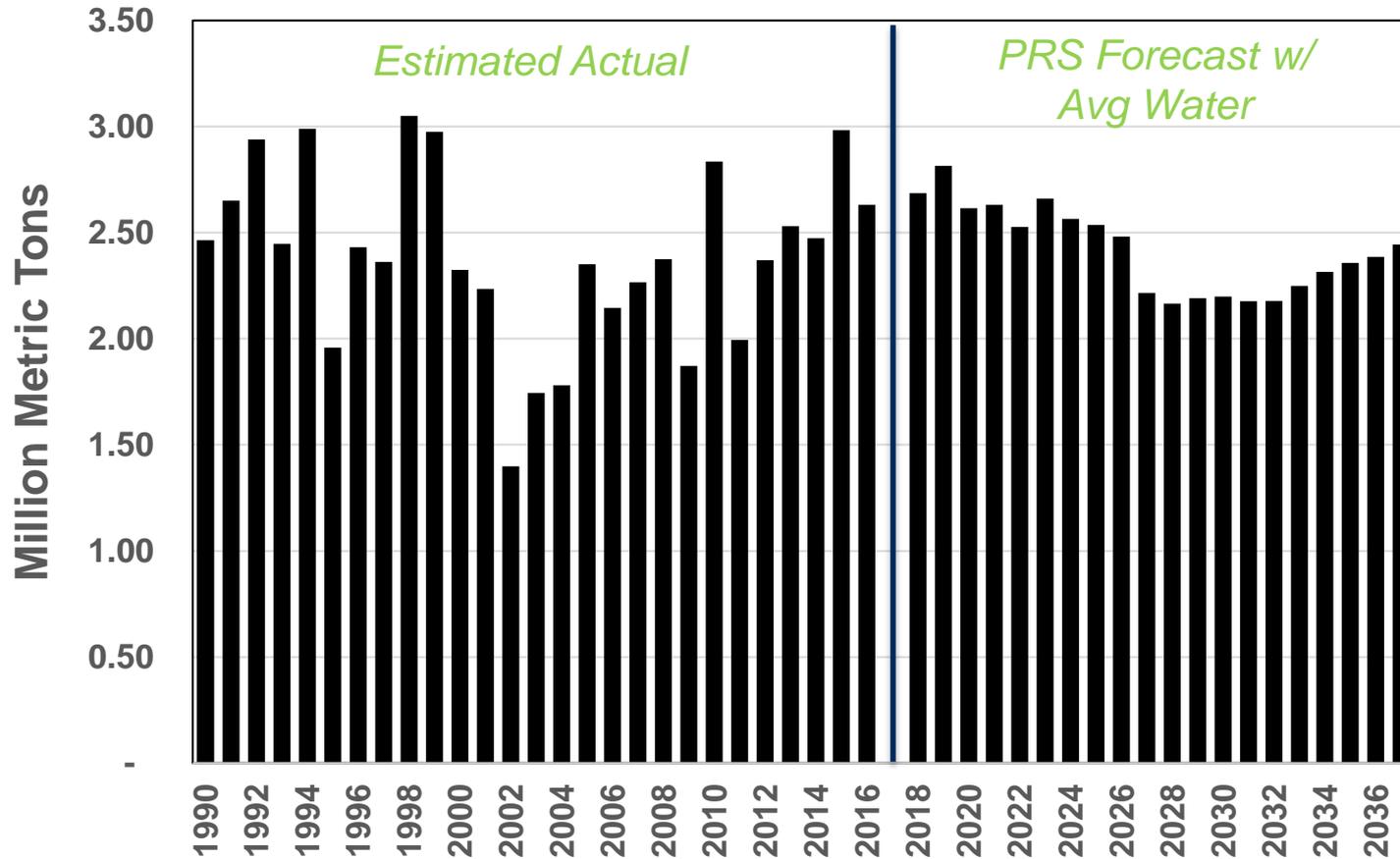


# Power Cost Forecast



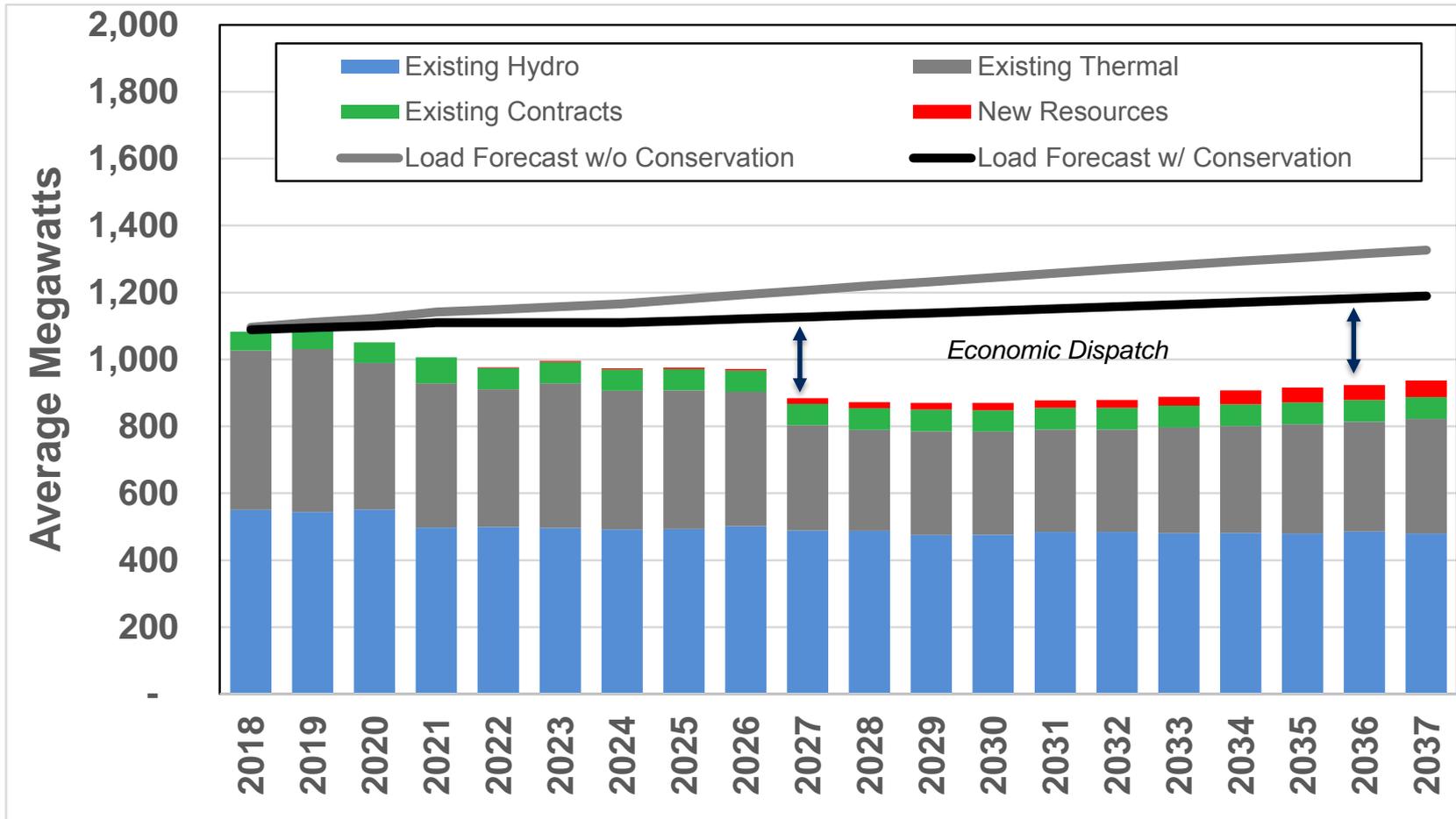
# Greenhouse Gas History & Forecast

## Avista's Generation (Owned & Controlled)



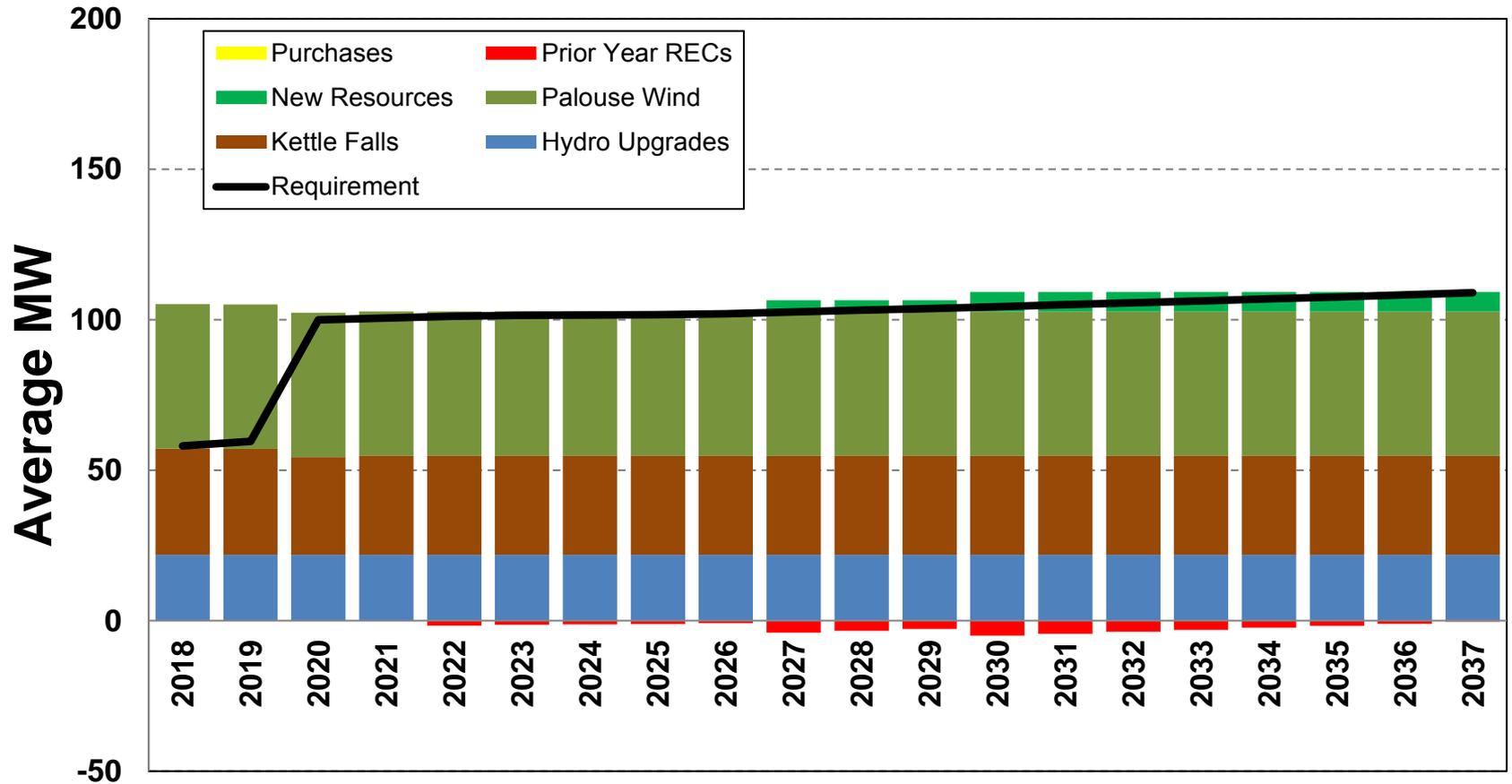
# Annual Dispatch Forecast

## Economic Dispatch of Owned/Controlled Generation as Compared to Load



# Washington State EIA Compliance

## Current Renewables Meet Current Requirement



*2017 Electric Integrated Resource Plan*  
**Technical Advisory Committee Meeting No. 6 Agenda**  
 Tuesday, June 20, 2017  
 Conference Room 130

<b>Topic</b>	<b>Time</b>	<b>Staff</b>
Introduction and TAC 5 Recap	9:00	Lyons
Conservation Assessment	9:10	Finesilver
Final 2017 Preferred Resource Strategy	9:40	Gall
Break	10:15	
Scenario Analysis	10:30	Gall
Lunch	12:00	
C&I Solar Select Program	1:00	Schaffner
2019 IRP Action Items	1:30	Lyons
Break	2:00	
2017 IRP Document Overview	2:15	Lyons
Adjourn	3:00	



# 2017 Electric IRP TAC Meeting Expectations & TAC 5 Recap

John Lyons, Ph.D.  
Sixth Technical Advisory Committee Meeting  
June 20, 2017

# Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington every other year
- Guides resource strategy over the next two years
- Resource procurements over the next 20 years – Preferred Resource Strategy (PRS)
- Snapshot of current and projected load & resource position

# Integrated Resource Planning (Continued)

- Based on significant modeling and many assumptions
  - Fuel prices
  - Economic activity
  - Policy considerations
  - Resource costs
  - Energy efficiency
- Action Items – areas for more research in the next IRP
- This is not an advocacy forum
- Not a forum on a particular resource or resource type
- Supports rate recovery, but not a preapproval process

# Technical Advisory Committee

- The public process piece of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants in all or some of the process
- Open forum, but we need to stay on topic to get through the agenda
- Welcome requests for studies or different assumptions.
  - Time or resources may limit the amount of studies we can do
  - The earlier study requests are made, the more accommodating we can be
  - January 13, 2017 was the final date for study requests
- Planning team is also available by email or phone for questions or comments between the TAC meetings

# TAC #5 Recap

- Introduction and TAC 4 Recap
- Updated Electric Price Forecast
- Energy Storage and Ancillary Services
- Conservation Potential Assessment
- Distribution Planning
- Draft Preferred Resource Strategy

# Today's Agenda

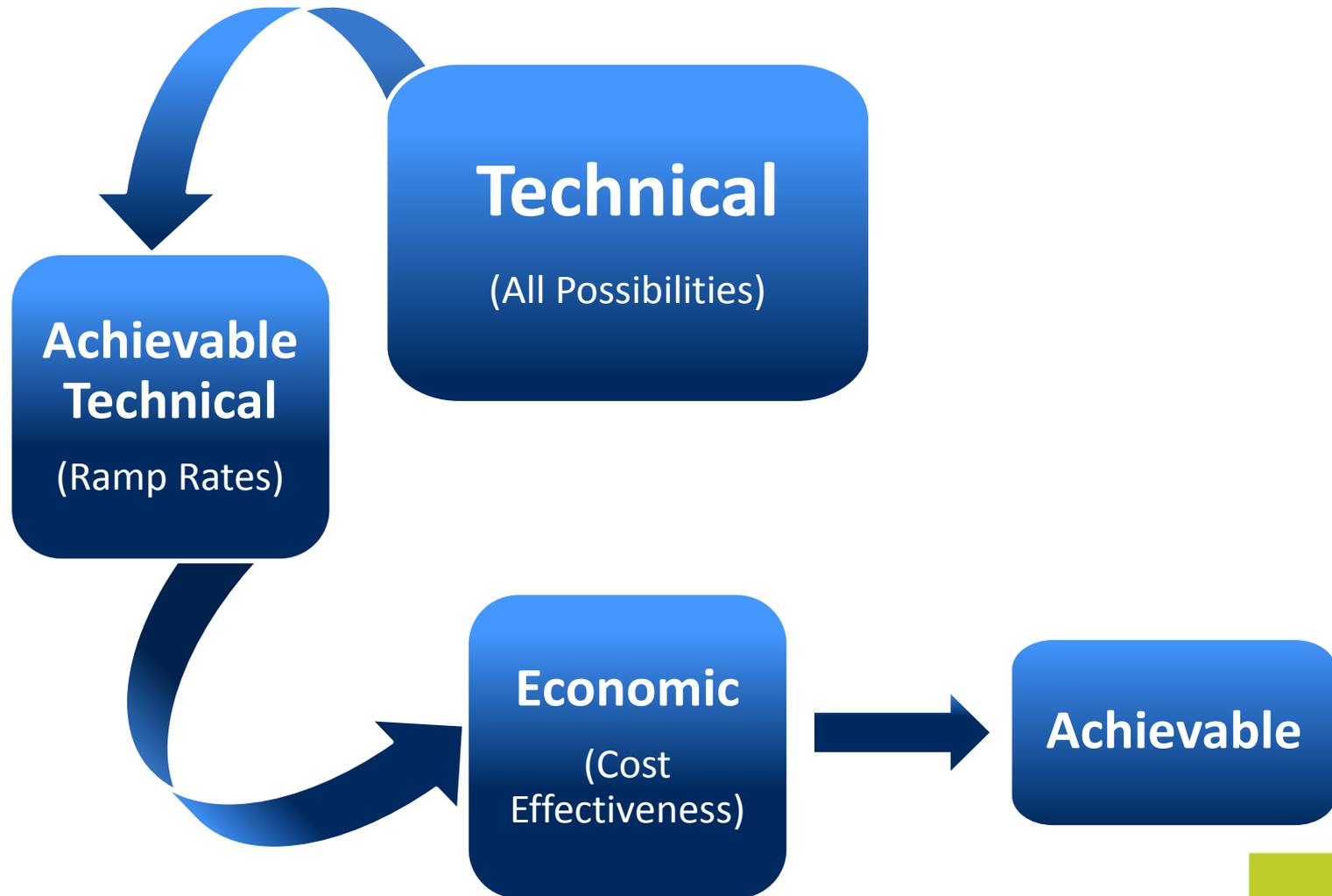
- 9:00 – Introduction and TAC 5 Recap, Lyons
- 9:10 – Conservation Assessment, Finesilver
- 9:40 – Final 2017 Preferred Resource Strategy, Gall
- 10:15 – Break
- 10:30 – Scenario Analysis, Gall
- 12:00 – Lunch
- 1:00 – C&I Solar Select Program, Schaffner
- 1:30 – 2019 Action Items, Lyons
- 2:00 – Break
- 2:15 – Document Overview, Lyons
- 3:00 – Adjourn



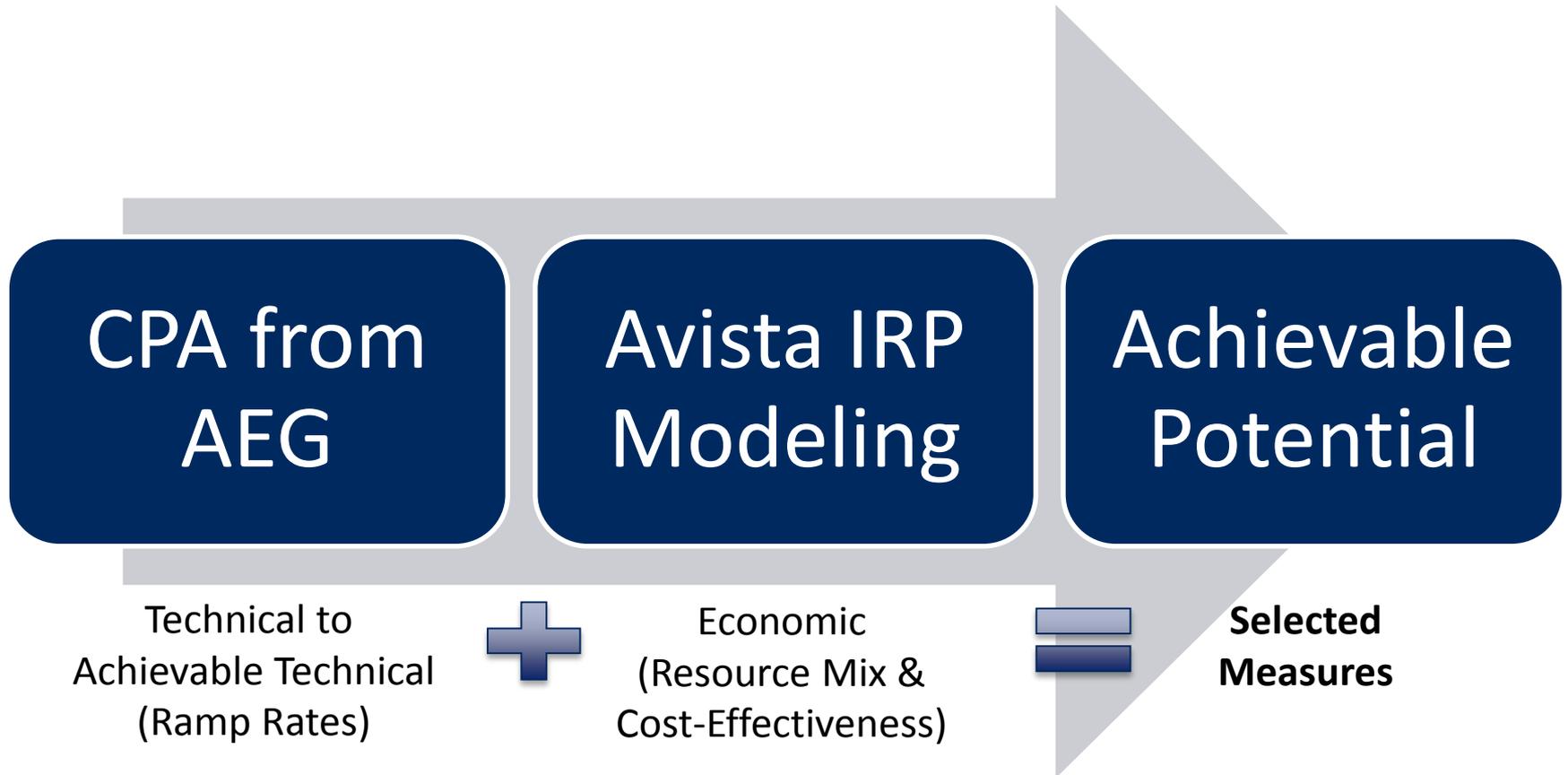
# Conservation Assessment

Ryan Finesilver, DSM Analyst – Planning and Analytics  
Sixth Technical Advisory Committee Meeting  
June 20, 2017

# Levels of Potential



# CPA to Avista Process

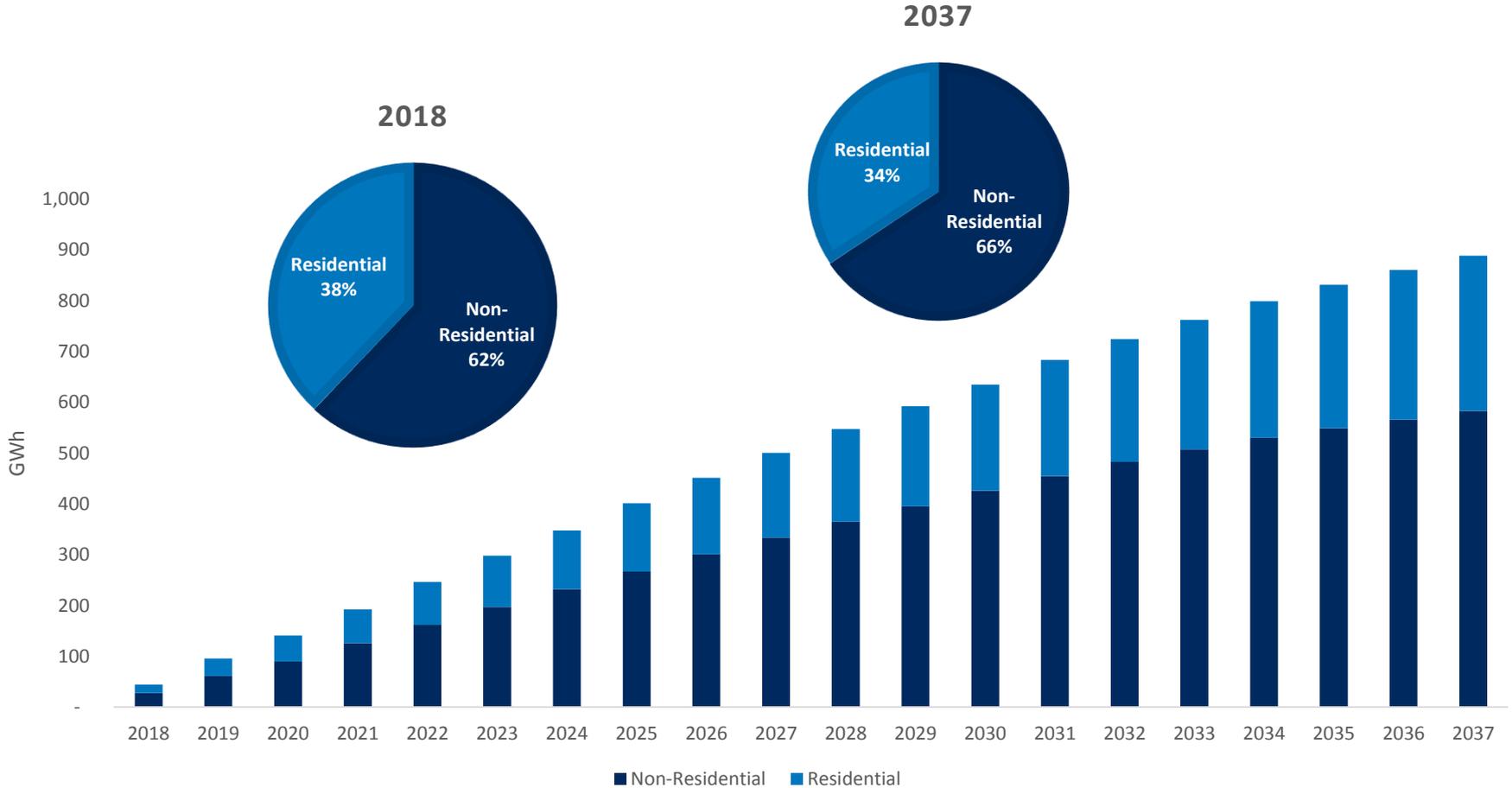


# Achievable Economic Potential<sup>470</sup> Quick Glance

- Cumulative Savings
  - By 2018: **44,402** MWh or **5.1** aMW
  - By 2027: **500,387** MWh or **57.1** aMW
  - By 2037: **888,850** MWh or **101.5** aMW
- Largest Contributors
  - Non-Residential Lighting
  - Non-Residential Motors
  - Residential Space and Water Heating

\*cumulative retail savings

# Cumulative Achievable Potential by Sector

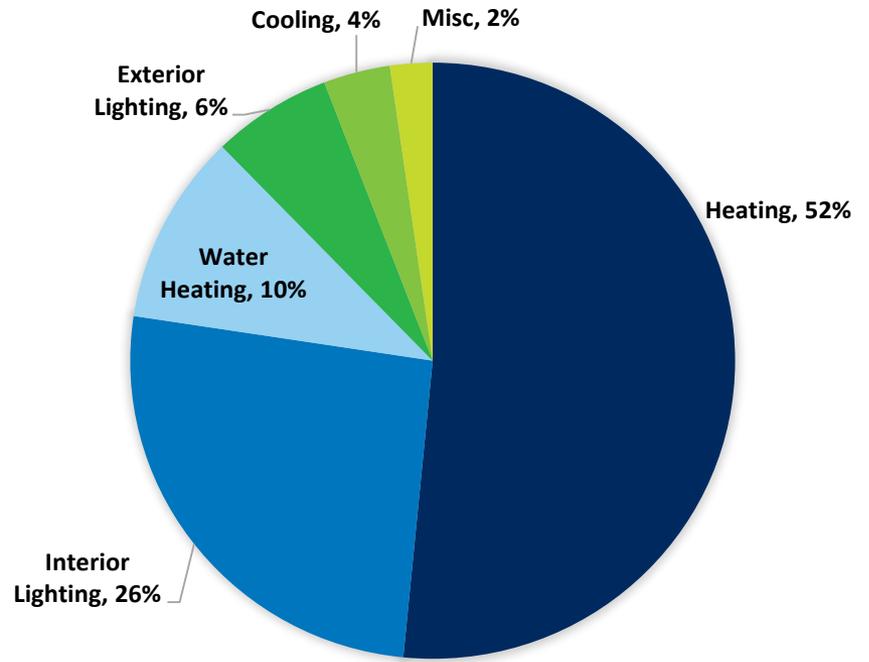


# Residential Achievable Potential

## Top Residential Measures

Measure / Technology	2018 Savings (GWh)	% of Total
Interior Lighting - General Service CFLs	2.04	12%
Ducting - Repair and Sealing	1.71	10%
Exempted Lighting	1.70	10%
Insulation - Wall Cavity Installation	1.63	10%
Insulation - Radiant Barrier	1.19	7%
Screw-In Lighting	1.06	6%
Windows - High Efficiency/ENERGY STAR	1.05	6%
Insulation - Ceiling Installation	0.92	6%
Thermostat - WiFi/Interactive	0.69	4%
Doors - Storm and Thermal	0.67	4%
Other Measures	3.91	24%
<b>Total</b>	<b>16.58</b>	<b>100%</b>

## End Use

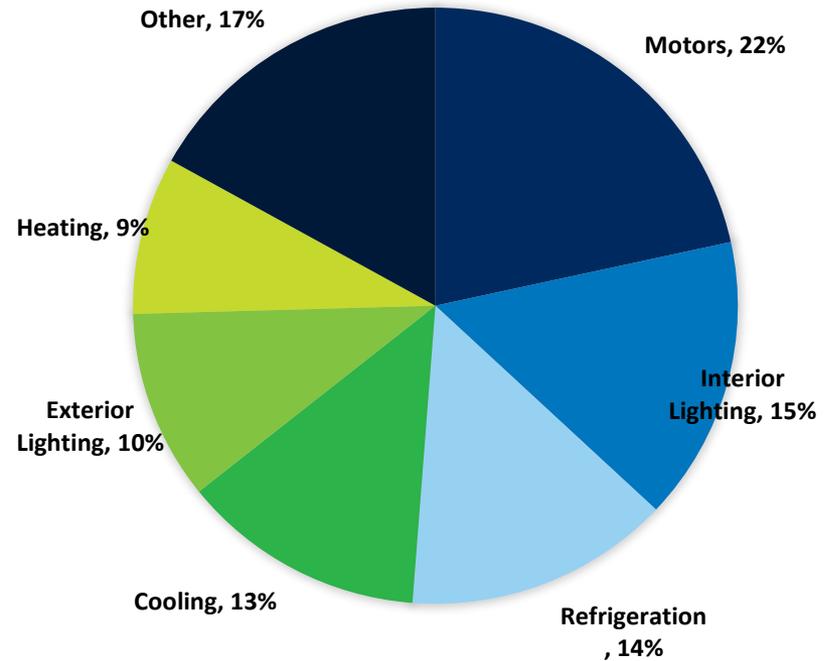


# Non-Residential Achievable Potential

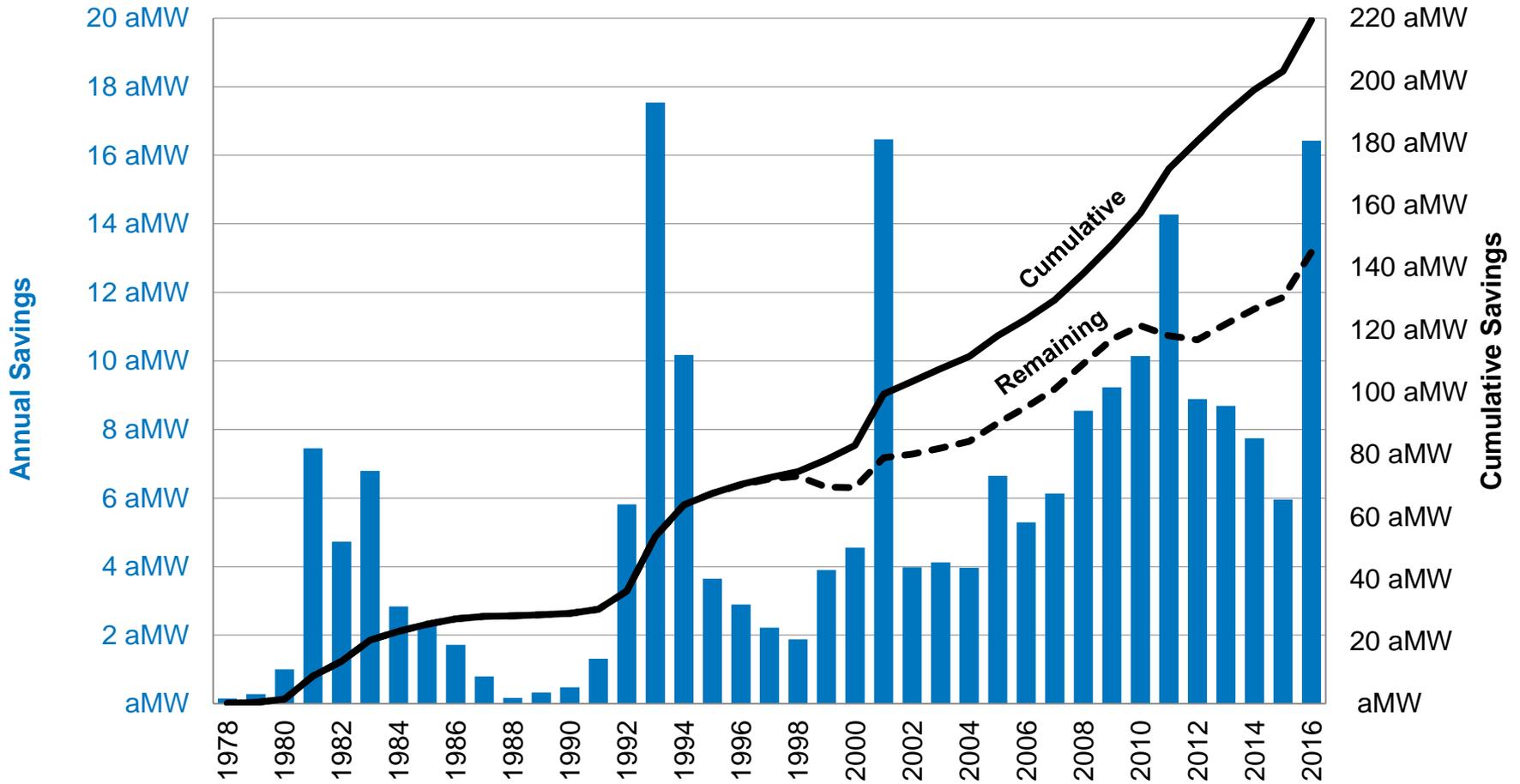
## Top Non-Res Measures

Measure / Technology	2018 Savings (GWh)	% of Total
Screw-In Lighting	3.29	12%
Retrocommissioning	2.05	7%
Compressed Air - Equipment Upgd	1.87	7%
Insulation - Ceiling	1.66	6%
Desktop Computer	1.48	5%
Strategic Energy Management	1.44	5%
Linear Lighting	1.11	4%
Refrigeration - Var Speed Compressor	1.08	4%
Commissioning	0.84	3%
Area Lighting	0.73	3%
Other Measures	12.27	44%
<b>Total</b>	<b>27.82</b>	<b>100%</b>

## End Use



# Historical Conservation Savings



# 2018-2019 Biennial Conservation Target Washington Electric



# 2018-2019 Biennial Conservation Target Washington Electric **DRAFT**

476

2018-2019 Biennial Conservation Target (DRAFT)	Savings (MWh)
Pro Rata Share of CPA	73,636
Behavioral Program	15,386
Less: NEEA	(21,812)
End-Use Efficiency Measures Subtotal	67,210
Plus: Distribution Efficiency	714
Plus: Generation Efficiency	151
<b>Total</b>	<b>68,075</b>
Plus: Decoupling Commitment	3,404
<b>Proposed Biennial Conservation Target + Decoupling (EIA) (Subject to Penalties)</b>	<b>71,479</b>
Plus: NEEA Projection	21,812
<b>Total Conservation Commitment</b>	<b>93,291</b>



**QUESTIONS?**

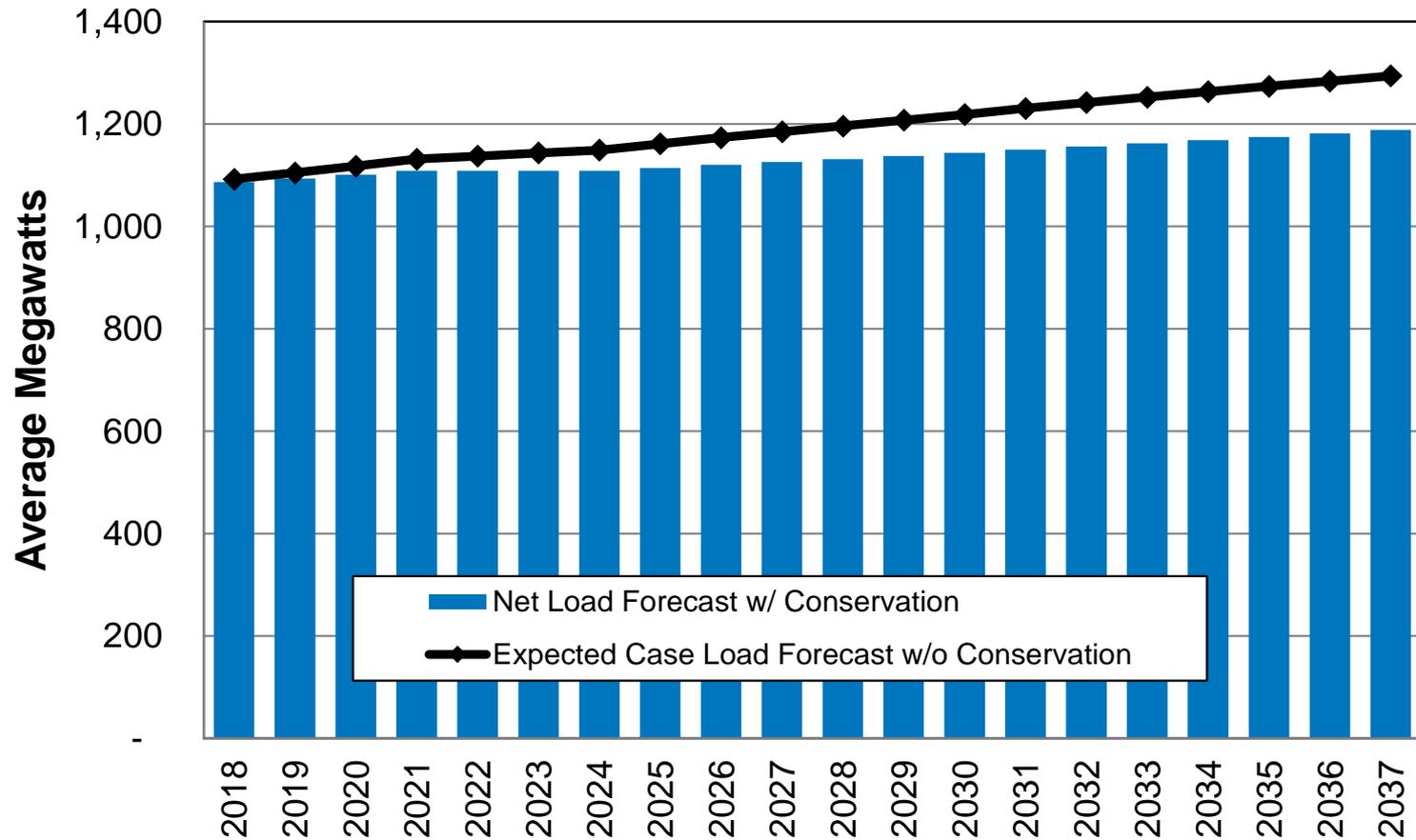


# 2017 Preferred Resource Strategy

James Gall, IRP Manager  
Sixth Technical Advisory Committee Meeting  
June 20, 2017

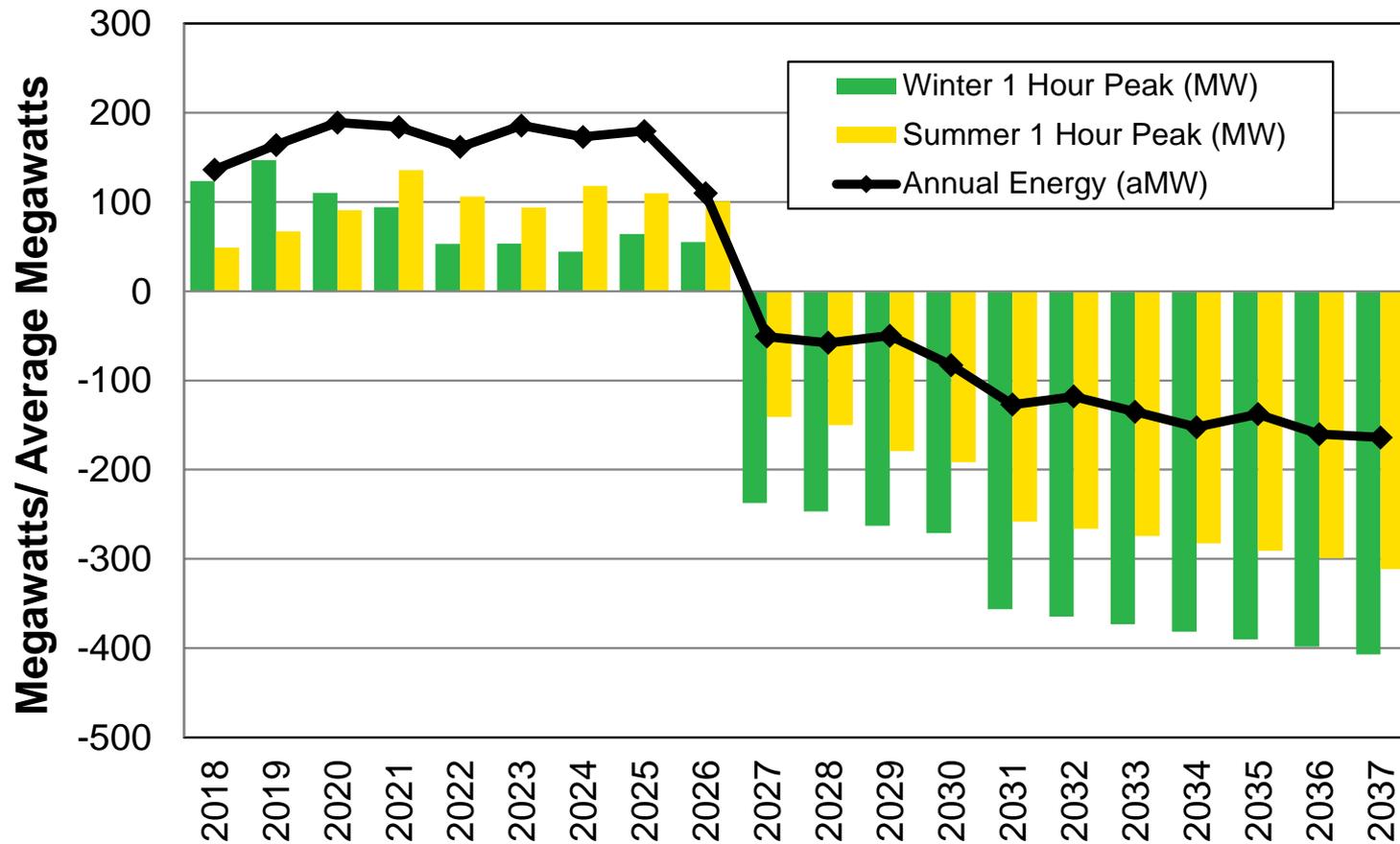
# Load Forecast

Loads grow at 0.9%, energy efficiency serves 53.3% of growth or a net growth of 0.47%



# Resource Needs

w/ Mid-C contract extension; no capacity requirements until 2026 when the Lancaster PPA Expires

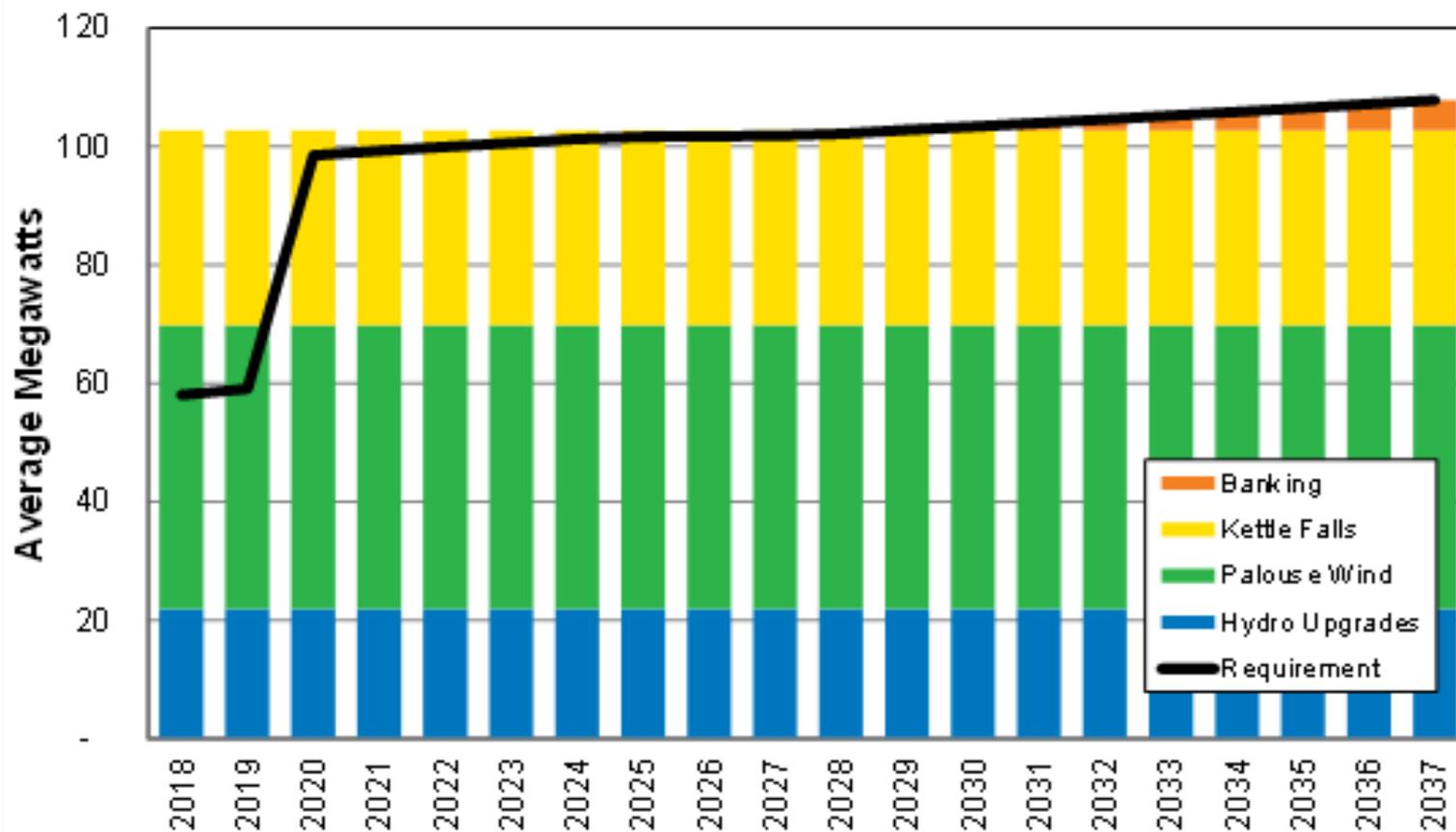


# Preferred Resource Strategy

Resource	By the End of Year	Nameplate (MW)	Winter Peak (MW)	Energy (aMW)
Solar	2018	15	0	3
Natural Gas Peaker	2026	192	204	178
Thermal Upgrades	2026-2029	34	34	31
Storage	2029	5	5	0
Natural Gas Peaker	2030	96	102	89
Natural Gas Peaker	2034	47	47	43
<b>Total</b>		<b>389</b>	<b>391</b>	<b>344</b>
Efficiency Improvements	Acquisition Range		Winter Peak Reduction	Energy (aMW)
Energy Efficiency	2018-2037		203	108
Demand Response	2025-2037		44	0
Distribution Efficiencies			<1	<1
<b>Total</b>			<b>247</b>	<b>108</b>

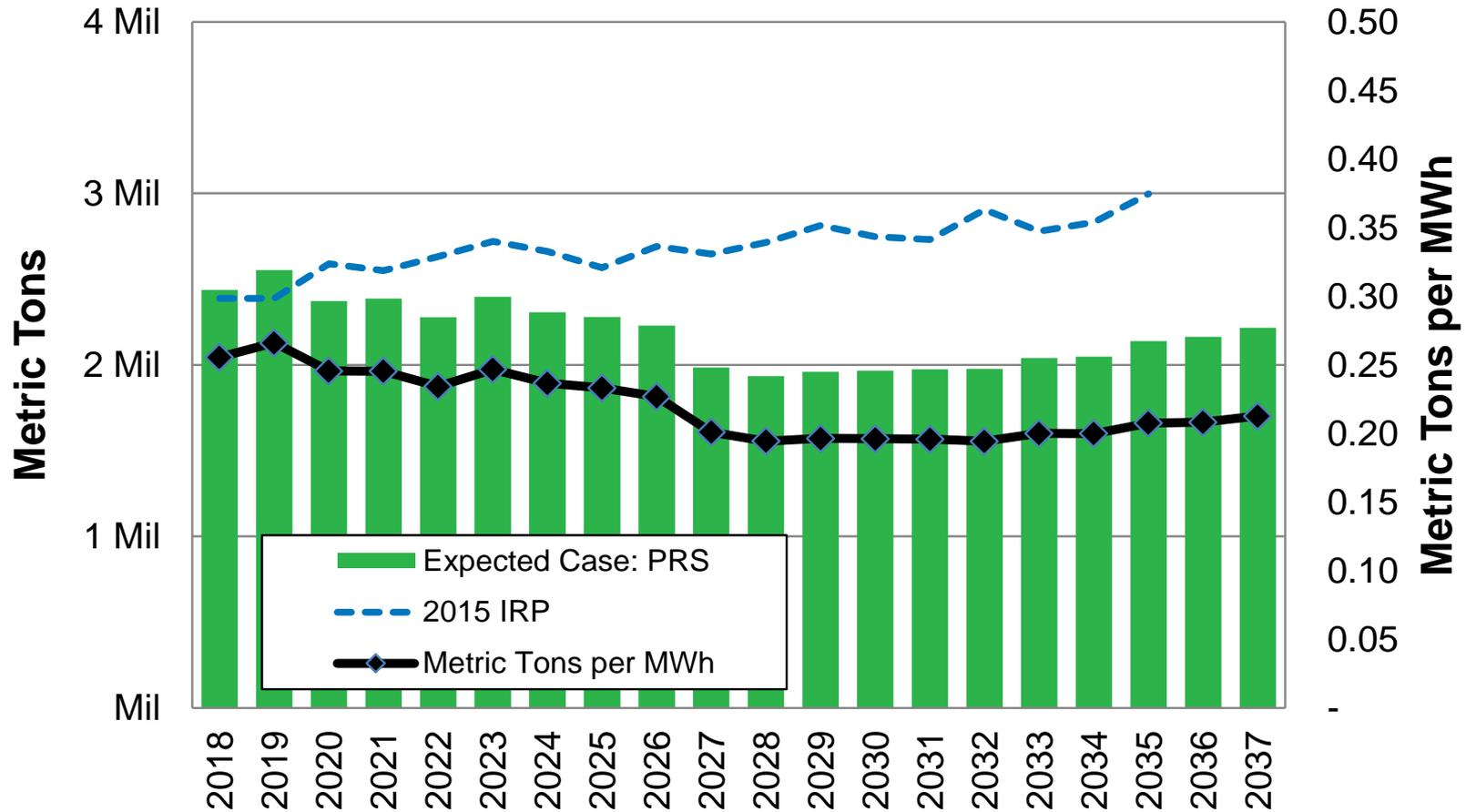
# Energy Independence Act Forecast

Existing resources + upgrades meet current requirements

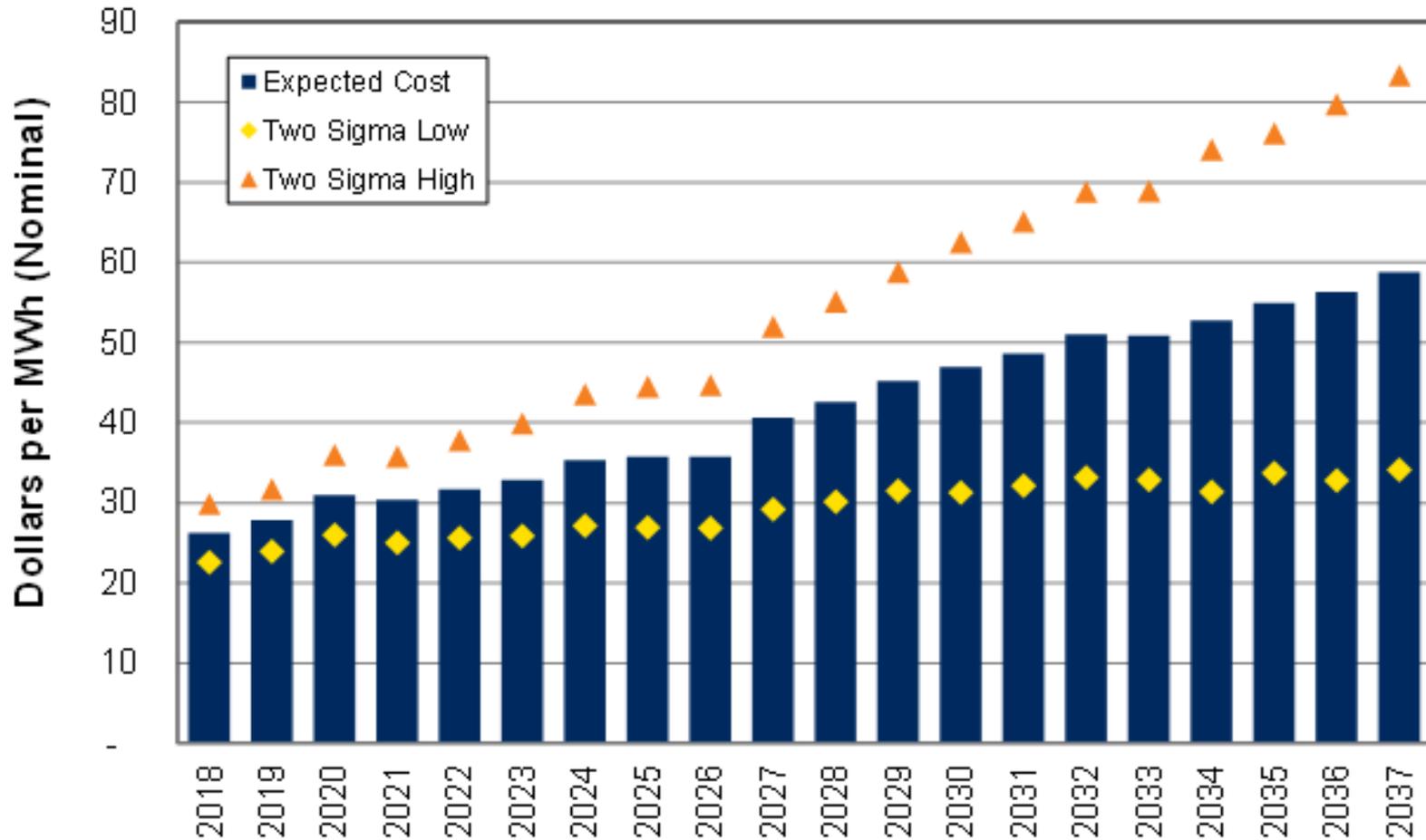


# PRS: Direct Greenhouse Gas Emissions

Emissions fall by 11% from 2018/19 avg, 29% below 2015 IRP PRS

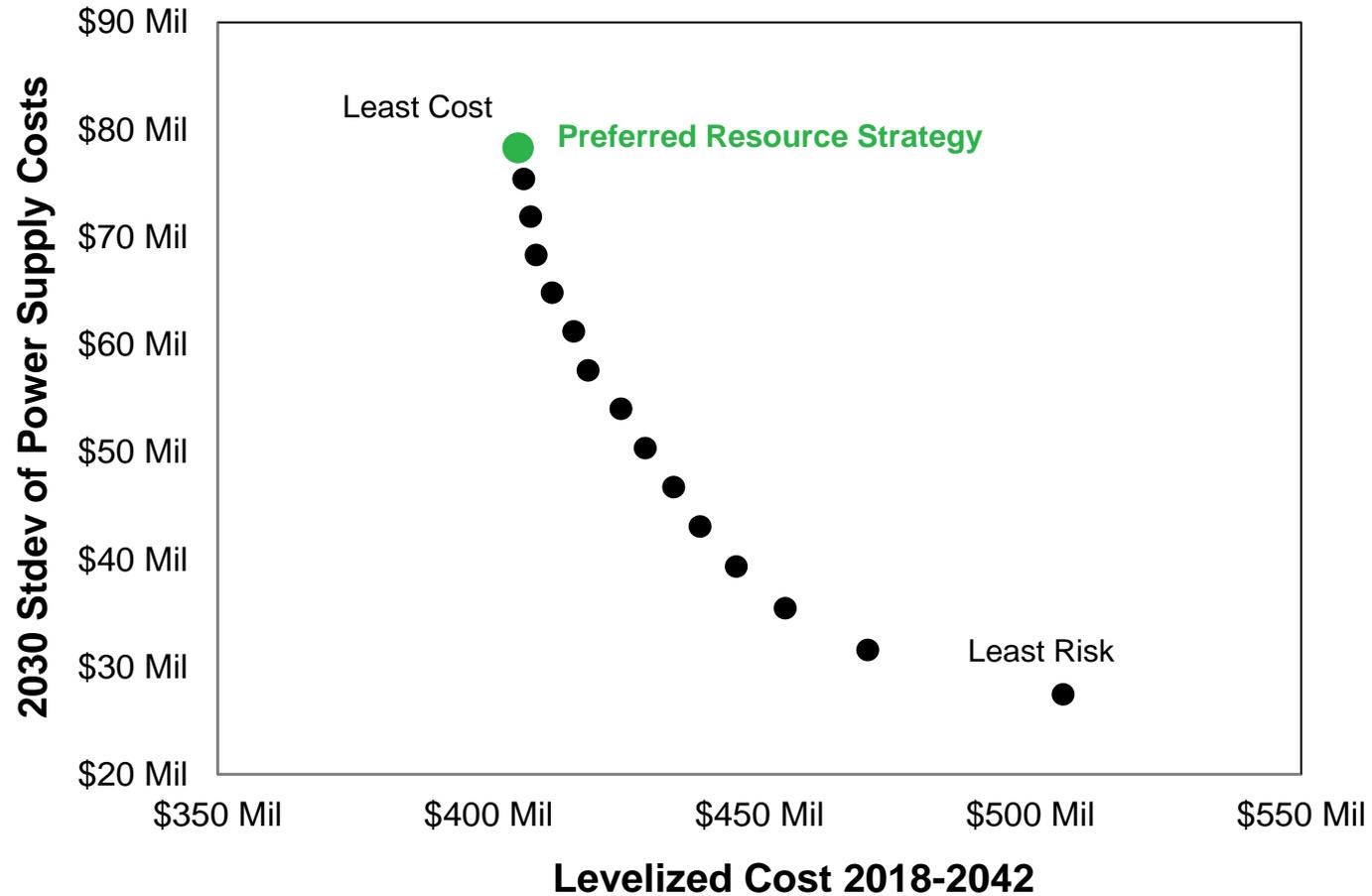


# Power Supply Cost Forecast

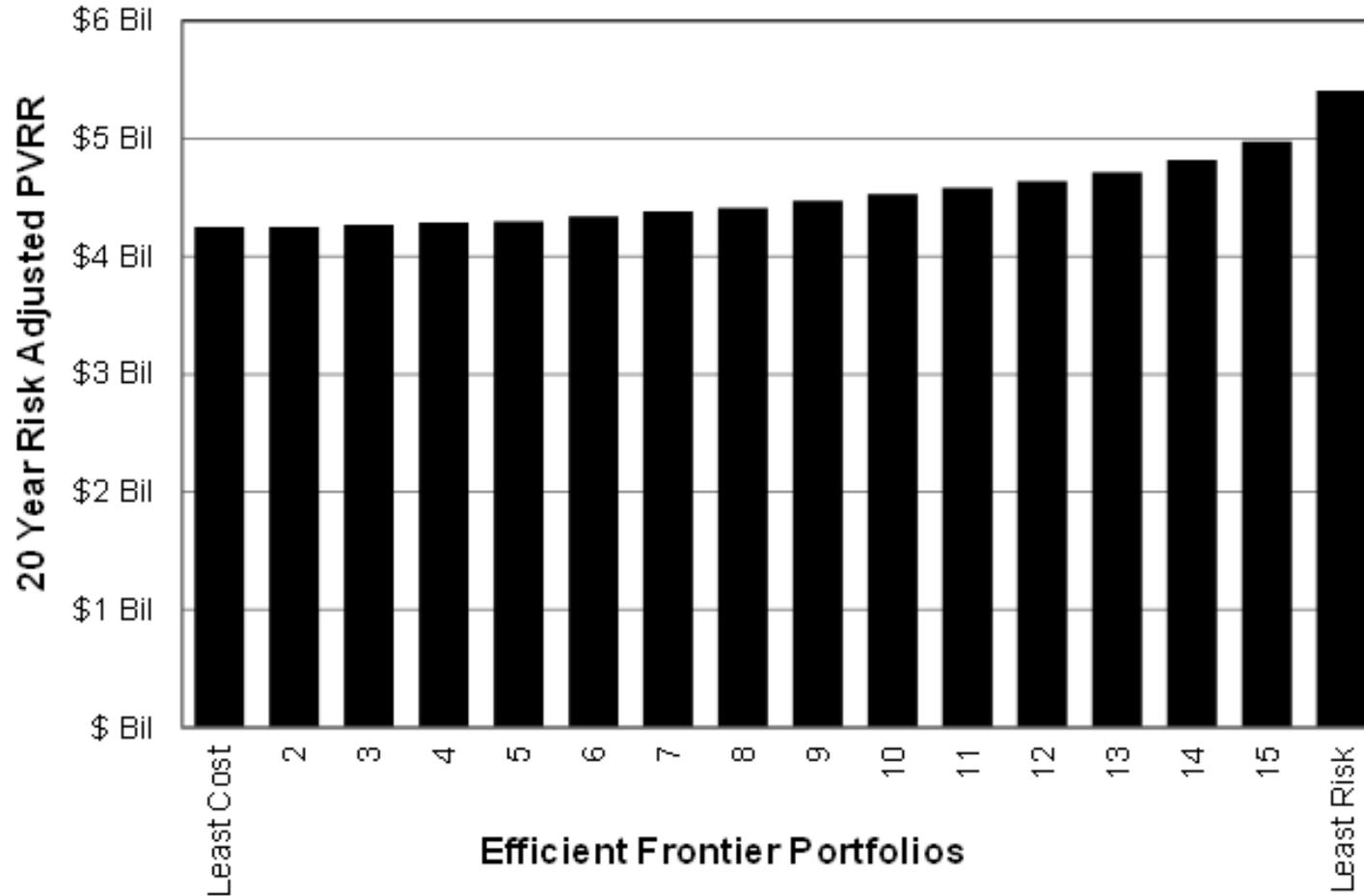


# Efficient Frontier

## Least Cost Strategy Selected as PRS



# Risk Adjusted PVRR



# Efficient Frontier Resource Portfolios

Portfolio	NG Peaker	NG CCCT	Wind	Solar	Demand Response	Thermal Upgrade	Storage	Hydro Upgrade	Energy Efficiency
Least Cost/ PRS	335	-	-	-	44	34	5	-	108
2	288	-	-	-	48	34	15	-	111
3	332	-	-	-	44	34	-	-	108
4	329	-	-	-	35	31	5	-	114
5	326	-	-	-	41	34	10	-	109
6	372	-	-	70	15	31	-	-	115
7	372	-	100	10	13	31	-	-	114
8	372	-	150	50	3	31	-	-	118
9	372	-	250	20	15	31	-	-	113
10	372	-	300	70	3	31	-	-	118
11	372	-	350	150	3	31	-	-	118
12	372	-	450	90	3	31	-	-	120
13	326	-	550	130	26	31	-	-	123
14	279	-	650	160	38	31	15	-	130
15	231	-	750	400	49	34	30	-	134
Least Risk	93	-	900	590	57	40	30	68	153

# Avoided Costs

*Levelized Costs:*    **\$35.93**    **\$38.10**    **\$33.02**    **\$88.94**    **\$29.80**    **\$31.81**

Year	Flat Energy \$/MWh	On-Peak Energy \$/MWh	Off-Peak Energy \$/MWh	Capacity \$/kW-Yr	Example Solar \$/MWh	Example Wind \$/MWh
2018	23.79	27.02	19.48	0	23.70	21.66
2019	23.71	26.85	19.53	0	23.28	21.71
2020	23.99	26.85	20.16	0	22.37	21.76
2021	24.30	26.85	20.88	0	21.67	21.63
2022	25.95	28.47	22.59	0	22.54	22.92
2023	29.68	32.24	26.30	0	25.36	26.35
2024	32.03	34.38	28.90	0	26.62	28.40
2025	32.58	34.65	29.83	0	26.66	28.85
2026	34.27	36.13	31.77	0	27.42	30.23
2027	37.61	39.25	35.43	195	29.51	33.25
2028	40.18	41.60	38.28	201	30.91	35.20
2029	44.06	45.27	42.44	207	33.84	38.65
2030	46.86	48.15	45.15	214	36.19	41.01
2031	48.08	49.32	46.42	220	36.88	41.98
2032	51.10	52.55	49.17	227	39.26	44.82
2033	52.81	54.29	50.83	234	40.73	46.13
2034	55.09	56.61	53.07	241	43.28	48.35
2035	57.50	59.26	55.14	249	45.96	50.51
2036	60.52	62.22	58.24	257	48.13	53.15
2037	64.51	66.33	62.09	265	51.98	57.14



# 2017 Market & Portfolio Scenarios

James Gall, IRP Manager  
Sixth Technical Advisory Committee Meeting  
June 20, 2017

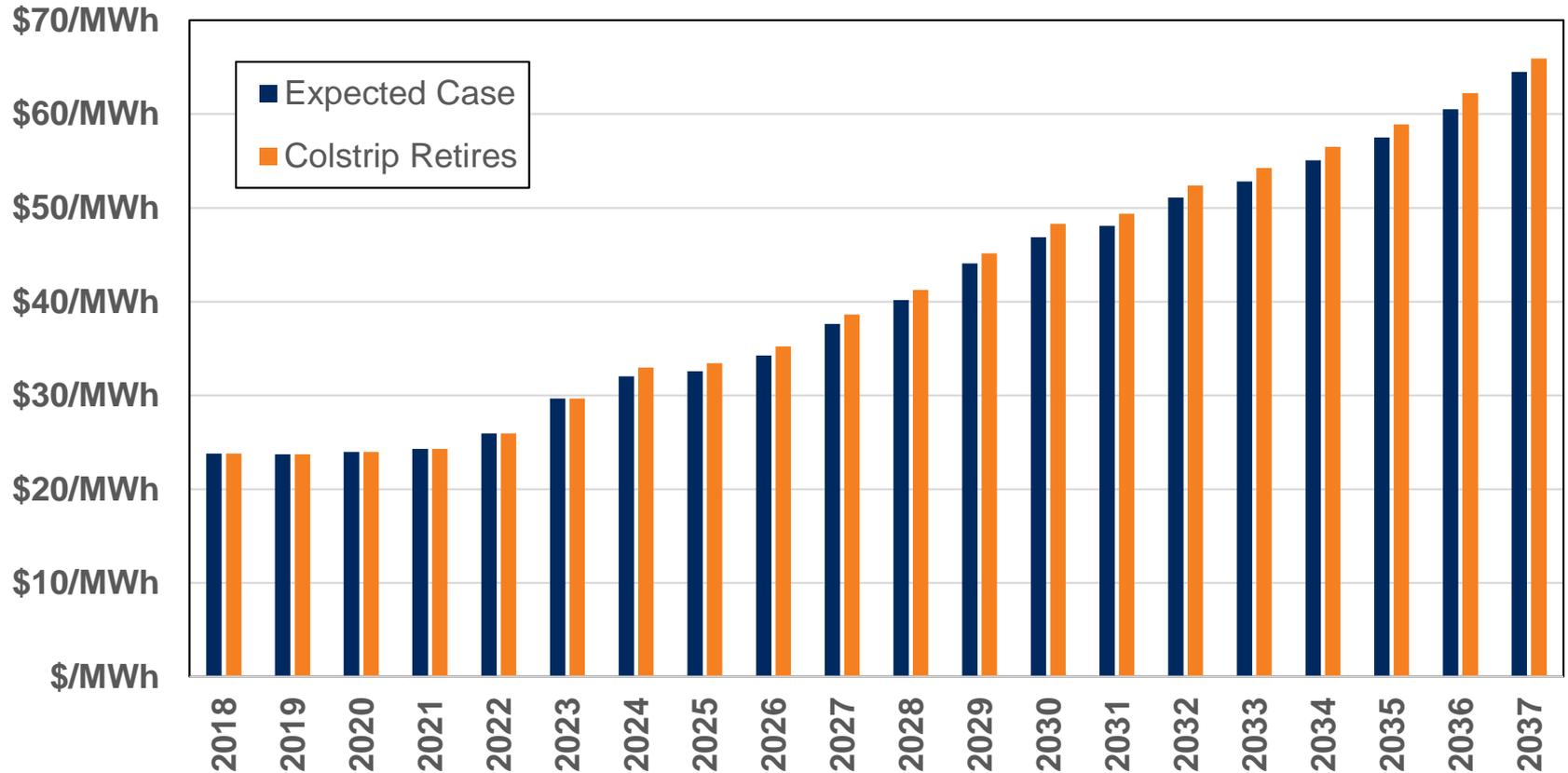
# Agenda

- Market Forecast Scenarios
  - Colstrip retires
  - Colstrip reduction
  - 50 percent emissions reduction
- Portfolio Scenario Results
  - Colstrip retires
  - High Colstrip cost
  - Colstrip reduction
  - High & Low Load Forecast
  - No new resources
  - Lower Palouse Wind dispatch
  - 14 percent summer planning margin
  - No new thermal resources
  - Colstrip retires and no new thermal resources

# Market Analysis

# Colstrip Retires

Developed to model Colstrip portfolio scenarios  
CCCT/CT/Wind replace Colstrip in 2024



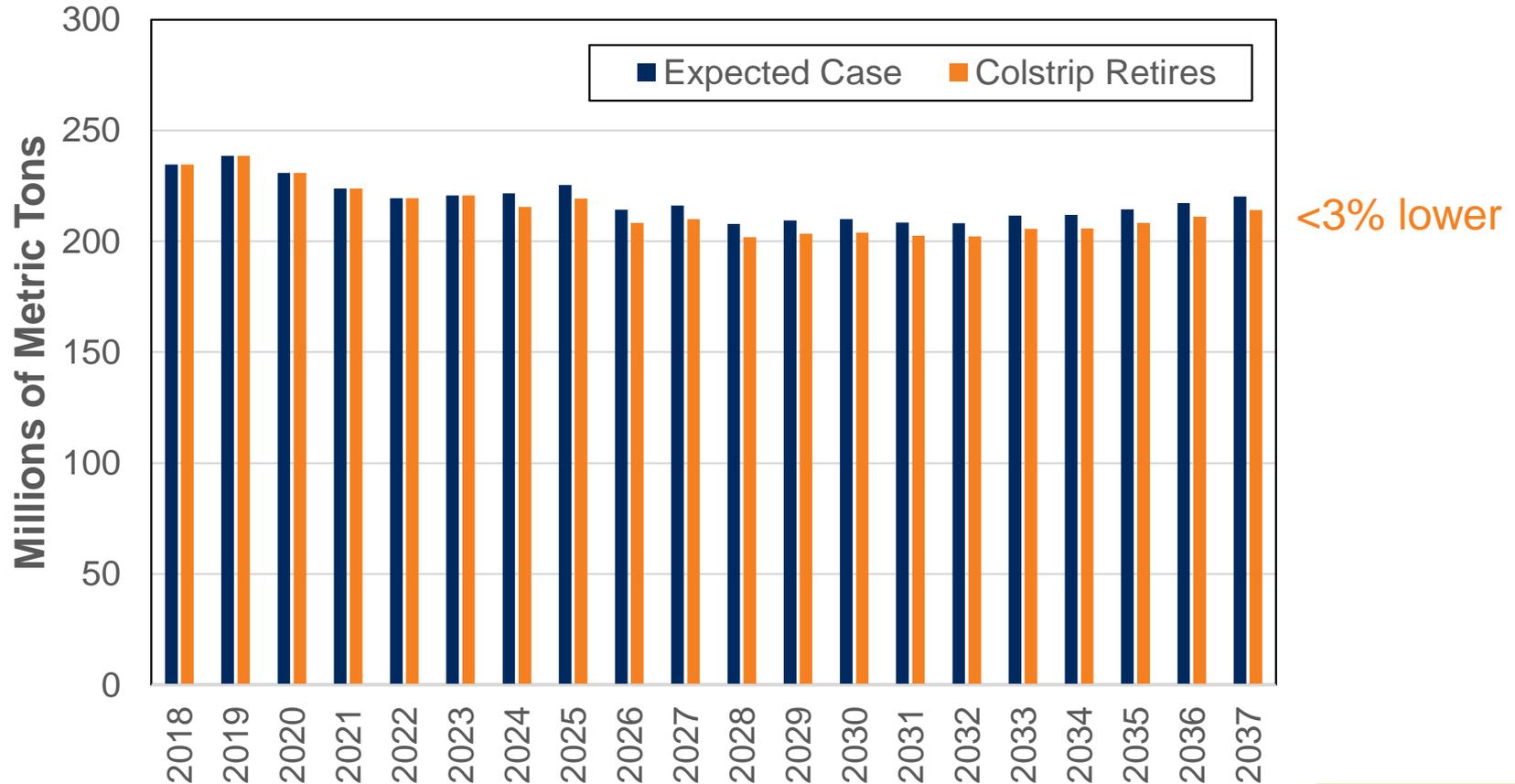
*Levelized price increase after “shutdown” is \$1.20/MWh*

2017 Electric IRP Appendix A

# Western Interconnect Emissions<sup>493</sup>

Mid-C price forecast, marginally different.

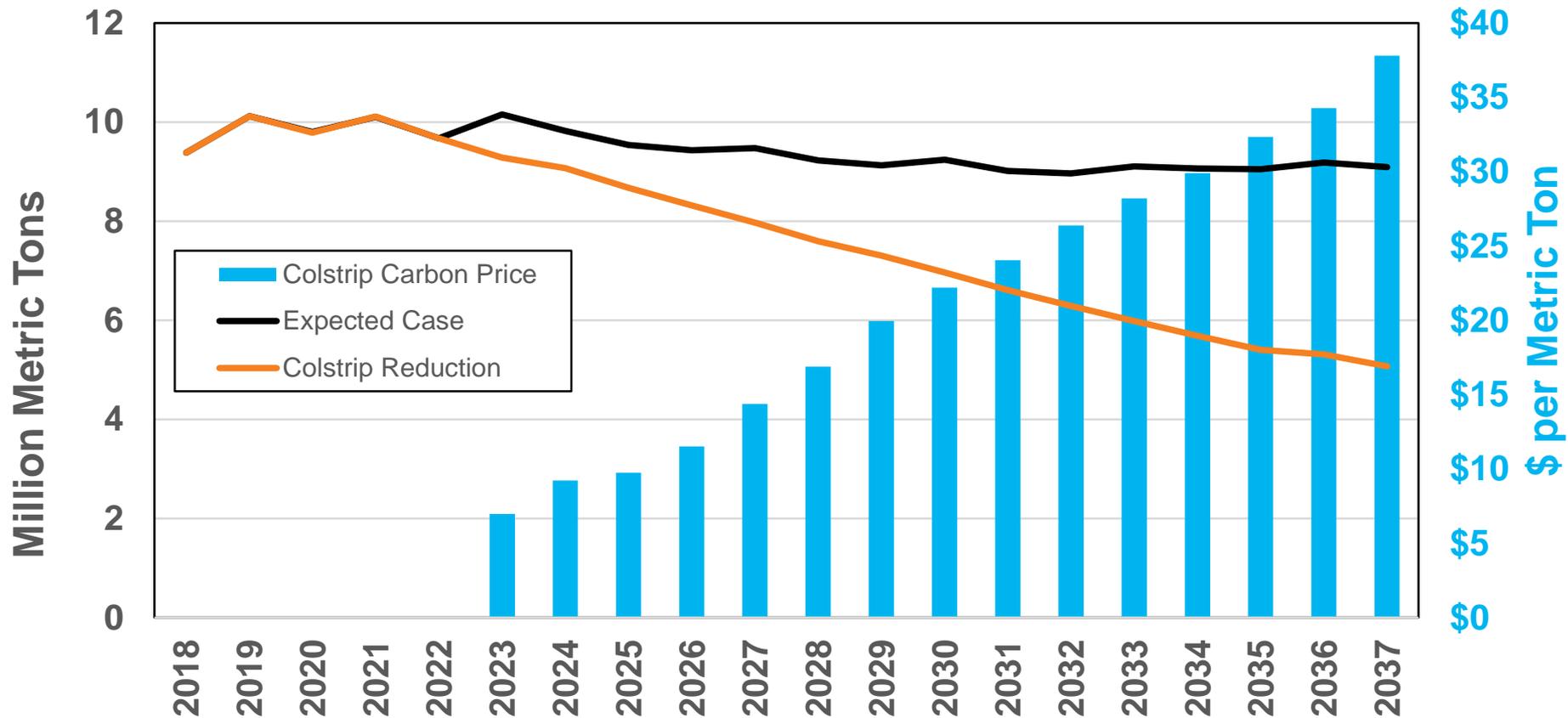
Without Colstrip, western emissions are 6 million metric tons lower



# Colstrip Reduction Scenario <sup>494</sup>

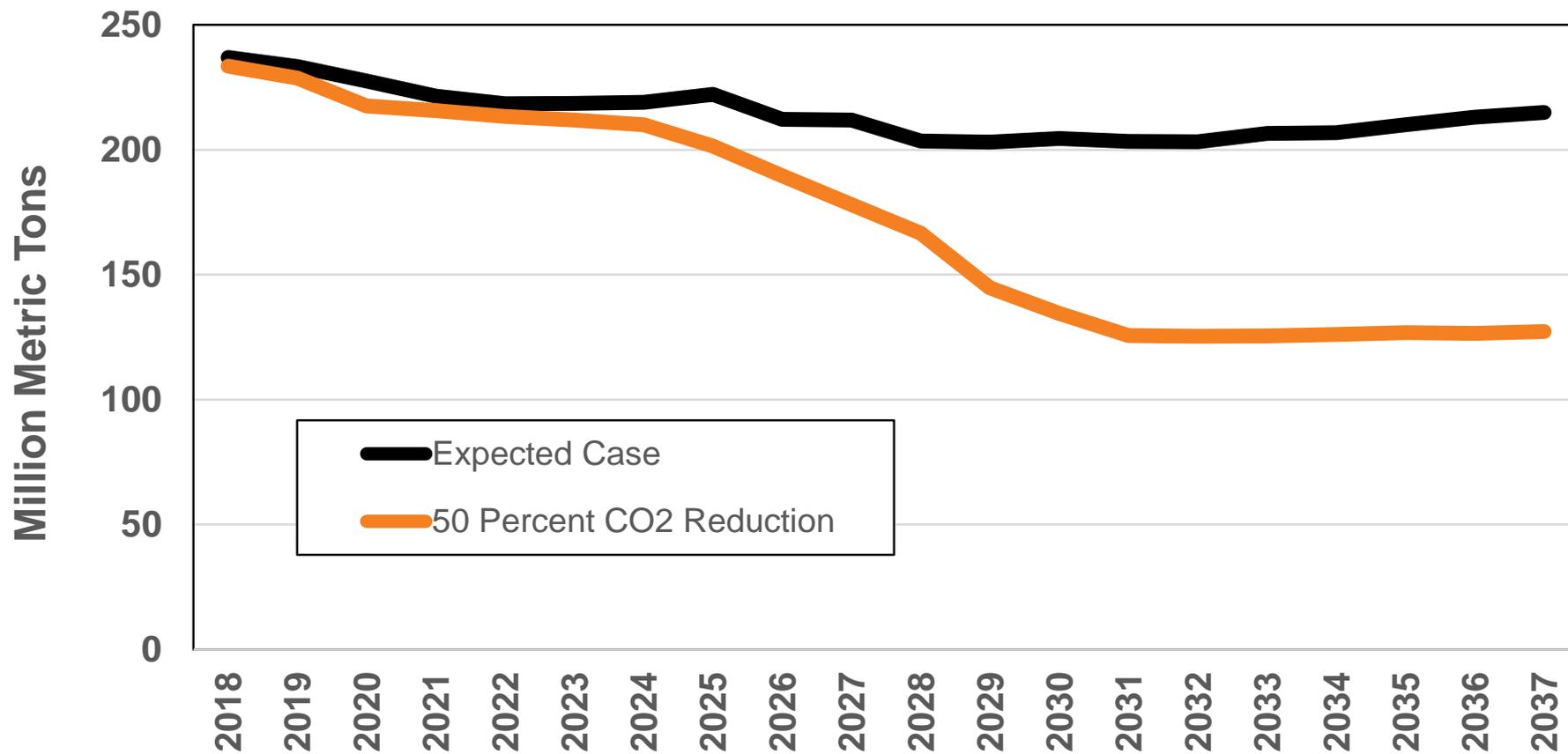
Colstrip dispatch limited to 50 percent of potential (cap or tax)

Colstrip emits 4 million less tons, net 2.5 million decrease in west

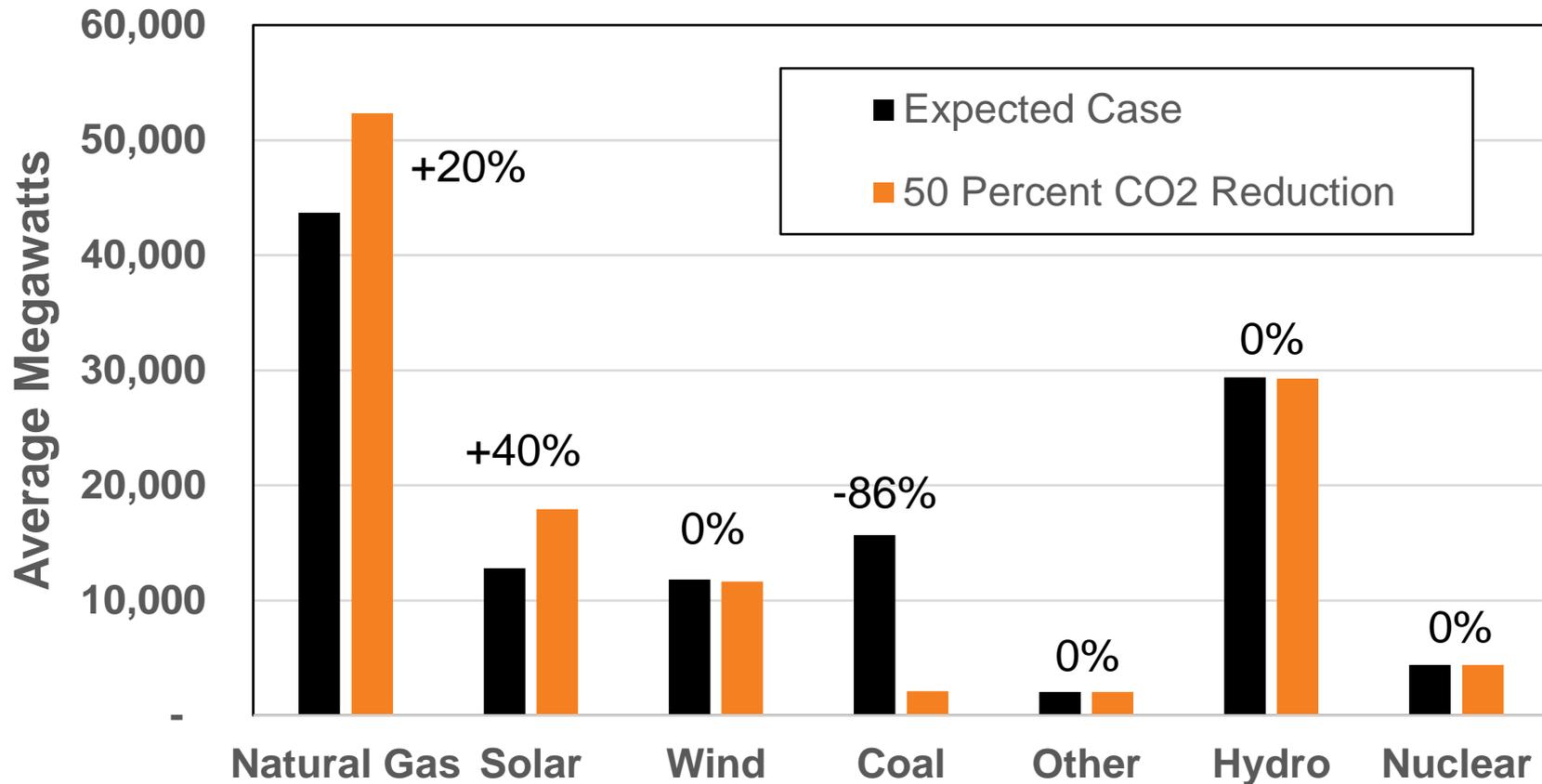


# 50% Reduction in Greenhouse Gas From 1990 Levels

495

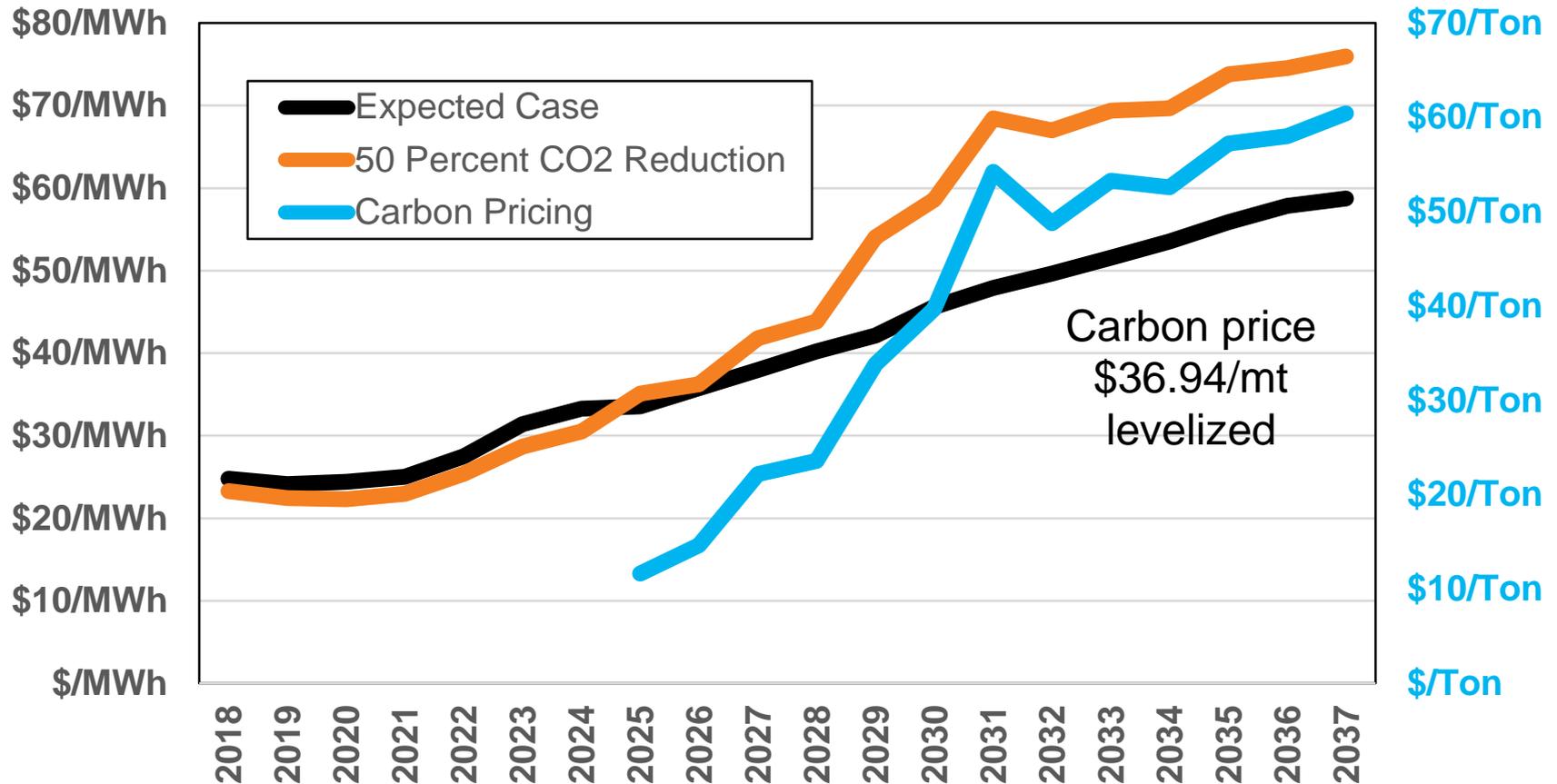


# Resource Dispatch changes to be 50% below 1990 Levels



# Electric/Carbon Market Prices

Electric prices increase 30-40% with to achieve significant reductions



# Portfolio Analysis

# Colstrip Retirement Scenarios

Shows how Avista's future portfolio could change if Colstrip Units #3 and #4 close early

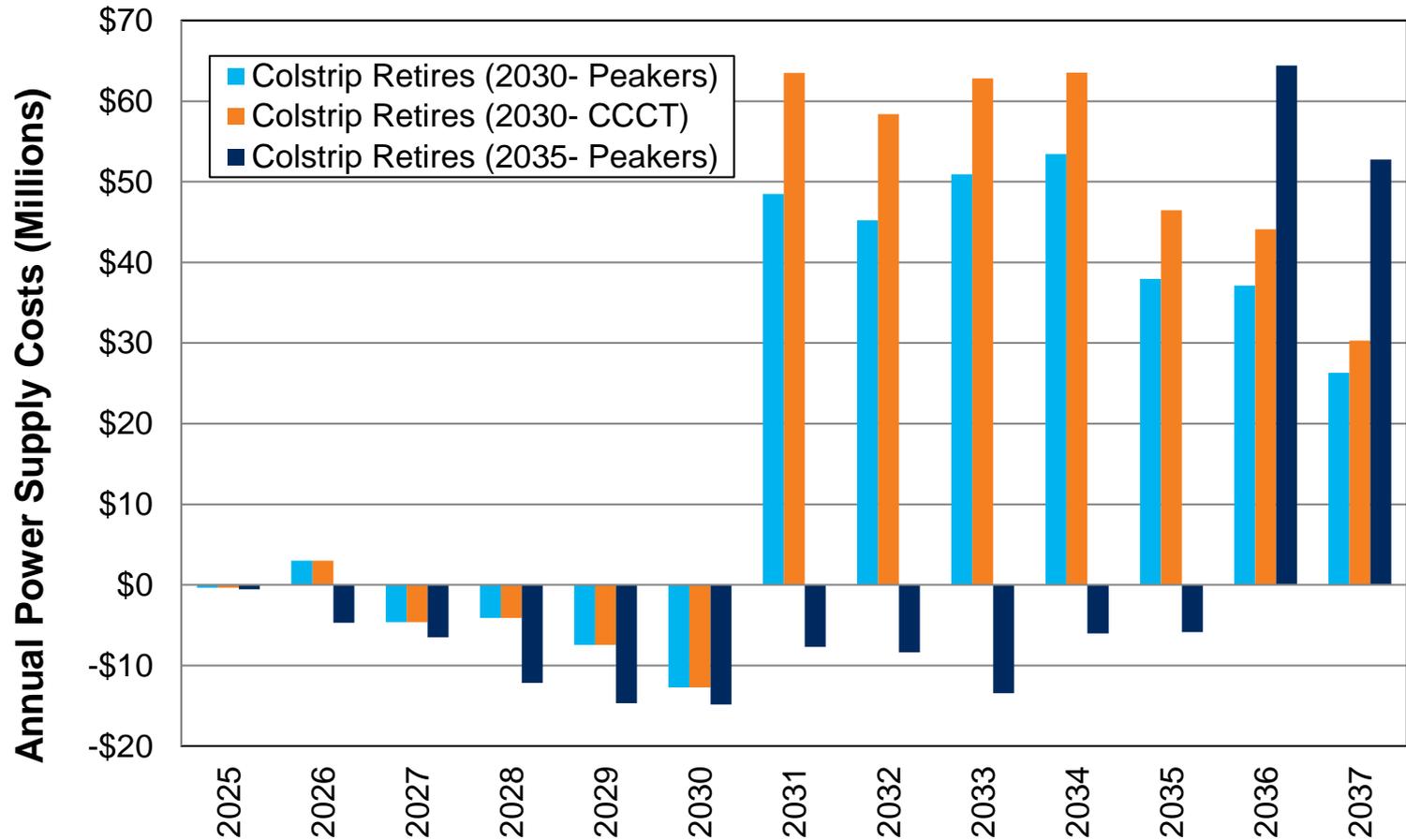
- Scenario 1: Retire Colstrip Units #3 and #4 in 2030 as alternative to SCR investment
- Scenario 2: Retire Colstrip Units #3 and #4 in 2035 to coincide with state of Oregon legislation and assumes no SCR investment
- Both of these cases assume the closure of Colstrip Units #1 and #2 by July 2022 to coincide with the agreements with the owners of those units

# If Colstrip Retires: Resource Portfolio's

		2030 Retirement with Peaker (ISO Conditions MW)	2030 Retirement with CCCT (ISO Conditions MW)	2035 Retirement with Peaker (ISO Conditions MW)
Resource	By End of Year			
Natural Gas Peaker	2026	192	192	192
Thermal Upgrades	2027-2030	34	34	34
Storage	2028	5	5	5
Natural Gas Peaker	2030	288	0	96
Natural Gas CCCT	2030	0	286	0
Storage	2032	5	5	0
Natural Gas Peaker	2033	47	47	0
Natural Gas Peaker	2034	0	0	47
Natural Gas Peaker	2035	0	0	192
<b>Total</b>		<b>571</b>	<b>569</b>	<b>566</b>
Demand Response	2025-2037	44	44	48
Conservation (w/ T&D losses)	2018-2037	107	107	108

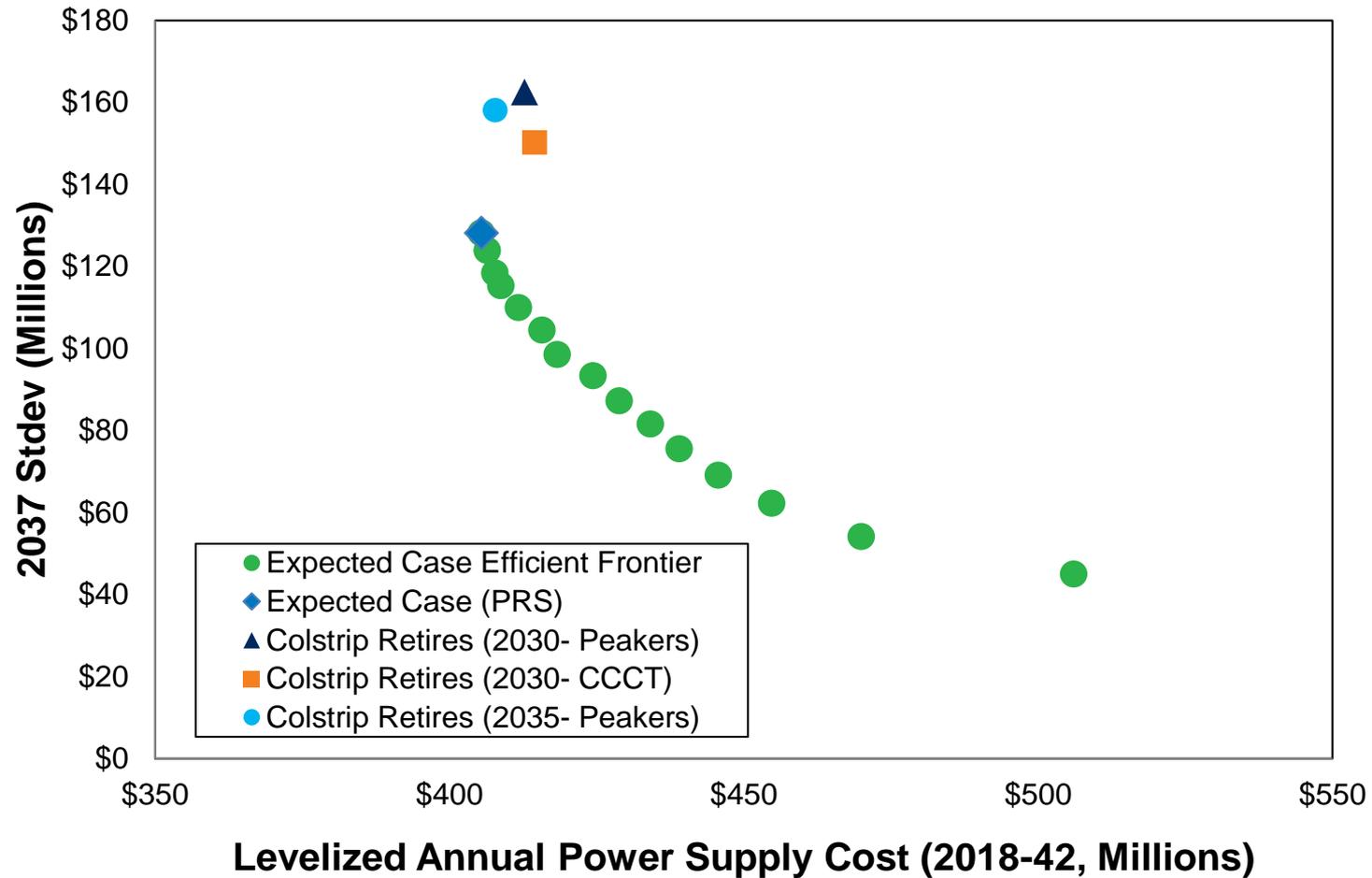
# Power Supply Cost Impact of Early Retirement

501

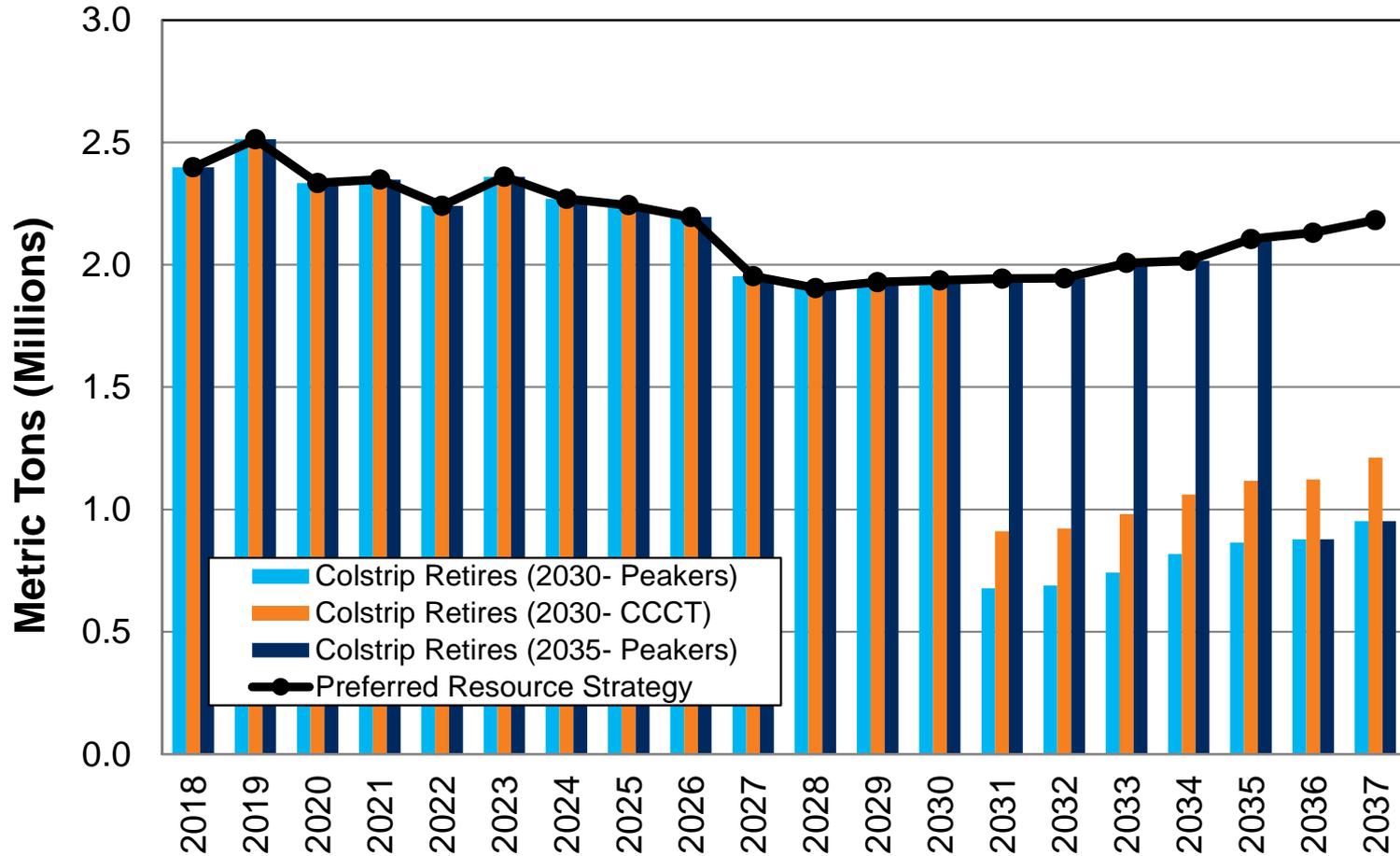


# Efficient Frontier

Colstrip retiring prior to the end of its life is higher cost



# Avista's Direct Greenhouse Gas Emissions

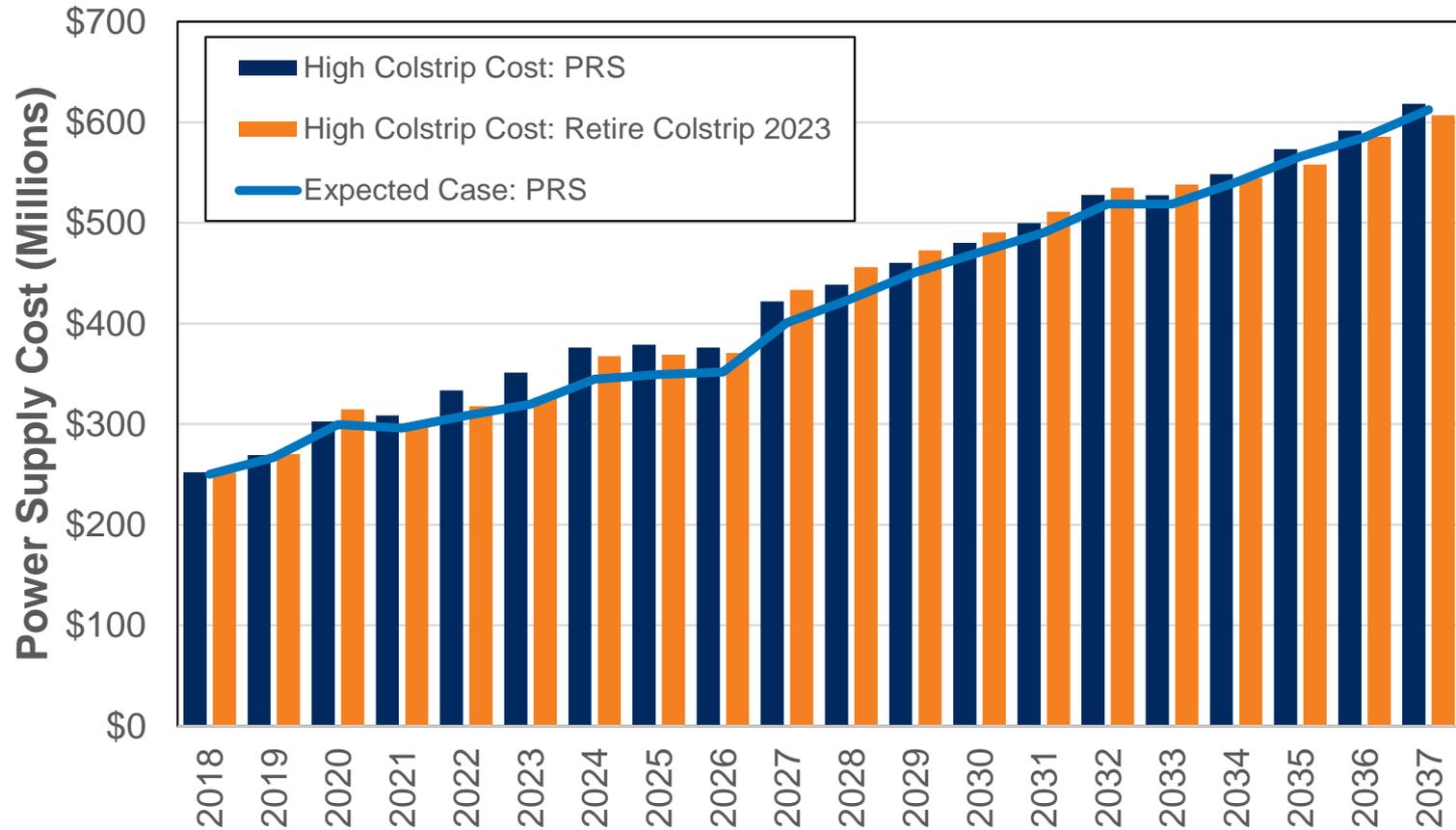


# High Colstrip Case

- This case answers the question posed by the Washington Commission in the 2015 IRP acknowledgement letter about several higher cost issues impacting Colstrip's compliance cost
- This scenario assumes:
  - Expected case assumptions, except:
  - EPA expands regional air quality programs and rules to the western U.S. such as CASPR and NAAQS requiring SCR installation on Units #3 and #4 at an earlier date **(End of 2023)**
  - Units #1 and #2 shut down earlier than announced, increasing the amount of shared costs cover by Units #3 and #4 **(End of 2018)**
  - MACT PM/MATS RTR compliance problems. Dry system required to remove particulates and reduce water use **(End of 2023)**
  - No enhancement to existing SO<sub>2</sub> scrubbers as no current regulation drives reduction levels beyond current plant emissions

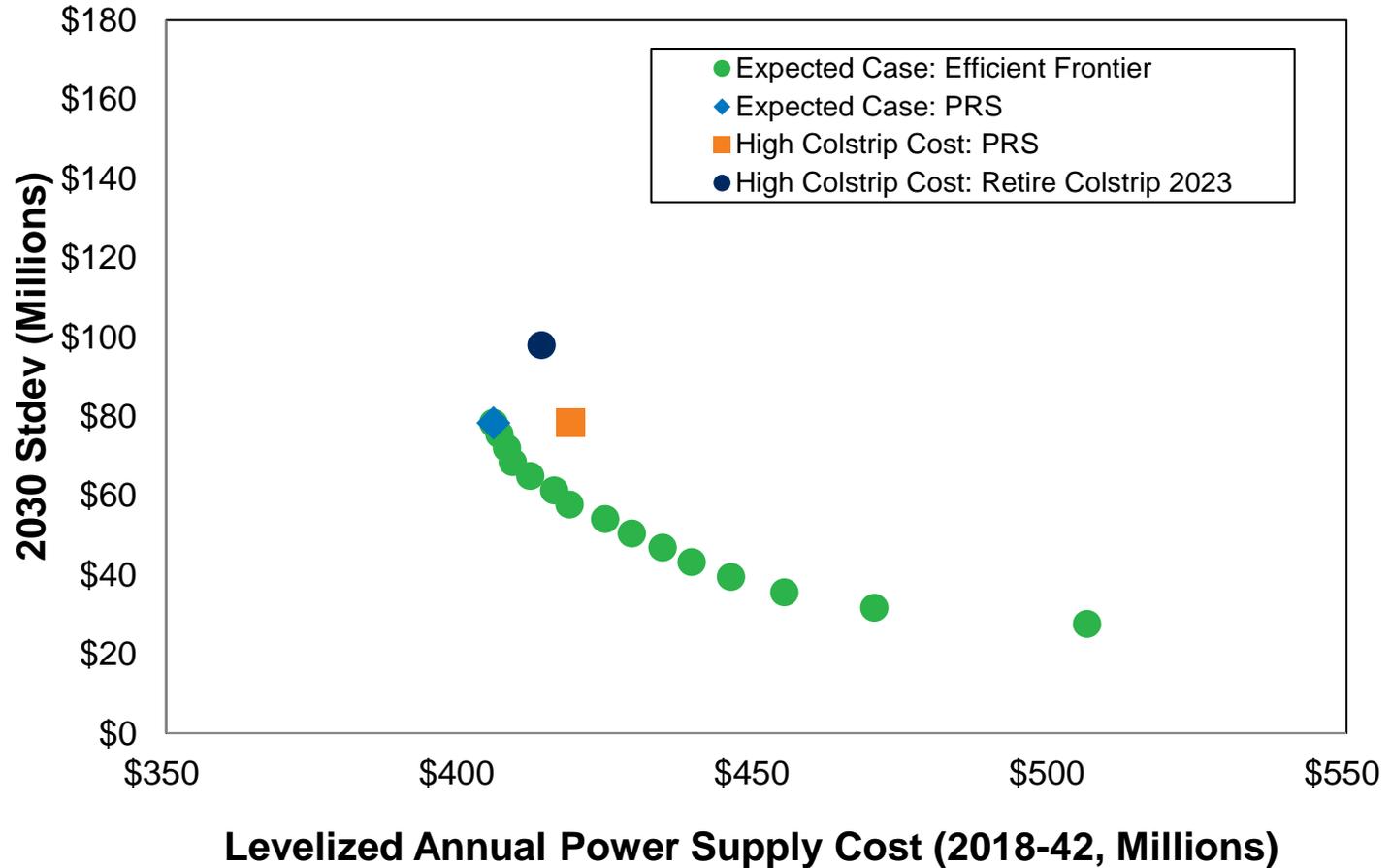
# Colstrip High Cost Scenario- Power Sup. Costs

High cost scenario's power supply cost is 4% higher than Expected Case



# High Cost Colstrip Scenario: Efficient Frontier

Retiring Colstrip is lower cost, but higher power supply cost risk

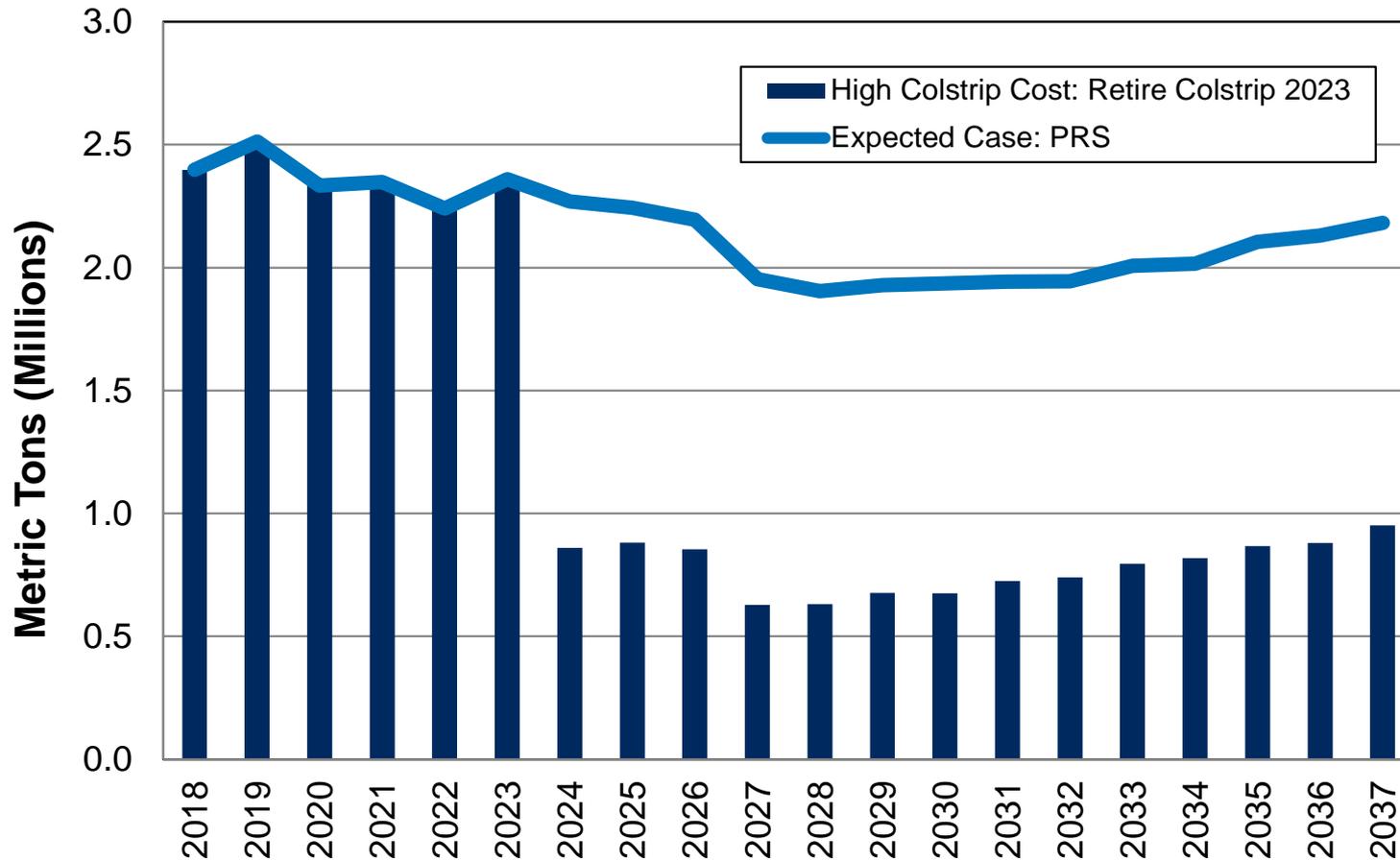


# High Colstrip Cost Scenario LC Portfolio<sup>507</sup>

Colstrip Retiring in 2023 is LC portfolio to avoid high compliance costs

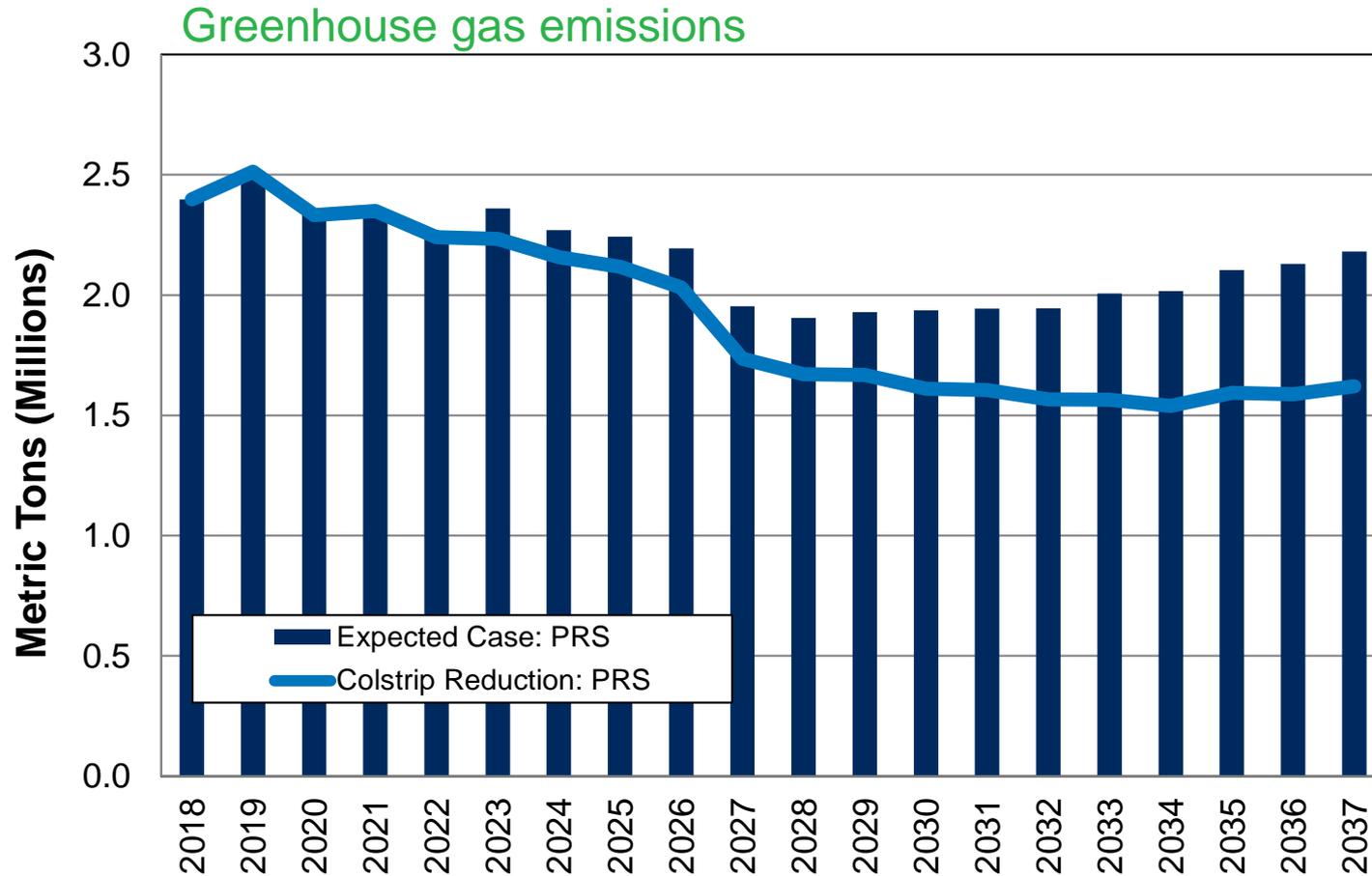
Resource	By End of Year	ISO Conditions (MW)
Natural Gas Peaker	2023	143
Thermal Upgrades	2023-2037	34
Natural Gas Peaker	2026	288
Natural Gas Peaker	2030	96
Storage	2035	5
<b>Total</b>		<b>566</b>
Demand Response	2025-2037	44
Conservation (w/ T&D losses)	2018-2037	107

# Avista Direct Emissions: Early Colstrip Retirement

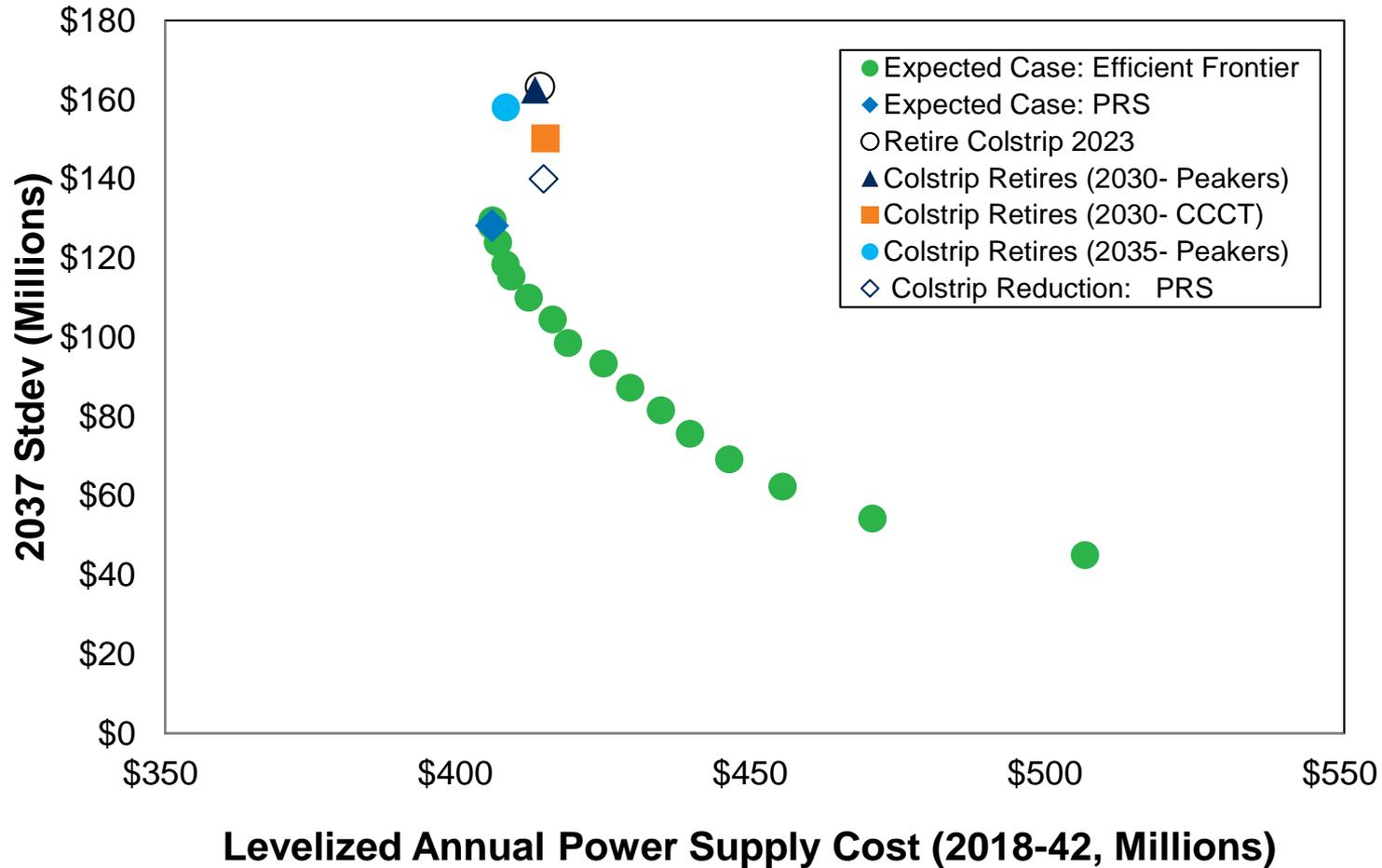


# Colstrip Reduction Scenario

Dispatch is lowered over time to 50 percent of capability



# Colstrip Scenarios P.S. Cost versus P.S. Risk



# Load Growth Scenarios

## 2026 resource required in all load scenarios

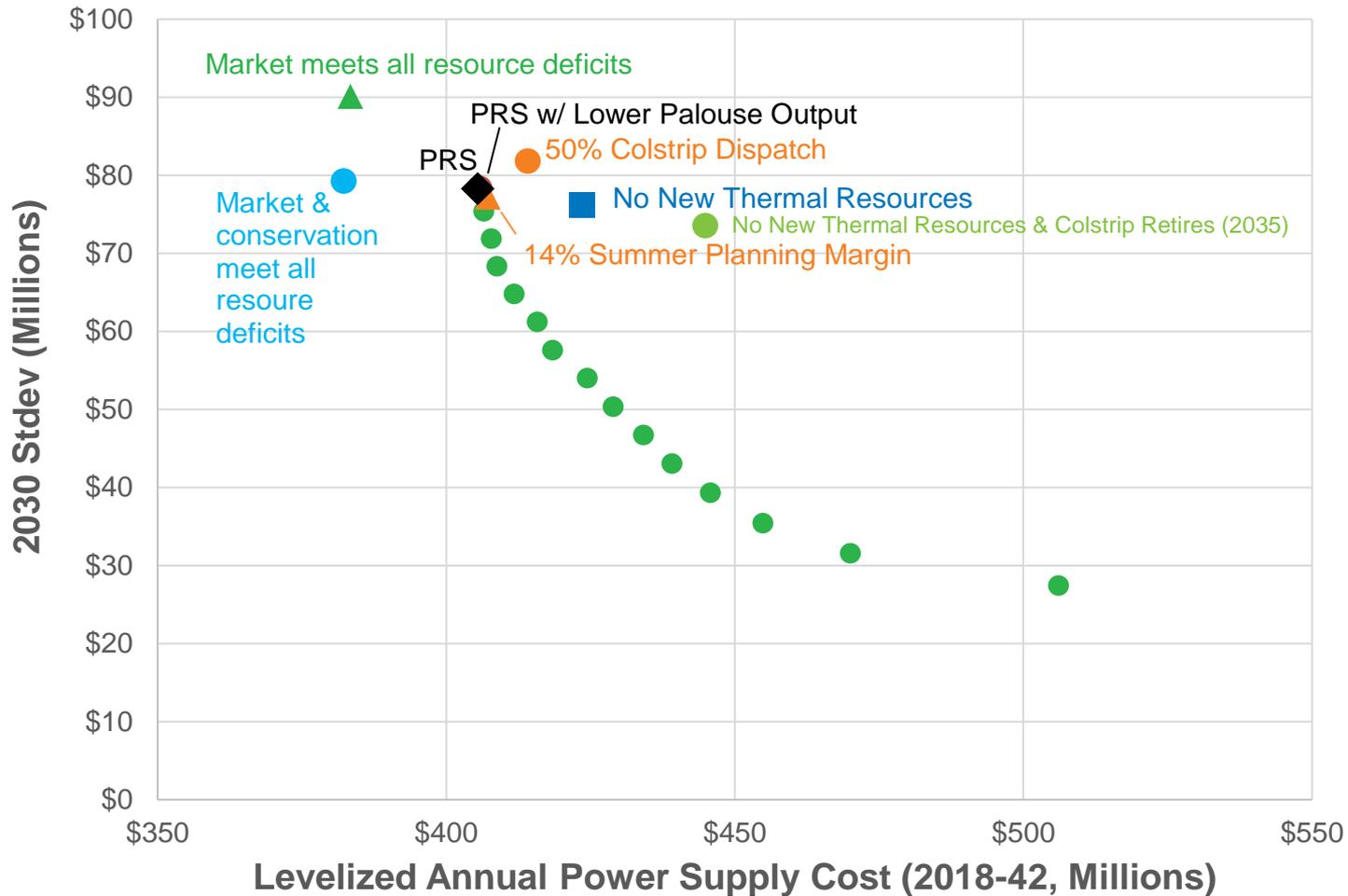
### Load growth assumptions

Scenario	Energy Growth (%)	Winter Peak Growth (%)	Summer Peak Growth (%)
Expected Case	0.45	0.39	0.42
High Load	0.74	0.72	0.78
Low Load	0.16	0.03	0.04

### Resource strategy changes

Resource	Expected Case's PRS	High Loads	Low Loads
NG Peaker	335	477	192
NG Combined Cycle CT	0	0	0
Wind	0	0	0
Solar	0	0	0
Demand Response	49	49	49
Storage	5	0	0
Thermal Upgrades	34	34	34
Hydro Upgrades	0	0	0
<b>Total</b>	<b>423</b>	<b>560</b>	<b>275</b>

# Other Scenarios: Efficient Frontier



# No New Thermals Resource Portfolios

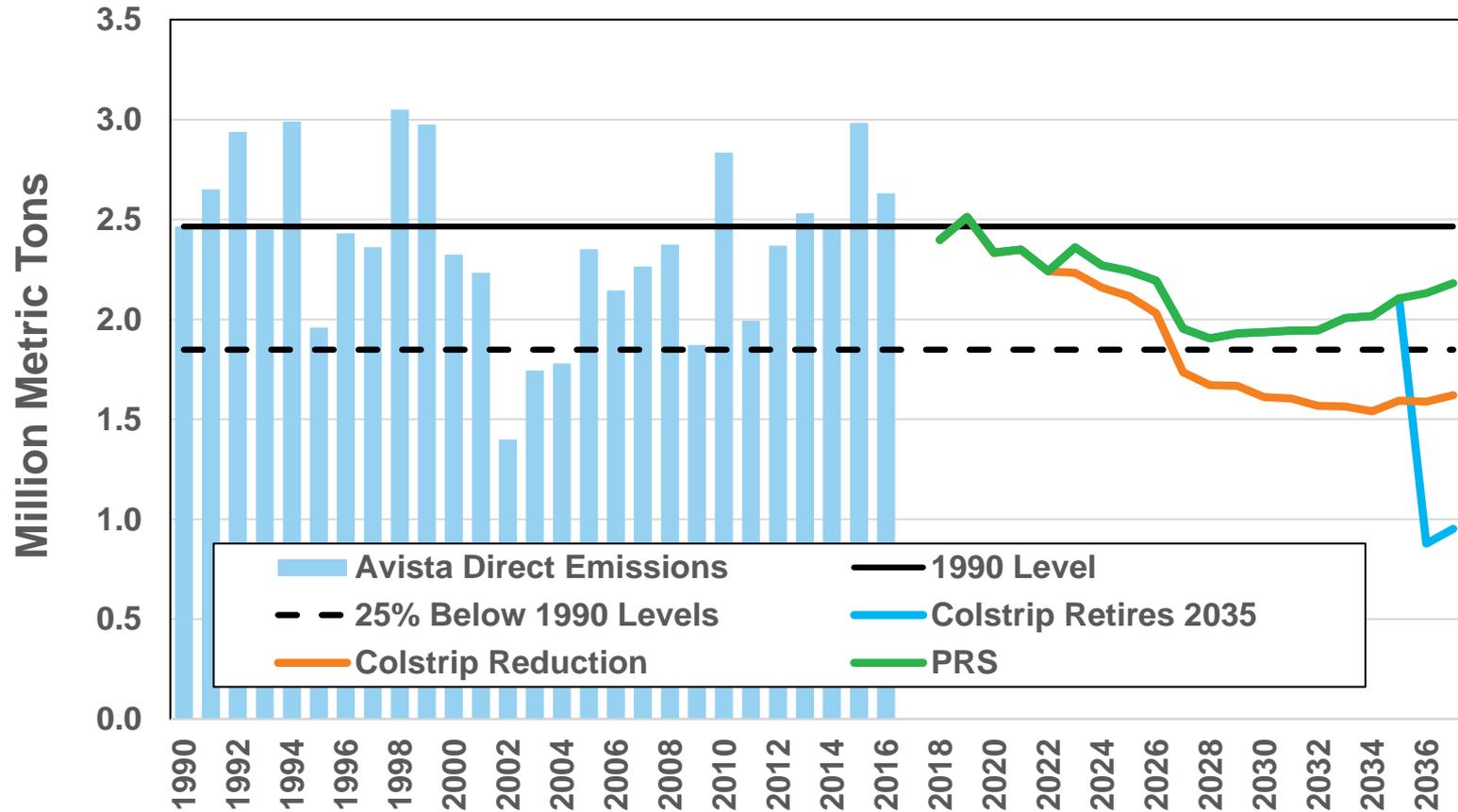
## No Added Thermal Resources Scenario Resource Selection

Resource	By End of Year	ISO Conditions (MW)
Storage	2026	150
Thermal Upgrades	2026-2030	44
Storage	2026-2037	65
Wind (on system)	2030	50
Hydro Upgrades	2030	68
Solar	2030-2037	250
<b>Total</b>		<b>627</b>
Demand Response	2025-2037	47
Conservation (w/ T&D losses)	2018-2037	123

## No Added Thermal Resources & Colstrip Retires Scenario Resource Selection

Resource	By End of Year	ISO Conditions (MW)
Storage	2026	155
Thermal Upgrades	2026-2030	44
Storage	2027-2037	225
Wind (on system)	2030-2037	250
Solar	2030-2037	550
Hydro Upgrades	2035	148
Wind (Montana)	2036	100
<b>Total</b>		<b>1472</b>
Demand Response	2025-2037	49
Conservation (w/ T&D losses)	2018-2037	124

# Avista Direct Emissions Comparison to 1990 Levels





# Solar Select Program

Marc Schaffner, Strategic Initiatives Manager  
Sixth Technical Advisory Committee  
June 20, 2017

# MORE CORPORATES ARE SETTING RE100 TARGETS

November 2015: 40 corporates with 100% renewable energy targets



November 2016: 77 corporates with 100% renewable energy targets



**YTD 2017  
96 Corporates have set RE 100 Targets**

Source: Business Renewables Center, Rocky Mountain Institute

# Renewable Energy Buyers' Principles

*A collaboration of leading companies seeking simplified access to renewable electricity they need to meet their clean and low carbon energy goals. The effort is facilitated by World Resources Institute and World Wildlife Fund.*

- **Greater choice in procurement options – suppliers and energy type.**
- **More access to cost competitive options with low capital costs.**
- **Lock-in price certainty as a hedge against price volatility.**
- **Access to new projects (“Additionality”) that reduce emissions near operating locations.**
- **Increased access to third-party financing vehicles, like PPAs to fund renewable energy projects.**
- **Opportunities to work with utilities and regulators to expand choices for buying renewable energy.**

# Avista's Renewable Energy Portfolio

Renewable  
Buck-A-  
Block  
(2002)

Community  
Solar  
(2015)

Solar Select  
Commercial  
(2017 - 2018)

Solar Select  
Residential  
(Future Phase)

# Solar Select - Request For Proposal

- **Secure solar electricity and Renewable Energy Certificates (RECs) for Avista's commercial and industrial customers.**
- **RFP produced 19 proposals and 24 distinct solar projects.**
- **15 MW (DC) facility proposed for Avista's Washington or Idaho service area.**
- **Solar developer to own and operate.**
- **Up to a 20 year Power Purchase Agreement.**
- **Proposed Commercial Operation Date – December 2018.**

# Questions?

# Thank you.



# 2017 Electric IRP Action Items

John Lyons, Ph.D.  
Sixth Technical Advisory Committee Meeting  
June 20, 2017

# Generation Resource Related Analysis

- Continue to review existing facilities for opportunities to upgrade capacity and efficiency.
- Model specific storage technologies within the IRP for technologies that are commercially available and likely resource options for Avista; including efficiency rates, capital cost, O&M, life cycle, and ability to provide non-power supply benefits.
- Report back to the TAC regarding the EIM study and Avista plan of action.
- Monitor regional winter and summer resource adequacy.
- Update TAC regarding progress regarding the Post Falls redevelopment.
- Perform a study to determine ancillary services valuation for storage and peaking technologies using intra hour modeling capabilities. Further, use this technology to estimate costs to integrate variable resources.

# Energy Efficiency

- Determine whether or not to move the T&D benefits estimate to a forward looking value versus a historical value.
- Prepare a study to determine the potential and costs for a residential demand response program and update the costs and potential for the commercial and industrial study completed in the 2015 IRP.

# Transmission and Distribution Planning

- Work to maintain Avista's existing transmission rights, under applicable FERC policies, for transmission service to bundled retail native load.
- Continue to participate in BPA transmission processes and rate proceedings to minimize costs of integrating existing resources outside of Avista's service area.
- Continue to participate in regional and sub-regional efforts to facilitate long-term economic expansion of the regional transmission system.
- IRP & T&D planning will coordinate on evaluating opportunities for alternative technologies to solve T&D constraints.

## Other 2017 Action Items

- Other areas of concern or suggestions?
  - Washington IRP rulemaking
- Please call or email the planning team with any suggestions or added Action Items.
- May also be able to make some edits to the draft IRP when it is released.



# 2017 Electric IRP Document Introduction

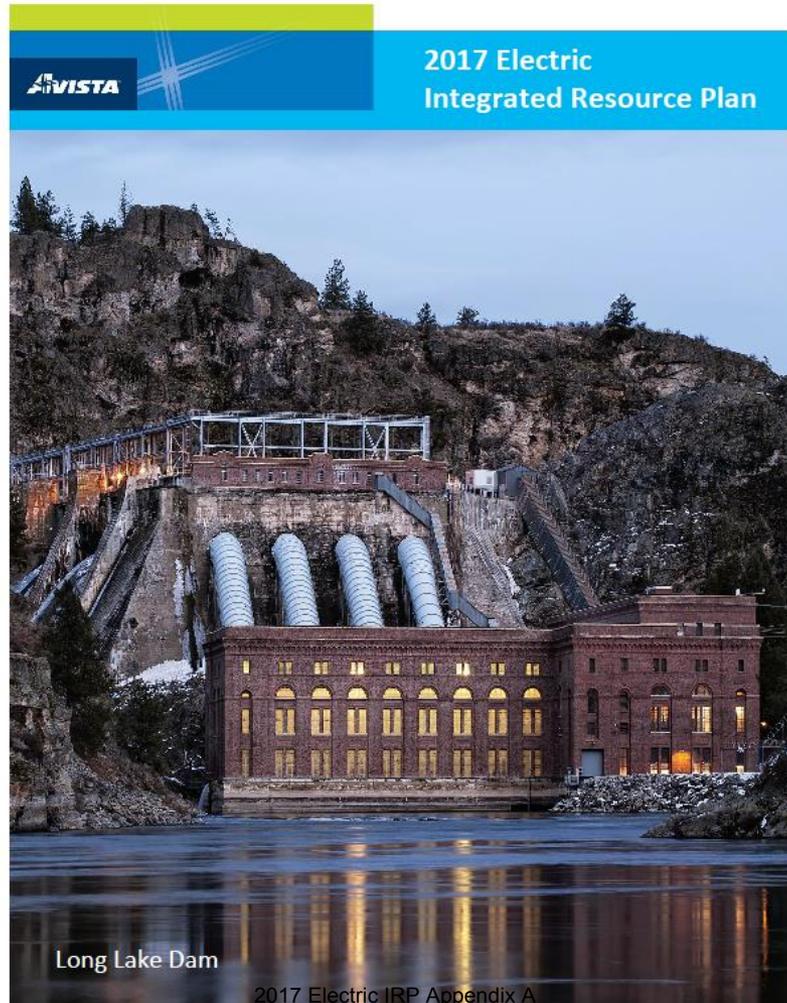
John Lyons, Ph.D.  
Sixth Technical Advisory Committee Meeting  
June 20, 2017

# 2017 Electric IRP Chapters

1. Executive Summary
2. Introduction and Stakeholder Involvement
3. Economic and Load Forecast
4. Existing Supply Resources
5. Energy Efficiency and Demand Response
6. Long-Term Position
7. Policy Considerations
8. Transmission and Distribution Planning
9. Generation Resource Options
10. Market Analysis
11. Preferred Resource Strategy
12. Portfolio Scenarios
13. Action Plan

# Ch. 1: Executive Summary

## Ch. 2: Introduction & Stakeholder Involvement



## Ch. 3: Economic and Load Forecast

- Population and employment growth are recovering from the Great Recession.
- The 2017 Expected Case energy forecast grows 0.47 percent per year, replacing the 0.6 percent annual growth rate in the 2015 IRP.
- Peak load growth is lower than energy growth, at 0.42 percent in the winter and 0.46 percent in the summer.
- Retail sales and residential use per customer forecasts continue to decline from 2015 IRP projections.

## Ch. 4: Existing Supply Resources

- Hydroelectric represents about half of Avista's winter generating capability.
- Natural gas-fired plants represents the largest portion of Avista's thermal generation portfolio.
- Six percent of Avista's generating potential is biomass and wind.
- A major rehabilitation project for Nine Mile Falls is ongoing; the capacity upgrade was complete in 2016.
- 490 of Avista customers net meter a total of 3.5 megawatts of their own generation.

## 5. Energy Efficiency and Demand Response

- Current Avista-sponsored conservation reduces retail loads by nearly 12.5 percent, or 149 aMW.
- This IRP evaluated over 8,400 measure options covering all major end use equipment, as well as devices and actions to reduce energy consumption for this IRP.
- In 2016, Non-residential interior lighting produced savings of over 43,000 MWh, accounting for over half of all non-residential electric energy savings.
- The 2018-19 Washington biennium goal is 71,479 MWh

## 6. Long-Term Position

- Avista's first long-term capacity deficit net of energy efficiency is in 2026; the first energy deficit is also in 2026.
- Expected conservation programs defer resource needs five years.
- Including operating reserves, Avista plans to a 22.6 percent planning margin in the winter and a 15.6 percent planning margin in the summer.
- The 2017 IRP meets all EIA mandates over the next 20 years with a combination of qualifying hydroelectric upgrades, purchased RECs, Palouse Wind, and Kettle Falls.

## 7. Policy Considerations

- The 2017 IRP reduces carbon emissions with actual and projected regulations.
- Avista's Climate Policy Council monitors greenhouse gas legislation and environmental regulation issues.
- Greenhouse emissions constraints are in force for Washington, Oregon, and Montana. California includes carbon pricing and the remaining western states include regional emission caps based on a delayed Clean Power Plan as a proxy for future emissions regulation.

## 8. Transmission and Distribution Planning

- Avista actively participates in regional transmission planning forums.
- Avista develops a transmission system plan annually.
- Planned projects include reconductoring, station rebuilds and reinforcements.
- Transmission planning estimates costs for locating new generation on the Avista system.
- Distribution planning evaluates potential storage opportunities that may allow deferment of new distribution capital as part of the IRP process.

## 9. Generation Resource Options

- Only resources with well-defined costs and operating histories are options to meet future resource needs.
- Storage resources have had significant cost reduction since the last IRP.
- Wind, solar, and hydroelectric upgrades represent renewable options available to Avista.
- Upgrades to Avista's hydroelectric and thermal facilities are included as resource options.
- Future competitive acquisition processes might identify different technologies.
- Renewable resource costs assume no extensions of current state and federal incentives.

# 10. Market Analysis

- Natural gas, solar and wind resources dominate new generation additions in the Western Interconnect.
- Greenhouse emissions constraints are in force for Washington, Oregon, and Montana. California includes carbon pricing and the remaining western states include regional emission caps based on a delayed Clean Power Plan.
- The Expected Case forecasts a continuing reduction of Western Interconnect greenhouse gas emissions due to coal plant closures brought on by federal and state regulations and low natural gas prices.

# 11. Preferred Resource Strategy

- Avista is acquiring a utility-scale solar facility for commercial or industrial customers voluntarily choosing solar for their power supply mix.
- The first anticipated resource acquisition is a demand response program beginning in 2025.
- Upgrades to existing thermal facilities begin prior to the 2026 deficit.
- Replacement of the Lancaster Facility with new natural gas peakers occurs in 2026 at the end of the power purchase agreement.
- Energy efficiency offsets 53.3 percent of projected load growth through the 20-year IRP timeframe.

## 12. Portfolio Scenarios

- Lower or higher future loads do not materially change the resource strategy.
- Colstrip remains a cost-effective and reliable source of power to meet future customer loads.
- Without Colstrip in 2030, customer bills increase \$50 million the first year.
- All load forecast scenarios require a new resource by the end of 2026.
- Avista has a pathway to reduce its emissions to 20 percent below 1990 levels.

# 13. Action Plan

- Covered in earlier presentation
- Generation resource related analysis
- Energy efficiency
- Transmission and distribution planning

# Remaining 2017 IRP Schedule

- June 30, 2017 – external draft released to TAC
- July 28, 2017 – external draft comments due
- August 31, 2017 – 2017 Electric IRP available to the public on Avista's web site
- Public comments period determined by the Commissions and posted on their respective web sites

# 2017 Electric Integrated Resource Plan

## Appendix B – 2017 Electric IRP Work Plan



**Work Plan for Avista's  
2017 Electric Integrated Resource Plan**

**For the  
Washington Utilities and Transportation Commission**

**August 30, 2016**

## 2017 Electric Integrated Resource Planning Work Plan

This Work Plan is submitted in compliance with the Washington Utilities and Transportation Commission's Integrated Resource Planning (IRP) rules (WAC 480-100-238). It outlines the process Avista will follow to develop its 2017 IRP for filing with Washington and Idaho Commissions by August 31, 2017. Avista uses a public process to solicit technical expertise and feedback throughout the development of the IRP through a series of public Technical Advisory Committee (TAC) meetings. Avista held the first TAC meeting for the 2017 IRP on June 2, 2016.

The 2017 IRP process will be similar to those used to produce the previous IRPs. Avista will use AURORA<sup>xmp</sup> for electric market price forecasting, resource valuation and for conducting Monte-Carlo style risk analyses. AURORA<sup>xmp</sup> modeling results will be used to select the Preferred Resource Strategy (PRS) using Avista's proprietary PRiSM model. This tool fills future capacity and energy (physical/renewable) deficits using an efficient frontier approach to evaluate quantitative portfolio risk versus portfolio cost while accounting for environmental laws and regulations. Qualitative risk evaluations involve separate analyses. Exhibit 1 shows the IRP timeline and the process to identify the PRS is in Exhibit 2.

Avista intends to use both detailed site-specific and generic resource assumptions in development of the 2017 IRP. The assumptions combine Avista's research of similar generating technologies, engineering studies, and the Northwest Power and Conservation Council's Seventh Power Plan. This IRP will study renewable portfolio standards, environmental costs, sustained peaking requirements and resource adequacy, energy efficiency programs, energy storage and demand response. The IRP will develop a strategy that meets or exceeds both the renewable portfolio standards and greenhouse gas emissions regulations.

Avista intends to test the PRS against a range of scenarios and potential futures. The TAC meetings will help to determine the underlying assumptions used in the scenarios and futures. The IRP process is very technical and data intensive; public comments are welcome but timely input and participation will be necessary for inclusion into the process so the plan can be submitted according to the tentative schedule in this Work Plan.

The following topics and meeting times may change depending on the availability of presenters and requests for additional topics from the TAC members. The tentative timeline and agenda items for TAC meetings follows:

- **TAC 1: Thursday, June 2, 2016:** TAC meeting Expectations, review of 2015 IRP acknowledgement letters, Energy Independence Act compliance, energy efficiency modeling discussion, resource adequacy – preliminary results and review the 2017 IRP draft Work Plan.
- **TAC 2: Wednesday, September 28, 2016:** Review conservation selection methodology, update on the Company's demand response study, load and economic forecasts, planning margin and generation options.

- **TAC 3: Tuesday, November 8, 2016:** Colstrip discussion, cost of carbon, modeling overview, Power Plan Simulator, and Clean Power Plan & Clean Air Rule discussion.
- **TAC 4: Wednesday, February 15, 2017:** Electric and natural gas price forecasts, transmission planning, resource needs assessment, market and portfolio scenario development,
- **TAC 5: Tuesday, March 28, 2017:** Energy storage and ancillary service evaluation, completed conservation potential assessment, draft PRS, review of scenarios and futures and portfolio analysis
- **TAC 6: Tuesday, June 20, 2017:** Review of final PRS and action items.

### *2017 Electric IRP Draft Outline*

This section provides a draft outline of the major sections in the 2017 Electric IRP. This outline may change as IRP studies are completed and input from the TAC has been received.

- 1. Executive Summary**
- 2. Introduction and Stakeholder Involvement**
- 3. Economic and Load Forecast**
  - a. Economic Conditions
  - b. Avista Energy & Peak Load Forecasts
  - c. Load Forecast Scenarios
- 4. Existing Supply Resources**
  - a. Avista Resources
  - b. Contractual Resources and Obligations
- 5. Energy Efficiency and Demand Response**
  - a. Conservation Potential Assessment
  - b. Demand Response Opportunities
- 6. Long-Term Position**
  - a. Reliability Planning and Reserve Margins
  - b. Resource Requirements
  - c. Reserves and Flexibility Assessment
- 7. Policy Considerations**
  - a. Environmental Concerns
  - b. State and Federal Policies
- 8. Transmission & Distribution Planning**
  - a. Avista's Transmission System
  - b. Future Upgrades and Interconnections
  - c. Transmission Construction Costs and Integration
  - d. Efficiency System Planning
  - e. Non-power supply storage benefits

**9. Generation Resource Options**

- a. New Resource Options
- b. Avista Plant Upgrades

**10. Market Analysis**

- a. Marketplace
- b. Fuel Price Forecasts
- c. Market Price Forecast
- d. Scenario Analysis

**11. Preferred Resource Strategy**

- a. Resource Selection Process
- b. Preferred Resource Strategy
- c. Efficient Frontier Analysis
- d. Avoided Cost

**12. Portfolio Scenarios**

- a. Portfolio Scenarios
- b. Tipping Point Analysis

**13. Action Plan**

- a. 2015 Action Plan Summary
- b. 2017 Action Plan

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**Exhibit 1: 2017 Electric IRP Timeline**

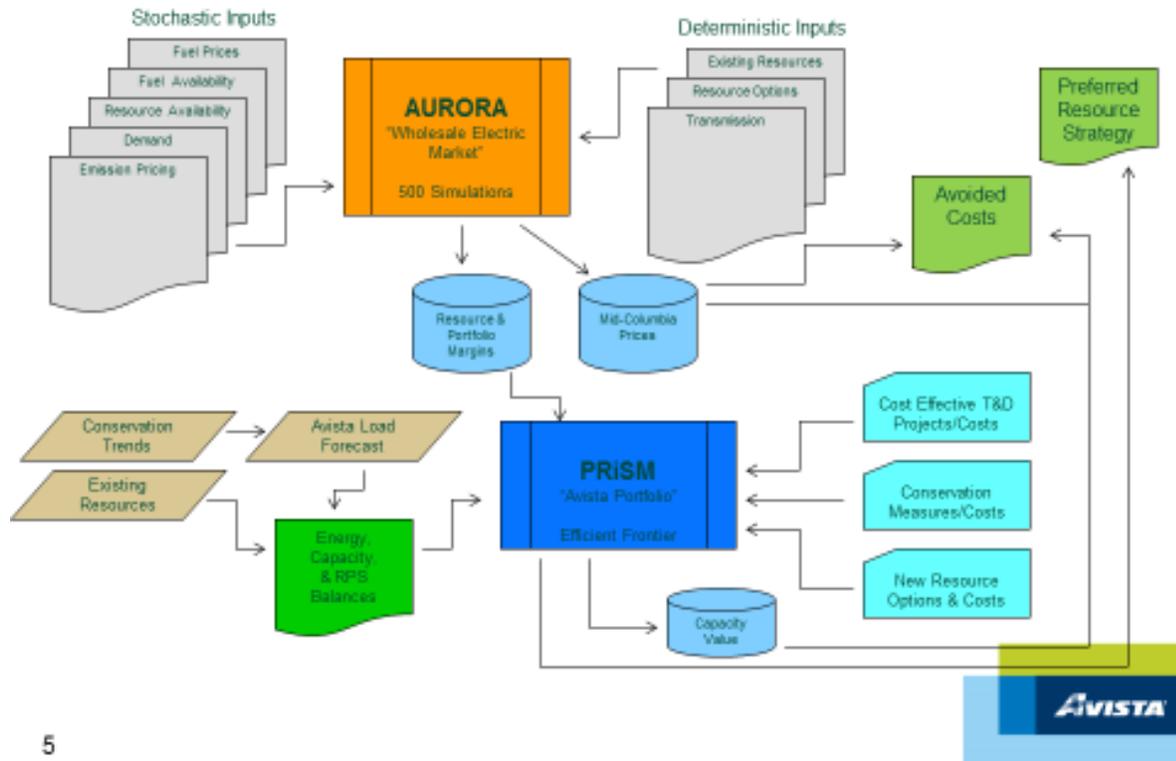

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<b><u>Task</u></b>	<b><u>Target Date</u></b>
<b>Preferred Resource Strategy (PRS)</b>	
Finalize energy demand forecast	July 2016
Identify Avista's supply & conservation resource options	September 2016
Finalize peak load forecast	September 2016
Update AURORA <sup>xmp</sup> database for market price forecast	October 2016
Energy efficiency load shapes input into AURORA <sup>xmp</sup>	October 2016
Finalize datasets/statistics variables for risk studies	November 2016
Transmission study due	December 2016
Finalize distribution feeder forecast	December 2016
Select natural gas price forecast	December 2016
Finalize deterministic base case	January 2017
Due date for study requests	January 13, 2017
Base case stochastic study complete	January 2017
Develop efficient frontier and PRS	January 2017
Finalize PRiSM model	February 2017
Simulation of risk studies "futures" complete	February 2017
Simulate market scenarios in AURORA <sup>xmp</sup>	February 2017
Evaluate resource strategies against market futures and scenarios	March 2017
Present preliminary study and PRS to TAC	March 2017
<b>Writing Tasks</b>	
File 2017 IRP Work Plan	August 31, 2016
Prepare report and appendix outline	October 2016
Prepare text drafts	April 2017
Prepare charts and tables	April 2017
Internal draft released at Avista	May 2017
External draft released to the TAC	June 2017
Final editing and printing	August 2017
Final IRP submission to Commissions and TAC	August 31, 2017

---

**Exhibit 2: 2017 Electric IRP Modeling Process**

## 2017 IRP Modeling Process



# 2017 Electric Integrated Resource Plan

## Appendix C – AEG Conservation Potential Assessment for the 2017 IRP





# AVISTA ELECTRIC CONSERVATION POTENTIAL ASSESSMENT FOR 2018-2037

## *ENERGY EFFICIENCY ANALYSIS*

Prepared for:  
Avista Utilities

June 2017

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# 1

## INTRODUCTION

Avista Corporation (Avista) engaged Applied Energy Group (AEG) to conduct a Conservation Potential Assessment (CPA). The CPA is a 20-year study, performed in accordance with Washington Initiative 937 (I-937), that provides data on conservation resources to support development of Avista's 2017 Integrated Resource Plan (IRP). AEG first performed an electricity CPA for Avista in 2013. We have also performed gas CPA studies in 2014 and 2016 and an assessment of demand-response potential in 2014. This study updates Avista's last electricity CPA, which AEG performed in 2015.

Since 2015, additional information became available and there was also a desire for more granularity, corresponding to increasing sophistication in CPA studies. Therefore, this study provided enhanced analysis compared to the previous studies.

- The base-year for the analysis was brought forward from 2013 to 2015.
- For the residential sector, the study incorporated Avista's GenPOP residential saturation survey from 2012. This provided the foundation for the base-year market characterization and energy market profiles. The Northwest Energy Efficiency Alliance's (NEEA's) 2014 Residential Building Stock Assessment (RBSA) supplemented the GenPOP survey.
- For the commercial sector, analysis was performed for the major building types in the service territory. Results from the 2015 Commercial Building Stock Assessment (CBSA), including hospital and university data, provided useful information for this characterization.
- Measure data have been updated based on the recently finalized Seventh Power Plan (Seventh Plan) completed by the Northwest Power and Conservation Council (Council).
- This study also incorporated changes to the list of energy conservation measures, as a result of research by the Regional Technical Forum (RTF). In particular, LED lamps continue to drop in price and provide a significant opportunity for savings.
- The study incorporates updated forecasting assumptions that line up with the most recent Avista load forecast.
- Measure-adoption rates were developed using the Seventh Plan's ramp rates as a starting point and adjusted to reflect Avista program results in recent years. Prior CPAs utilized Sixth Power Plan ramp rates instead.
- Analysis of economic potential was excluded from this study. Avista will screen for cost effective opportunities directly within the IRP model. As such, economic potential and achievable potential have been replaced by an achievable technical potential case.
- In addition to analyzing annual energy savings, the study also estimated the opportunity for reduction of summer peak demand. This involved a full characterization by sector, segment and end use of summer peak demand in the base year.
- Finally, this year's study included an update to the 2014 assessment of demand-response potential within the commercial and industrial (C&I) sectors in Washington and Idaho.

Since achievable potential has been removed from this CPA, it is not possible to compare achievable potential results with prior CPAs. Therefore when making comparisons to the previous study we will focus on **technical potential**. Compared to the 2015 Study, 10-year technical potential has increased

to 187.9 aMW from 180.5 aMW. This is due to the addition of new measures in the Seventh Plan and increased baseline consumption growth.

## ABBREVIATIONS AND ACRONYMS

Table 1-1 provides a list of abbreviations and acronyms used in this report, along with an explanation.

*Table 1-1 Explanation of Abbreviations and Acronyms*

<b>Acronym</b>	<b>Explanation</b>
ACS	American Community Survey
AEO	Annual Energy Outlook forecast developed by EIA
AHAM	Association of Home Appliance Manufacturers
AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
Auto-DR	Automated Demand Response
B/C Ratio	Benefit to Cost Ratio
BEST	AEG's Building Energy Simulation Tool
C&I	Commercial and Industrial
CAC	Central Air Conditioning
CFL	Compact fluorescent lamp
CPP	Critical Peak Pricing
C&I	Commercial and Industrial
DHW	Domestic Hot Water
DLC	Direct Load Control
DR	Demand Response
DSM	Demand Side Management
EE	Energy Efficiency
EIA	Energy Information Administration
EUL	Estimated Useful Life
EUI	Energy Usage Intensity
FERC	Federal Energy Regulatory Commission
HH	Household
HID	High intensity discharge lamps
HVAC	Heating Ventilation and Air Conditioning
ICAP	Installed Capacity
IOU	Investor Owned Utility
LED	Light emitting diode lamp
LoadMAP	AEG's Load Management Analysis and Planning™ tool
LCOE	Levelized cost of energy
MW	Megawatt
NPV	Net Present Value
O&M	Operations and Maintenance
PCT	Programmable Communicating Thermostat
RTU	Roof top unit
TRC	Total Resource Cost test
UEC	Unit Energy Consumption

## 2

### ANALYSIS APPROACH AND DATA DEVELOPMENT

This section describes the analysis approach taken for the study and the data sources used to develop the potential estimates.

#### OVERVIEW OF ANALYSIS APPROACH

To perform the potential analysis, AEG used a bottom-up approach following the major steps listed below. We describe these analysis steps in more detail throughout the remainder of this chapter.

1. Perform a market characterization to describe sector-level electricity use for the residential, commercial, and industrial sectors for the base year, 2015.
2. Develop a baseline projection of energy consumption and peak demand by sector, segment, and end use for 2015 through 2037.
3. Define and characterize several hundred conservation measures to be applied to all sectors, segments, and end uses.
4. Estimate technical and achievable technical potential at the measure level in terms of energy and peak demand impacts from conservation measures for 2018-2037.

#### LOADMAP MODEL

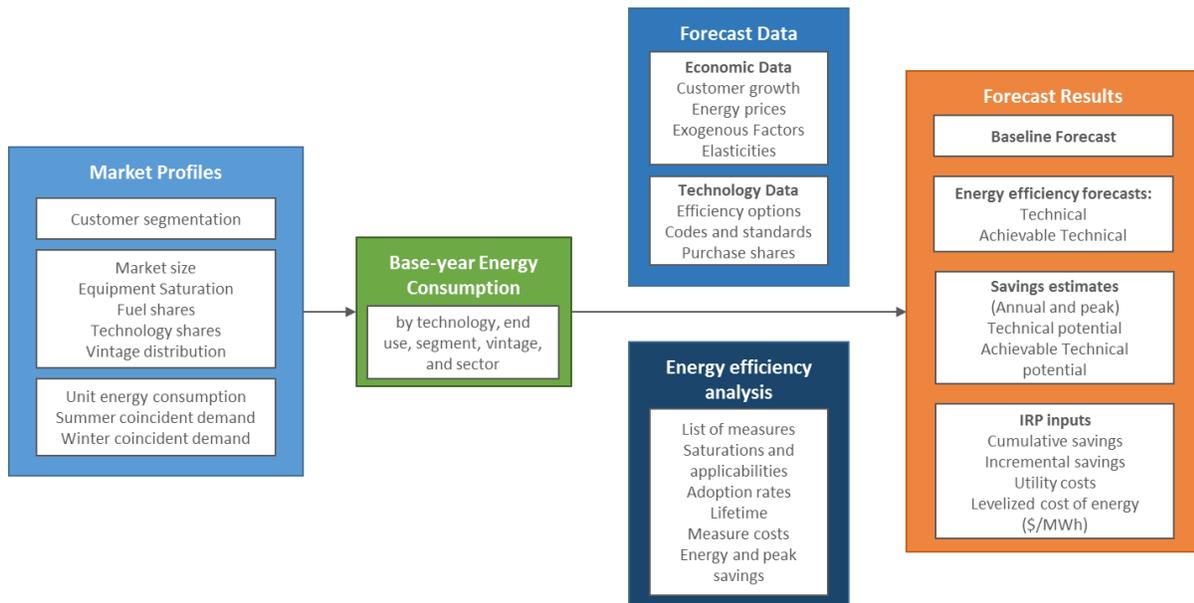
AEG used its Load Management Analysis and Planning tool (LoadMAP™) version 5.0 to develop both the baseline projection and the estimates of potential. AEG developed LoadMAP in 2007 and has enhanced it over time, using it for the EPRI National Potential Study and numerous utility-specific forecasting and potential studies since that time. Built in Excel, the LoadMAP framework (see Figure 2-1) is both accessible and transparent and has the following key features.

- Embodies the basic principles of rigorous end-use models (such as EPRI's REEPS and COMMEND) but in a more simplified, accessible form.
- Includes stock-accounting algorithms that treat older, less efficient appliance/equipment stock separately from newer, more efficient equipment. Equipment is replaced according to the measure life and appliance vintage distributions defined by the user.
- Balances the competing needs of simplicity and robustness by incorporating important modeling details related to equipment saturations, efficiencies, vintage, and the like, where market data are available, and treats end uses separately to account for varying importance and availability of data resources.
- Isolates new construction from existing equipment and buildings and treats purchase decisions for new construction and existing buildings separately.
- Uses a simple logic for appliance and equipment decisions. Other models available for this purpose embody complex decision choice algorithms or diffusion assumptions, and the model parameters tend to be difficult to estimate or observe and sometimes produce anomalous results that require calibration or even overriding. The LoadMAP approach allows the user to drive the appliance and equipment choices year by year directly in the model. This flexible approach allows users to import the results from diffusion models or to input individual assumptions. The framework also facilitates sensitivity analysis.

- Includes appliance and equipment models customized by end use. For example, the logic for lighting is distinct from refrigerators and freezers.
- Can accommodate various levels of segmentation. Analysis can be performed at the sector level (e.g., total residential) or for customized segments within sectors (e.g., housing type or income level).
- Incorporates conservation measures, demand-response options, combined heat and power (CHP) and distributed generation options and fuel switching.

Consistent with the segmentation scheme and the market profiles we describe below, the LoadMAP model provides projections of baseline energy use by sector, segment, end use, and technology for existing and new buildings. It also provides forecasts of total energy use and energy-efficiency savings associated with the various types of potential.<sup>1</sup>

Figure 2-1 LoadMAP Analysis Framework



<sup>1</sup> The model computes energy and peak-demand forecasts for each type of potential for each end use as an intermediate calculation. Annual-energy and peak-demand savings are calculated as the difference between the value in the baseline projection and the value in the potential forecast (e.g., the technical potential forecast).

## DEFINITIONS OF POTENTIAL

In this study, the conservation potential estimates represent gross savings developed for two levels of potential: technical potential and achievable technical potential. These levels are described below.

- **Technical Potential** is defined as the theoretical upper limit of conservation potential. It assumes that customers adopt all feasible measures regardless of their cost. At the time of existing equipment failure, customers replace their equipment with the most efficient option available. In new construction, customers and developers also choose the most efficient equipment option.

In new construction, customers and developers also choose the most efficient equipment option relative to applicable codes and standards. Non-equipment measures which may be realistically installed apart from equipment replacements are implemented according to ramp rates developed by the NWPCC for its Seventh Power Plan, applied to 100% of the applicable market. This case is a theoretical construct, and is provided primarily for planning and informational purposes.

- **Achievable Technical Potential** refines technical potential by applying customer participation rates that account for market barriers, customer awareness and attitudes, program maturity, and other factors that may affect market penetration of DSM measures. We used achievability assumptions from the Council's Seventh Plan, adjusted for Avista's recent program accomplishments, as the customer adoption rates for this study. For the achievable technical case, ramp rates are applied to at most 85% of the applicable market, per Council methodology. This achievability factor represents potential which can reasonably be acquired by all mechanisms available, regardless of how conservation is achieved. Thus, the market applicability assumptions utilized in this study include savings outside of utility programs.<sup>2</sup>

Details regarding the market adoption factors appear in Appendix B.

## MARKET CHARACTERIZATION

The first step in the analysis approach is market characterization. In order to estimate the savings potential from energy-efficient measures, it is necessary to understand how much energy is used today and what equipment is currently being used. This characterization begins with a segmentation of Avista's electricity footprint to quantify energy use by sector, segment, end-use application, and the current set of technologies used. We rely primarily on information from Avista, NEEA, and secondary sources as necessary.

### *Segmentation for Modeling Purposes*

The market assessment first defined the market segments (building types, end uses, and other dimensions) that are relevant in the Avista service territory. The segmentation scheme for this project is presented in Table 2-1.

<sup>2</sup> Council's 7<sup>th</sup> Power Plan applicability assumptions reference an "Achievable Savings" report published August 1, 2007. <http://www.nwcouncil.org/reports/2007/2007-13/>

Table 2-1 Overview of Avista Analysis Segmentation Scheme

Dimension	Segmentation Variable	Description
1	Sector	Residential, commercial, industrial
2	Segment	<b>Residential:</b> single family, multifamily, manufactured home, low income <b>Commercial:</b> small office, large office, restaurant, retail, grocery, college, school, health, lodging, warehouse, and miscellaneous <b>Industrial:</b> total
3	Vintage	Existing and new construction
4	End uses	Cooling, lighting, water heat, motors, etc. (as appropriate by sector)
5	Appliances/end uses and technologies	Technologies such as lamp type, air conditioning equipment, motors by application, etc.
6	Equipment efficiency levels for new purchases	Baseline and higher-efficiency options as appropriate for each technology

With the segmentation scheme defined, we then performed a high-level market characterization of electricity sales in the base year to allocate sales to each customer segment. We used Avista data and secondary sources to allocate energy use and customers to the various sectors and segments such that the total customer count, energy consumption, and peak demand matched the Avista system totals from 2015 billing data. This information provided control totals at a sector level for calibrating the LoadMAP model to known data for the base-year.

### Market Profiles

The next step was to develop market profiles for each sector, customer segment, end use, and technology. A market profile includes the following elements:

- **Market size** is a representation of the number of customers in the segment. For the residential sector, it is number of households. In the commercial sector, it is floor space measured in square feet. For the industrial sector, it is overall electricity use.
- **Saturations** define the fraction of homes or square feet with the various technologies. (e.g., homes with electric space heating).
- **UEC (unit energy consumption) or EUI (energy-use index)** describes the amount of energy consumed in 2015 by a specific technology in buildings that have the technology. For electricity, UECs are expressed in kWh/household for the residential sector, and EUIs are expressed in kWh/square foot for the commercial sector.
- **Annual Energy Intensity** for the residential sector represents the average energy use for the technology across all homes in 2015. It is computed as the product of the saturation and the UEC and is defined as kWh/household for electricity. For the commercial sector, intensity, computed as the product of the saturation and the EUI, represents the average use for the technology across all floor space in 2015.
- **Annual Usage** is the annual energy use by an end-use technology in the segment. It is the product of the market size and intensity and is quantified in GWh.
- **Peak Demand** for each technology, summer peak and winter peak are calculated using peak fractions of annual energy use from AEG's EnergyShape library and Avista system peak data.

The market characterization results and the market profiles are presented in Chapter 3.

### BASELINE PROJECTION

The next step was to develop the baseline projection of annual electricity use and summer peak demand for 2015 through 2037 by customer segment and end use without new utility programs. The

end-use projection includes the impacts of relatively certain codes and standards which will unfold over the study timeframe. All such mandates that were defined as of September 2016 are included in the baseline. The baseline projection is the foundation for the analysis of savings from future conservation efforts as well as the metric against which potential savings are measured.

Inputs to the baseline projection include:

- Current economic growth forecasts (i.e., customer growth, income growth)
- Electricity price forecasts
- Trends in fuel shares and equipment saturations
- Existing and approved changes to building codes and equipment standards
- Avista's internally developed sector-level projections for electricity sales

We also developed a baseline projection for summer and winter peak by applying the peak fractions from the energy market profiles to the annual energy forecast in each year.

We present the baseline-projection results for the system as a whole and for each sector in Chapter 4.

### **CONSERVATION MEASURE ANALYSIS**

This section describes the framework used to assess the savings, costs, and other attributes of conservation measures. These characteristics form the basis for measure-level cost-effectiveness analyses as well as for determining measure-level savings. For all measures, AEG assembled information to reflect equipment performance, incremental costs, and equipment lifetimes. We used this information, along with the Seventh Plan's updated ramp rates to identify achievable technical measure potential.

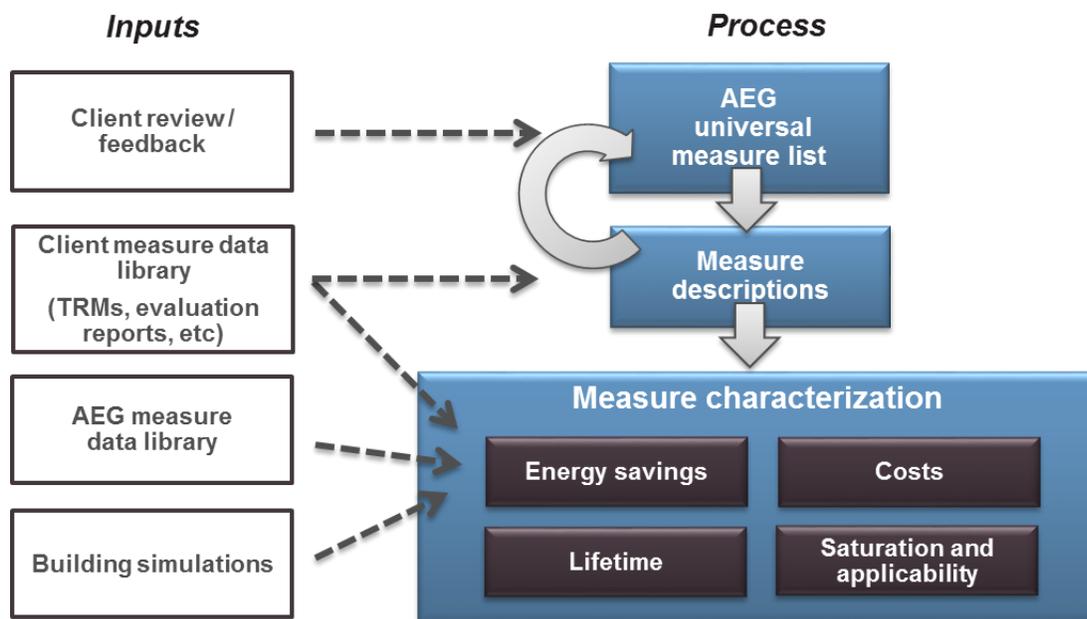
#### ***Conservation Measures***

Figure 2-2 outlines the framework for conservation measure analysis. The framework for assessing savings, costs, and other attributes of conservation measures involves identifying the list of measures to include in the analysis, determining their applicability to each market sector and segment, fully characterizing each measure, and calculating the levelized cost of energy (\$/MWh). Potential measures include the replacement of a unit that has failed or is at the end of its useful life with an efficient unit, retrofit or early replacement of equipment, improvements to the building envelope, the application of controls to optimize energy use, and other actions resulting in improved energy efficiency.

We compiled a robust list of conservation measures for each customer sector, drawing upon Avista's measure database, the Seventh Plan, and the Regional Technical Forum (RTF) deemed measures database, as well as a variety of secondary sources. This universal list of conservation measures covers all major types of end-use equipment, as well as devices and actions to reduce energy consumption.

Since an economic screen was not performed in this Study, we have instead calculated the levelized cost of energy (LCOE) for each measure evaluated. This value, expressed in dollars per first-year megawatt hour (MWh) saved, can be used by Avista's IRP model to evaluate cost effectiveness. To calculate a measure's LCOE, first-year measure costs, annual non-energy benefits, and annual operations and maintenance (O&M) costs are levelized over a measure's lifetime, then divided by the first-year savings in MWh. Note that while non-energy benefits are typically included in the numerator of a traditional TRC economic screen, the LCOE benefits have not been monetized. Therefore, these benefits are instead subtracted from the costs portion of the test.

Figure 2-2 Approach for Conservation Measure Assessment



The selected measures are categorized into two types according to the LoadMAP taxonomy: equipment measures and non-equipment measures.

- **Equipment measures** are efficient energy-consuming pieces of equipment that save energy by providing the same service with a lower energy requirement than a standard unit. An example is an ENERGY STAR refrigerator that replaces a standard efficiency refrigerator. For equipment measures, many efficiency levels may be available for a given technology, ranging from the baseline unit (often determined by code or standard) up to the most efficient product commercially available. For instance, in the case of central air conditioners, this list begins with the current federal standard SEER 13 unit and spans a broad spectrum up to a maximum efficiency of a SEER 21 unit. The Seventh Plan’s “Lost Opportunity” ramp rates are primarily applied to equipment measures.
- **Non-equipment measures** save energy by reducing the need for delivered energy, but do not involve replacement or purchase of major end-use equipment (such as a refrigerator or air conditioner). An example would be a programmable thermostat that is pre-set to run heating and cooling systems only when people are home. Non-equipment measures can apply to more than one end use. For instance, addition of wall insulation will affect the energy use of both space heating and cooling. The Seventh Plan’s “Retrofit” ramp rates are primarily applied to non-equipment measures. Non-equipment measures typically fall into one of the following categories:
  - Building shell (windows, insulation, roofing material)
  - Equipment controls (thermostat, compressor staging and controls)
  - Equipment maintenance (cleaning filters, changing setpoints)
  - Whole-building design (building orientation, advanced new construction designs)
  - Lighting retrofits (included as a non-equipment measure because retrofits are performed prior to the equipment’s normal end of life)
  - Displacement measures (ceiling fan to reduce use of central air conditioners)
  - Commissioning and retrocommissioning (initial or ongoing monitoring of building energy systems to optimize energy use)

We developed a preliminary list of conservation measures, which was distributed to the Avista project team for review. The list was finalized after incorporating comments and is presented in the appendix to this volume.

Once we assembled the list of conservation measures, the project team characterized measure savings, incremental cost, service life, and other performance factors, drawing upon data from the Avista measure database, the Seventh Power Plan, the RTF deemed measure workbooks, simulation modeling, and other well-vetted sources as required.

#### REPRESENTATIVE CONSERVATION MEASURE DATA INPUTS

To provide an example of the conservation measure data, Table 2-2 and Table 2-3 present examples of the detailed data inputs behind both equipment and non-equipment measures, respectively, for the case of residential CAC in single-family homes. Table 2-2 displays the various efficiency levels available as equipment measures, as well as the corresponding useful life, energy usage, and cost estimates. The columns labeled “On Market” and “Off Market” reflect equipment availability due to codes and standards or the entry of new products to the market. Note that in this example no standards come into play and therefore all options are available throughout the forecast.

Table 2-2 Example Equipment Measures for Central AC – Single-Family Home

Efficiency Level	Useful Life (yrs)	Equipment Cost	Energy Usage (kWh/yr)	On Market	Off Market
SEER 13.0	8 to 22	\$2,030.66	1,159	2015	n/a
SEER 14.0	8 to 22	\$2,425.51	1,063	2015	n/a
SEER 15.0	8 to 22	\$2,820.36	1,028	2015	n/a
SEER 16.0	8 to 22	\$3,215.22	998	2015	n/a
SEER 18.0	8 to 22	\$4,008.24	951	2015	n/a
SEER 21.0	8 to 22	\$4,681.94	901	2015	n/a

Table 2-3 lists some of the non-equipment measures applicable to a CAC in an existing single family home. LCOE values for all measures are evaluated based on the lifetime costs of the measure divided by the first-year savings. The total costs and savings are calculated for each year of the study and depend on the base year saturation of the measure, the applicability<sup>3</sup> of the measure, and the savings as a percentage of the relevant energy end uses.

<sup>3</sup> The applicability factors take into account whether the measure is applicable to a particular building type and whether it is feasible to install the measure. For instance, attic fans are not applicable to homes where there is insufficient space in the attic or there is no attic at all.

Table 2-3 Example Non-Equipment Measures – Single Family Home, Existing

End Use	Measure	Saturation in 2015 <sup>4</sup>	Applicability	Lifetime (yrs)	Measure Installed Cost	Energy Savings (%)
Cooling	Insulation - Ceiling Installation	12.5%	25.0%	45	\$1,191.58	15.77%
Cooling	Insulation - Wall Cavity Installation	15.0%	30.0%	45	\$2,587.65	3.94%
Cooling	Ducting - Repair and Sealing	15.0%	50.0%	20	\$636.06	3.41%
Cooling	Windows - High Efficiency/ENERGY STAR	10.0%	37.5%	45	\$3,249.66	6.44%
Cooling	Thermostat - Wi-Fi/Interactive	5.0%	75.0%	10	\$260.84	3.72%

Table 2-4 summarizes the number of measures evaluated for each segment within each sector.

Table 2-4 Number of Measures Evaluated

Sector	Total Measures	Measure Permutations w/ 2 Vintages	Measure Permutations w/ Segments
Residential	80	160	1,280
Commercial	97	194	4,268
Industrial	93	186	372
<b>Total Measures Evaluated</b>	<b>270</b>	<b>540</b>	<b>5,920</b>

## CONSERVATION POTENTIAL

The approach we used for this study to calculate the conservation potential adheres to the approaches and conventions outlined in the National Action Plan for Energy-Efficiency (NAPEE) Guide for Conducting Potential Studies (November 2007).<sup>5</sup> The NAPEE Guide represents the most credible and comprehensive industry practice for specifying conservation potential. As described in Chapter 2, two types of potential were developed as part of this effort: technical potential, and achievable technical potential.

- Technical potential** is a theoretical construct that assumes the highest efficiency measures that are technically feasible to install are adopted by customers, regardless of cost or customer preferences. Thus, determining the technical potential is relatively straightforward. LoadMAP “chooses” the most efficient equipment options for each technology at the time of equipment replacement. In addition, it installs all relevant non-equipment measures for each technology to calculate savings. For example, for central air conditioning, as shown in Table 2-2, the most efficient option is a SEER 21. The multiple non-equipment measures shown in Table 2-3 are then applied to the energy used by the SEER 21 system to further reduce air conditioning energy use. LoadMAP applies the savings due to the non-equipment measures one-by-one to avoid double counting of savings. The measures are evaluated in order of their LCOE ratio, with the measure with the lowest LCOE values applied first. Each time a measure is applied, the baseline energy use for the end use is reduced and the percentage savings for the next measure is applied to the revised (lower) usage.
- Achievable technical potential** constrains technical potential by applying market adoption rates for each measure that estimate the percentage of customers who would be likely to select each measure, given consumer preferences (partially a function of incentive levels), retail energy rates, imperfect information, and real market barriers and conditions. These barriers tend to vary, depending on the customer sector, local energy market conditions, and other, hard-to-

<sup>4</sup> Note that saturation levels reflected for the base year change over time as more measures are adopted.

<sup>5</sup> National Action Plan for Energy Efficiency (2007). *National Action Plan for Energy Efficiency Vision for 2025: Developing a Framework for Change*. [www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan).

quantify factors. In addition to utility-sponsored programs, alternative acquisition methods, such as improved codes and standards and market transformation, can be used to capture portions of these resources, and are included within the achievable technical potential, per 7<sup>th</sup> Power Plan methodology.

The calculation of technical potential is a straightforward algorithm. To develop estimates for achievable technical potential, we develop market adoption rates for each measure that specify the percentage of customers that will select the highest-efficiency economic option. For Avista, the project team began with the ramp rates specified in the Seventh Plan conservation workbooks, but modified these to match Avista program history and service territory specifics. We examined historic program results for the most recent program years. We then adjusted the 2018 achievable technical potential for these measures to approximately match the historical results. This provided a starting for 2018 potential that was aligned to historic results. In future years, the potential factors increased to a maximum of 85%, 55% for emerging technologies, to model increasing market acceptance and program improvements. For measures within the Seventh Plan, the Council's prescribed ramp rates were used. For measures outside the Seventh Plan, AEG assigned ramp rates comparable to similar measures within the Seventh Plan. The market adoption rates for each measure appear in Appendix B. Results of all the potentials analysis are presented in Chapter 5.

## DATA DEVELOPMENT

This section details the data sources used in this study, followed by a discussion of how these sources were applied. In general, data sources were applied in the following order: Avista data, Pacific Northwest data, and well-vetted national or other regional secondary sources.

### DATA SOURCES

The data sources are organized into the following categories:

- Avista data
- Northwest Energy Efficiency Alliance data
- Northwest Power and Conservation Council data
- AEG's databases and analysis tools
- Other secondary data and reports

#### *Avista Data*

Our highest priority data sources for this study were those that were specific to Avista.

- **Avista customer data:** Avista provided billing data for development of customer counts and energy use for each sector. We also used the results of the Avista GenPOP survey, a residential saturation survey.
- **Load forecasts:** Avista provided an economic growth forecast by sector; electric load forecast; peak-demand forecasts at the sector level; and retail electricity price history and forecasts.
- **Economic information:** Avista Power provided a discount rate and line loss factor. Avoided costs were not provided due to the economic screen being moved to the IRP model.
- **Avista program data:** Avista provided information about past and current programs, including program descriptions, goals, and achievements to date.

#### *Northwest Energy Efficiency Alliance Data*

The Northwest Energy Efficiency Alliance conducts research on an ongoing basis for the Northwest region. The following studies were particularly useful for this study:

- **Northwest Energy Efficiency Alliance, 2011 Residential Building Stock Assessment Single-Family**, Market Research Report, <http://neea.org/docs/reports/residential-building-stock-assessment-single-family-characteristics-and-energy-use.pdf?sfvrsn=8>
- **Northwest Energy Efficiency Alliance, 2011 Residential Building Stock Assessment: Manufactured Home**, Market Research Report, #E13-249, January, 2013. <http://neea.org/docs/default-source/reports/residential-building-stock-assessment--manufactured-homes-characteristics-and-energy-use.pdf?sfvrsn=8>
- **Northwest Energy Efficiency Alliance, Long-Term Northwest Residential Lighting Tracking and Monitoring Study**, Market Research Report, 11-228, August, 2011. [http://neea.org/research/reports/E11-231\\_Combinedv2.pdf](http://neea.org/research/reports/E11-231_Combinedv2.pdf)
- **Northwest Energy Efficiency Alliance, 2011 Residential Building Stock Assessment: Multifamily**, Market Research Report, #13-263, September, 2013. <http://neea.org/docs/default-source/reports/residential-building-stock-assessment--multi-family-characteristics-and-energy-use.pdf?sfvrsn=4>
- **Northwest Energy Efficiency Alliance, 2014 Commercial Building Stock Assessment**, December 16, 2014, [http://neea.org/docs/default-source/reports/2014-cbsa-final-report\\_05-dec-2014.pdf?sfvrsn=12](http://neea.org/docs/default-source/reports/2014-cbsa-final-report_05-dec-2014.pdf?sfvrsn=12)
- **Northwest Energy Efficiency Alliance, 2014 Industrial Facilities Site Assessment**, December 29, 2014, <http://neea.org/docs/default-source/reports/2014-industrial-facilities-stock-assessment-final-report.pdf?sfvrsn=6>

#### *Northwest Power and Conservation Council Data*

Several sources of data were used to characterize the conservation measures. We used the following regional data sources and supplemented with AEG's data sources to fill in any gaps.

- **Northwest Power and Conservation Council Seventh Plan Conservation Supply Curve Workbooks.** To develop its Seventh Power Plan, the Council used workbooks with detailed information about measures, available at <https://nwcouncil.app.box.com/v/7thplanconservationdatafiles>
- **Regional Technical Forum Deemed Measures.** The NWPCC Regional Technical Forum maintains databases of deemed measure savings data, available at <http://www.nwcouncil.org/energy/rtf/measures/Default.asp>.
- **Northwest Power and Conservation Council, MC and Loadshape File**, September 29, 2016. The Council's load shape library was utilized to convert CPA results into hourly conservation impacts for use in Avista's IRP process. Generalized Least Square (GLS) versions of these load shapes are available at <https://nwcouncil.app.box.com/s/gacr21z8i89hh8ppk11rdzgm6fz4xlz3>

#### **AEG DATA**

AEG maintains several databases and modeling tools that we use for forecasting and potential studies. Relevant data from these tools has been incorporated into the analysis and deliverables for this study.

- **AEG Energy Market Profiles:** For more than 10 years, AEG staff has maintained profiles of end-use consumption for the residential, commercial, and industrial sectors. These profiles include market size, fuel shares, unit consumption estimates, and annual energy use by fuel (electricity and natural gas), customer segment and end use for 10 regions in the U.S. The Energy Information Administration surveys (RECS, CBECS and MECS) as well as state-level statistics and local customer research provide the foundation for these regional profiles.
- **Building Energy Simulation Tool (BEST).** AEG's BEST is a derivative of the DOE 2.2 building simulation model, used to estimate base-year UECs and EUIs, as well as measure savings for the HVAC-related measures.
- **AEG's EnergyShape™:** AEG's load shape database was used in addition to the Council's load shape database for comparative purposes. This database of load shapes includes the following:

- Residential – electric load shapes for ten regions, three housing types, 13 end uses
- Commercial – electric load shapes for nine regions, 54 building types, ten end uses
- Industrial – electric load shapes, whole facility only, 19 2-digit SIC codes, as well as various 3-digit and 4-digit SIC codes
- **AEG’s Database of Energy Efficiency Measures (DEEM):** AEG maintains an extensive database of measure data for our studies. Our database draws upon reliable sources including the California Database for Energy Efficient Resources (DEER), the EIA Technology Forecast Updates – Residential and Commercial Building Technologies – Reference Case, RS Means cost data, and Grainger Catalog Cost data.
- **Recent studies.** AEG has conducted numerous studies of EE potential in the last five years. We checked our input assumptions and analysis results against the results from these other studies, which include Tacoma Power, Idaho Power, PacifiCorp, Ameren Missouri, Vectren Energy, Indianapolis Power & Light, Tennessee Valley Authority, Ameren Missouri, Ameren Illinois, and Seattle City Light. In addition, we used the information about impacts of building codes and appliance standards from recent reports for the Edison Electric Institute<sup>6</sup>.

#### OTHER SECONDARY DATA AND REPORTS

Finally, a variety of secondary data sources and reports were used for this study. The main sources are identified below.

- **Annual Energy Outlook.** The Annual Energy Outlook (AEO), conducted each year by the U.S. Energy Information Administration (EIA), presents yearly projections and analysis of energy topics. For this study, we used data from the 2016 AEO.
- **Local Weather Data:** Weather from NOAA’s National Climatic Data Center for Spokane, WA was used as the basis for building simulations.
- **EPRI End-Use Models (REEPS and COMMEND).** These models provide the elasticities we apply to electricity prices, household income, home size and heating and cooling.
- **Database for Energy Efficient Resources (DEER).** The California Energy Commission and California Public Utilities Commission (CPUC) sponsor this database, which is designed to provide well-documented estimates of energy and peak demand savings values, measure costs, and effective useful life (EUL) for the state of California. We used the DEER database to cross check the measure savings we developed using BEST and DEEM.
- **Other relevant regional sources:** These include reports from the Consortium for Energy Efficiency, the EPA, and the American Council for an Energy-Efficient Economy.

#### DATA APPLICATION

We now discuss how the data sources described above were used for each step of the study.

##### *Data Application for Market Characterization*

To construct the high-level market characterization of electricity use and households/floor space for the residential, commercial and industrial sectors, we used Avista billing data and customer surveys to estimate energy use.

<sup>6</sup> AEG staff has prepared three white papers on the topic of factors that affect U.S. electricity consumption, including appliance standards and building codes. Links to all three white papers are provided:  
[http://www.edisonfoundation.net/IEE/Documents/IEE\\_RohmundApplianceStandardsEfficiencyCodes1209.pdf](http://www.edisonfoundation.net/IEE/Documents/IEE_RohmundApplianceStandardsEfficiencyCodes1209.pdf)  
[http://www.edisonfoundation.net/iee/Documents/IEE\\_CodesandStandardsAssessment\\_2010-2025\\_UPDATE.pdf](http://www.edisonfoundation.net/iee/Documents/IEE_CodesandStandardsAssessment_2010-2025_UPDATE.pdf)  
[http://www.edisonfoundation.net/iee/Documents/IEE\\_FactorsAffectingUSElecConsumption\\_Final.pdf](http://www.edisonfoundation.net/iee/Documents/IEE_FactorsAffectingUSElecConsumption_Final.pdf)

- For the residential sector, Avista estimated the numbers of customers and the average energy use per customer for each of the three segments, based on its GenPOP survey, matched to billing data for surveyed customers. AEG compared the resulting segmentation with data from the American Community Survey (ACS) regarding housing types and income and found that the Avista segmentation corresponded well with the ACS data. (See Chapter 3 for additional details.)
- To segment the commercial and industrial segments, we relied upon the allocation from the previous energy efficiency potential study. For the previous study, customers and sales were allocated to building type based on SIC codes, with some adjustments between the commercial and industrial sectors to better group energy use by facility type and predominate end uses. (See Chapter 3 for additional details.)

#### **DATA APPLICATION FOR MARKET PROFILES**

The specific data elements for the market profiles, together with the key data sources, are shown in Table 2-5. To develop the market profiles for each segment, we did the following:

1. Developed control totals for each segment. These include market size, segment-level annual electricity use, and annual intensity.
2. Used the Avista GenPOP Survey, NEEA's RBSA, NEEA's CBSA, NEEA's IFSA, and AEG's Energy Market Profiles database to develop existing appliance saturations, appliance and equipment characteristics, and building characteristics.
3. Ensured calibration to control totals for annual electricity sales in each sector and segment.
4. Compared and cross-checked with other recent AEG studies.
5. Worked with Avista staff to vet the data against their knowledge and experience.

### Data Application for Baseline Projection

Table 2-5 summarizes the LoadMAP model inputs required for the baseline projection. These inputs are required for each segment within each sector, as well as for new construction and existing dwellings/buildings.

Table 2-5 Data Applied for the Market Profiles

Model Inputs	Description	Key Sources
Market size	Base-year residential dwellings, commercial floor space, and industrial employment	Avista billing data Avista GenPOP Survey NEEA RBSA and CBSA AEO 2016
Annual intensity	<b>Residential:</b> Annual use per household <b>Commercial:</b> Annual use per square foot <b>Industrial:</b> Annual use per employee	Avista billing data AEG's Energy Market Profiles NEEA RBSA and CBSA AEO 2016 Other recent studies
Appliance/equipment saturations	Fraction of dwellings with an appliance/technology Percentage of C&I floor space/employment with equipment/technology	Avista GenPOP Survey NEEA RBSA and CBSA AEG's Energy Market Profiles Avista Load Forecasting
UEC/EUI for each end-use technology	UEC: Annual electricity use in homes and buildings that have the technology EUI: Annual electricity use per square foot/employee for a technology in floor space that has the technology	NWPCC Seventh Plan and RTF data HVAC uses: BEST simulations using prototypes developed for Idaho Engineering analysis DEEM Recent AEG studies
Appliance/equipment age distribution	Age distribution for each technology	NWPCC Seventh Plan and RTF data NEEA regional survey data Utility saturation surveys Recent AEG studies
Efficiency options for each technology	List of available efficiency options and annual energy use for each technology	AEG DEEM AEO 2016 DEER NWPCC workbooks, RTF Previous studies
Peak factors	Share of technology energy use that occurs during the peak hour	EnergyShape database

Table 2-5 Data Needs for the Baseline Projection and Potentials Estimation in LoadMAP

Model Inputs	Description	Key Sources
Customer growth forecasts	Forecasts of new construction in residential and C&I sectors	Avista load forecast AEO 2016 economic growth forecast
Equipment purchase shares for baseline projection	For each equipment/technology, purchase shares for each efficiency level; specified separately for existing equipment replacement and new construction	Shipments data from AEO AEO 2016 regional forecast assumptions <sup>7</sup> Appliance/efficiency standards analysis Avista program results and evaluation reports
Utilization model parameters	Price elasticities, elasticities for other variables (income, weather)	EPRI's REEPS and COMMEND models AEO 2016

In addition, we implemented assumptions for known future equipment standards as of September 2016, as shown in Table 2-6, Table 2-7 and Table 2-8. The assumptions tables here extend through 2025, after which all standards are assumed to hold steady.

<sup>7</sup> We developed baseline purchase decisions using the Energy Information Agency's *Annual Energy Outlook* report (2016), which utilizes the National Energy Modeling System (NEMS) to produce a self-consistent supply and demand economic model. We calibrated equipment purchase options to match manufacturer shipment data for recent years and then held values constant for the study period. This removes any effects of naturally occurring conservation or effects of future EE programs that may be embedded in the AEO forecasts.

Table 2-6 Residential Electric Equipment Standards<sup>8</sup>

End Use	Technology	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Cooling	Central AC	SEER 13											
	Room AC	EER 11.0											
Cooling/Heating	Heat Pump	SEER 14.0/HSPF 8.0											
Water Heating	Water Heater (<=55 gallons)	EF 0.95											
	Water Heater (>55 gallons)	Heat Pump Water Heater											
Lighting	Screw-in/Pin Lamps	Advanced Incandescent (~20 lumens/watt)					Advanced Incandescent (45 lumens/watt)						
	Linear Fluorescent	T8 (89 lumens/watt)				T8 (92.5 lumens/watt)							
Appliances	Refrigerator	25% more efficient											
	Freezer	25% more efficient											
	Clothes Washer	1.29 IMEF top loader				1.57 IMEF top loader							
	Clothes Dryer	3.73 Combined EF											
Miscellaneous	Furnace Fans	Conventional				40% more efficient							

<sup>8</sup> The assumptions tables here extend through 2025, after which all standards are assumed to hold steady.

Table 2-7 Commercial Electric Equipment Standards<sup>9</sup>

End Use	Technology	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Cooling	Chillers	2007 ASHRAE 90.1											
	Roof Top Units	EER 11.0/11.2											
	PTAC	EER 11.7	EER 11.9										
Cooling/Heating	Heat Pump	EER 11.0/COP 3.3											
	PTHP	EER 11.9/COP 3.3											
Ventilation	Ventilation	Constant Air Volume/Variable Air Volume											
Lighting	Screw-in/Pin Lamps	Advanced Incandescent (~20 lumens/watt)					Advanced Incandescent (45 lumens/watt)						
	Linear Fluorescent	T8 (89 lumens/watt)			T8 (92.5 lumens/watt)								
	High Intensity Discharge	EPACT 2005		Metal Halide Ballast Improvement									
Water Heating	Water Heater	EF 0.97											
Refrigeration	Walk-in Refrigerator/Freezer	EISA 2007		10-38% more efficient									
	Reach-in Refrigerator/Freezer	EPACT 2005		40% more efficient									
	Glass Door Display	EPACT 2005		12-28% more efficient									
	Open Display Case	EPACT 2005		10-20% more efficient									
	Ice maker	EPACT 2005			15% more efficient								
Food Service	Pre-rinse Spray Valve	1.6 GPM				1.0 GPM							
Miscellaneous	Motors	EISA 2007	Expanded EISA 2007										

<sup>9</sup> The assumptions tables here extend through 2025, after which all standards are assumed to hold steady.

Table 2-8 Industrial Electric Equipment Standards<sup>10</sup>

End Use	Technology	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Cooling	Chillers	2007 ASHRAE 90.1											
	Roof Top Units	EER 11.0/11.2											
	PTAC	EER 11.7	EER 11.9										
Cooling/Heating	Heat Pump	EER 11.0/COP 3.3											
	PTHP	EER 11.9/COP 3.3											
Ventilation	Ventilation	Constant Air Volume/Variable Air Volume											
Lighting	Screw-in/Pin Lamps	Advanced Incandescent (~20 lumens/watt)					Advanced Incandescent - tier 2 (45 lumens/watt)						
	Linear Fluorescent	T8 (89 lumens/watt)			T8 (92.5 lumens/watt)								
	High Intensity Discharge	EPACT 2005			Metal Halide Ballast Improvement								
Motors	Pumps, Fans & Blowers, Compressors	EISA 2007	Expanded EISA 2007										

<sup>10</sup> The assumptions tables here extend through 2025, after which all standards are assumed to hold steady.

## CONSERVATION MEASURE DATA APPLICATION

Table 2-9 details the energy-efficiency data inputs to the LoadMAP model. It describes each input and identifies the key sources used in the Avista analysis.

Table 2-9 Data Needs for the Measure Characteristics in LoadMAP

Model Inputs	Description	Key Sources
Energy Impacts	The annual reduction in consumption attributable to each specific measure. Savings were developed as a percentage of the energy end use that the measure affects.	Avista measure data NPCC Seventh Plan conservation workbooks BEST AEG DEEM AEO 2016 DEER NPCC workbooks, RTF Other secondary sources
Peak Demand Impacts	Savings during the peak demand periods are specified for each electric measure. These impacts relate to the energy savings and depend on the extent to which each measure is coincident with the system peak.	Avista measure data NPCC Seventh Plan conservation workbooks BEST AEG DEEM EnergyShape
Costs	Equipment Measures: Includes the full cost of purchasing and installing the equipment on a per-household, per-square-foot, per employee or per service point basis for the residential, commercial, and industrial sectors, respectively. Non-equipment measures: Existing buildings – full installed cost. New Construction - the costs may be either the full cost of the measure, or as appropriate, it may be the incremental cost of upgrading from a standard level to a higher efficiency level.	Avista measure data NPCC Seventh Plan conservation workbooks RTF deemed measure database AEG DEEM AEO 2016 DEER RS Means Other secondary sources
Measure Lifetimes	Estimates derived from the technical data and secondary data sources that support the measure demand and energy savings analysis.	Avista measure data NPCC Seventh Plan conservation workbooks RTF deemed measure database AEG DEEM AEO 2016 DEER Other secondary sources
Applicability	Estimate of the percentage of dwellings in the residential sector, square feet in the commercial sector, or employees in the industrial sector where the measure is applicable and where it is technically feasible to implement.	Avista measure data NPCC Seventh Plan conservation workbooks RTF deemed measure database AEG DEEM DEER Other secondary sources
On Market and Off Market Availability	Expressed as years for equipment measures to reflect when the equipment technology is available or no longer available in the market.	AEG appliance standards and building codes analysis

#### DATA APPLICATION FOR ACHIEVABLE TECHNICAL POTENTIAL

To estimate achievable technical potential, two sets of parameters are needed to represent customer decision making behavior with respect to energy-efficiency choices.

- **Technical diffusion curves for non-equipment measures.** Equipment measures are installed when existing units fail. Non-equipment measures do not have this natural periodicity, so rather than installing all available non-equipment measures in the first year of the projection (instantaneous potential), they are phased in according to adoption schedules that generally align with the diffusion of similar equipment measures. In the 2016 CPA, we applied the “Retrofit” ramp rates from the Seventh Power Plan directly as diffusion curves. For technical potential, these rates summed up to 100% by the 20<sup>th</sup> for most measures. Emerging technologies summed to 65% by the 20<sup>th</sup> year.
- **Adoption rates.** Customer adoption rates or take rates are applied to technical potential to estimate achievable technical potential. For equipment measures, the Council’s “Lost Opportunity” ramp rates were applied to technical potential with a maximum achievability of 85% for most measures and 55% for emerging technologies. For non-equipment measures, the Council’s “Retrofit” ramp rates have already been applied to calculate technical diffusion. In this case, we multiply each of these by 85% for most measures and 55% for emerging technologies to calculate achievable technical potential. Adoption rates are presented in Appendix B.

## 3

## MARKET CHARACTERIZATION AND MARKET PROFILES

In this section, we describe how customers in the Avista service territory use electricity in the base year of the study, 2015. It begins with a high-level summary of energy use across all sectors and then delves into each sector in more detail.

### ENERGY USE SUMMARY

Total electricity use for the residential, commercial, and industrial sectors for Avista in 2015 was 8,108 GWh; 5,588 GWh (WA) and 2,520 GWh (ID). As shown in the tables below, in both states the residential sector accounts for 44% of the annual energy use, followed by commercial at 38% of the annual energy use. In terms of winter peak demand, the total system peak in 2015 was 1,661 MW; 1,156 (WA) and 505 MW (ID). In both states, the residential sector contributes the most to the winter peak.

Figure 3-1 Sector-Level Electricity Use in Base Year 2015, Washington

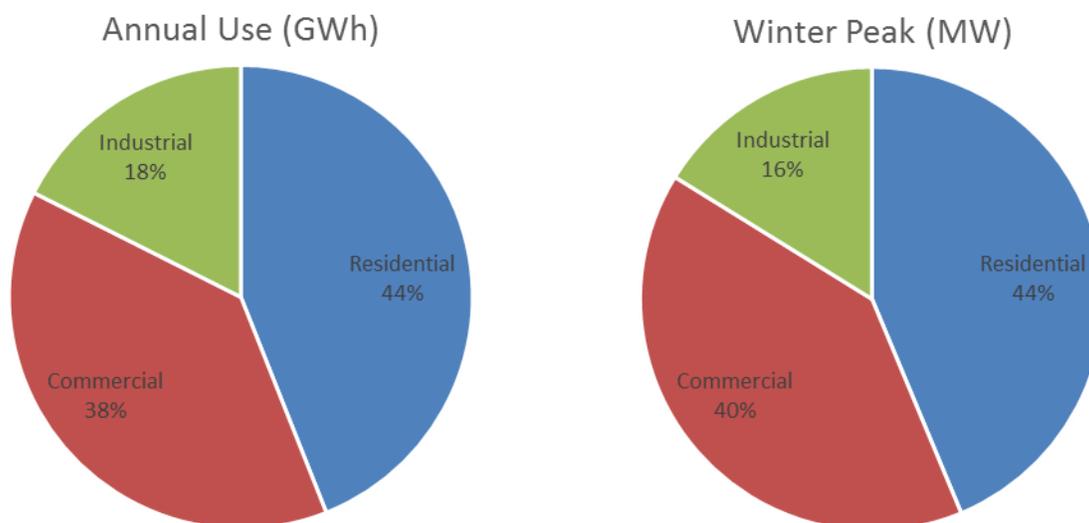


Table 3-1 Avista Sector Control Totals (2015), Washington

Sector	Annual Electricity Use (GWh)	% of Annual Use	Winter Peak Demand (MW)	% of Winter Peak
Residential	2,458	44%	505	44%
Commercial	2,148	38%	464	40%
Industrial	982	18%	187	16%
<b>Total</b>	<b>5,588</b>	<b>100%</b>	<b>1,156</b>	<b>100%</b>

Figure 3-2 Sector-Level Electricity Use in Base Year 2015, Idaho

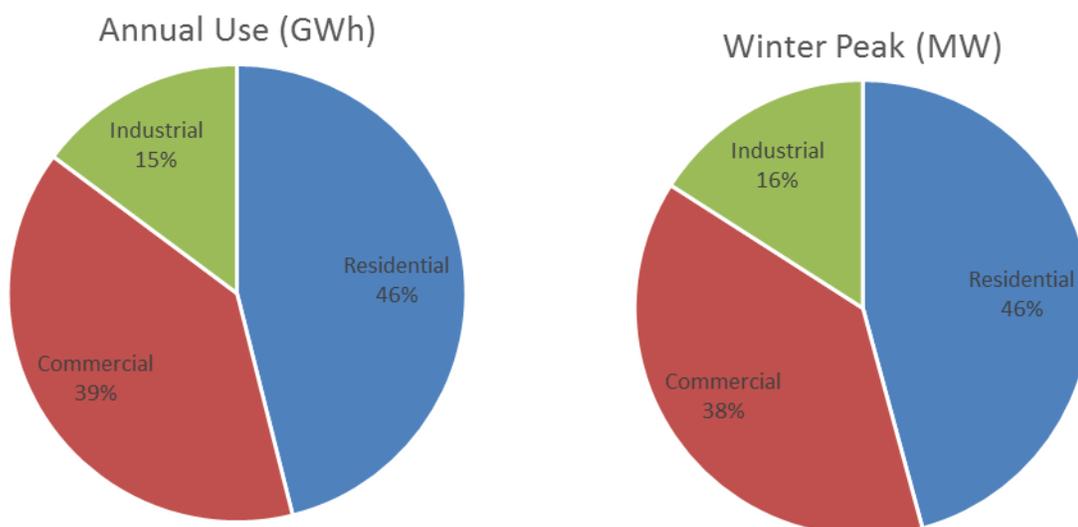


Table 3-2 Avista Sector Control Totals (2015), Idaho

Sector	Annual Electricity Use (GWh)	% of Annual Use	Winter Peak Demand (MW)	% of Winter Peak
Residential	1,161	46%	231	46%
Commercial	985	39%	193	38%
Industrial	373	15%	81	16%
<b>Total</b>	<b>2,520</b>	<b>100%</b>	<b>505</b>	<b>100%</b>

### RESIDENTIAL SECTOR

The total number of households and electricity sales for the service territory were obtained from Avista's customer database. In 2015, there were 219,546 households in the state of Washington that used a total of 2,458 GWh with winter peak demand of 505 MW. Average use per customer (or household) at 11,197 kWh is about average compared to other regions of the country. We allocated these totals into four residential segments and the values are shown in Table 3-3.

Table 3-4 shows the total number of households and electricity sales in the state of Idaho. In 2015, there were 110,289 households that used a total of 1,161 GWh with winter peak demand of 231 MW. Average use per customer (or household) was 10,530 kWh.

Table 3-3 Residential Sector Control Totals (2015), Washington

Segment	Number of Customers	Electricity Use (GWh)	% of Annual Use	Annual Use/Customer (kWh/HH)	Winter Peak (MW)
Single Family	133,484	1,721	70%	12,894	343
Multifamily	12,295	95	4%	7,737	24
Manufactured Home	7,904	92	4%	11,605	18
Low Income	65,864	550	22%	8,353	120
<b>Total</b>	<b>219,546</b>	<b>2,458</b>	<b>100%</b>	<b>11,197</b>	<b>505</b>

Table 3-4 Residential Sector Control Totals (2015), Idaho

Segment	Number of Customers	Electricity Use (GWh)	% of Annual Use	Annual Use/Customer (kWh/HH)	Winter Peak (MW)
Single Family	67,055	811	70%	12,094	160
Multifamily	5,404	39	3%	7,249	9
Manufactured Home	4,963	54	5%	10,873	10
Low Income	32,866	257	22%	7,826	52
<b>Total</b>	<b>110,289</b>	<b>1,161</b>	<b>100%</b>	<b>10,530</b>	<b>231</b>

As we describe in the previous chapter, the market profiles provide the foundation for development of the baseline projection and the potential estimates. The average market profile for the residential sector is presented in Table 3-5 (WA) and Table 3-6 (ID). Segment-specific market profiles are presented in Appendix A.

Figure 3-3 (WA) and Figure 3-4 (ID) show the distribution of annual electricity use by end use for all customers. Two main electricity end uses—appliances and space heating—account for approximately 50% of total use. Appliances include refrigerators, freezers, stoves, clothes washers, clothes dryers, dishwashers, and microwaves. The remainder of the energy falls into the water heating, lighting, cooling, electronics, and the miscellaneous category – which is comprised of furnace fans, pool pumps, electric vehicles, and other “plug” loads (all other usage not covered by those listed in Table 3-5 and Table 3-6 such as hair dryers, power tools, coffee makers, etc.).

The charts also show estimates of winter peak demand by end use. As expected, heating is the largest contributor to winter peak demand, followed by appliances, lighting, and water heating.

Figure 3-5 (WA) and Figure 3-6 (ID) present the electricity intensities by end use and housing type. Single family homes have the highest use per customer at 12,894 kWh/year (WA) and 12,094 kWh/year (ID).

Figure 3-3 Residential Electricity Use and Winter Peak Demand by End Use (2015), Washington

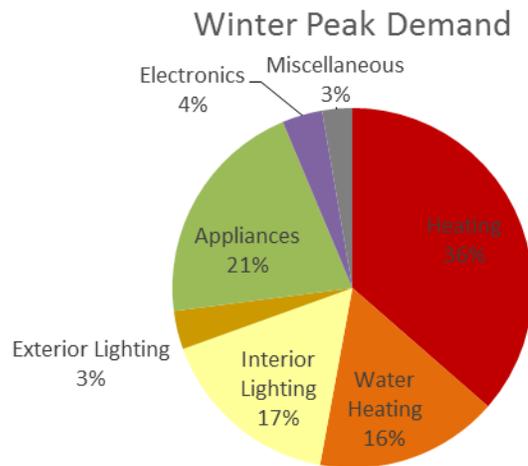
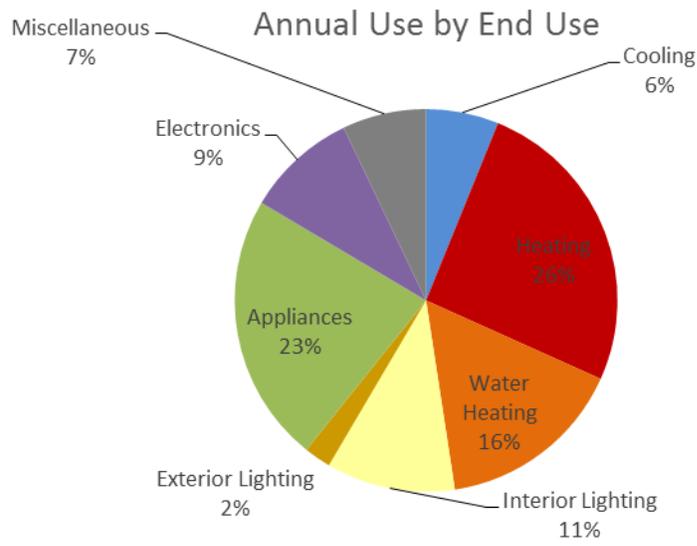


Figure 3-4 Residential Electricity Use and Winter Peak Demand by End Use (2015), Idaho

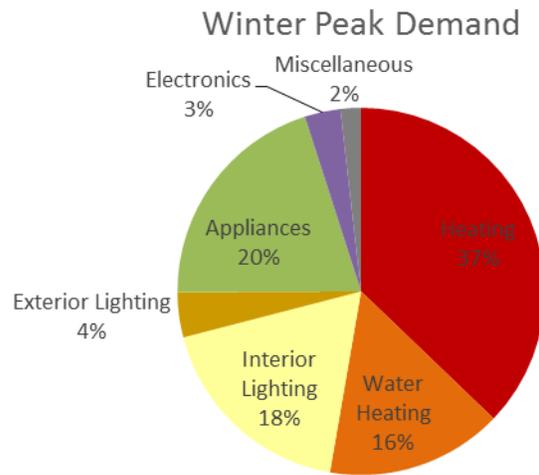
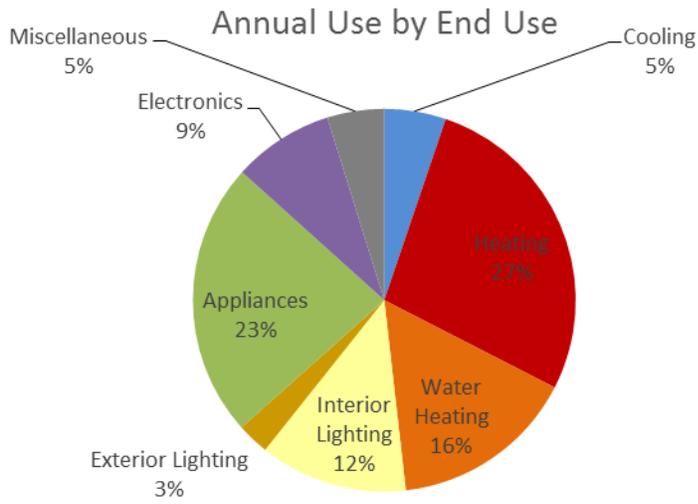


Figure 3-5 Residential Intensity by End Use and Segment (Annual kWh/HH, 2015), Washington

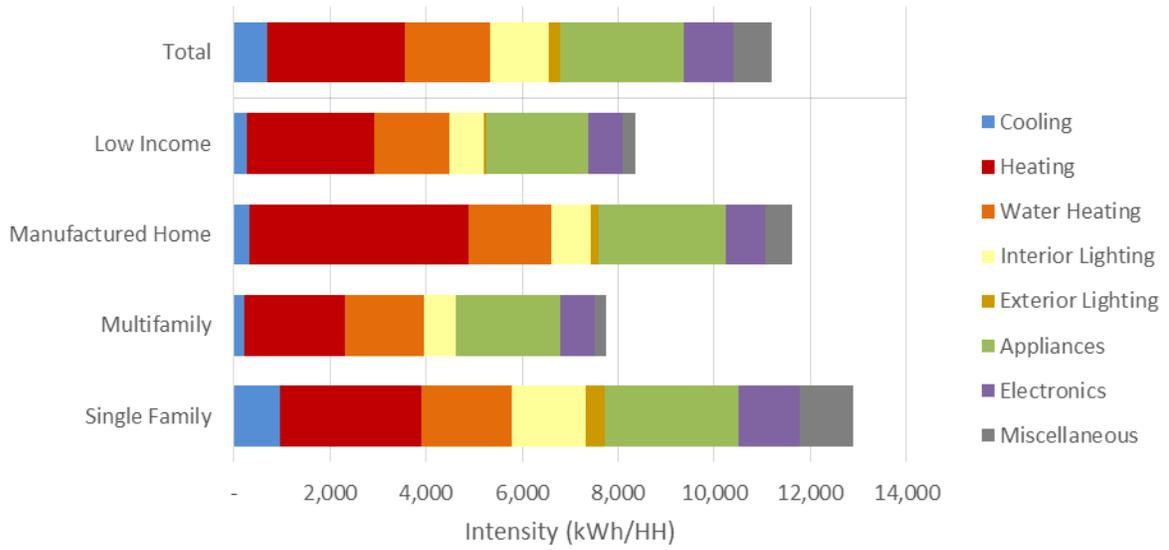


Figure 3-6 Residential Intensity by End Use and Segment (Annual kWh/HH, 2015), Idaho

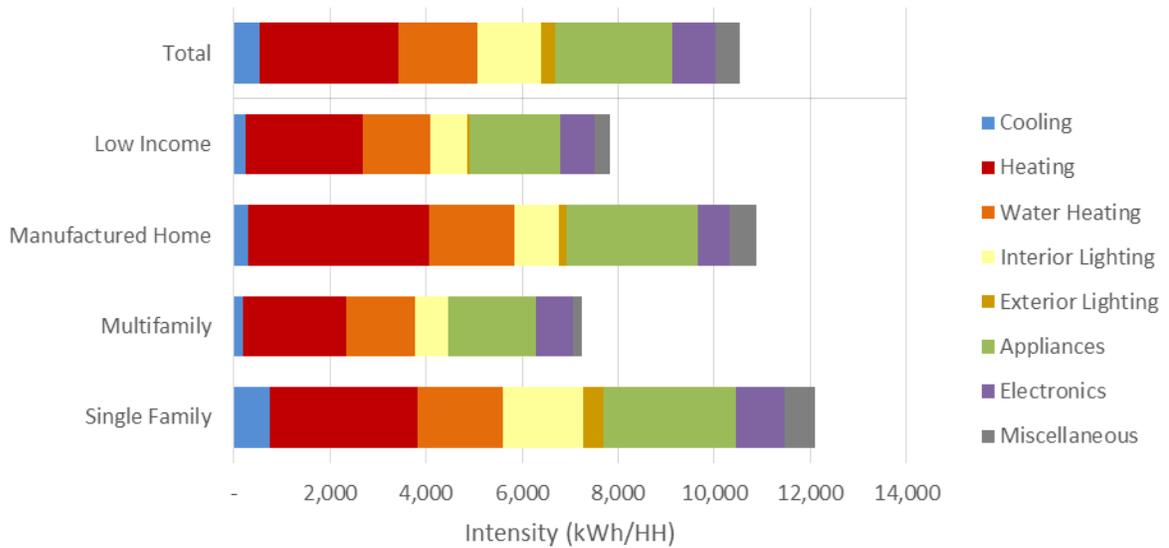


Table 3-5 Average Market Profile for the Residential Sector, 2015, Washington

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	37.30%	1,303	486	107
Cooling	Room AC	26.23%	384	101	22
Cooling	Air-Source Heat Pump	6.72%	1,298	87	19
Cooling	Geothermal Heat Pump	0.19%	1,384	3	1
Cooling	Evaporative AC	1.21%	844	10	2
Space Heating	Electric Room Heat	24.29%	4,746	1,153	253
Space Heating	Electric Furnace	13.30%	8,139	1,082	238
Space Heating	Air-Source Heat Pump	6.72%	9,232	621	136
Space Heating	Geothermal Heat Pump	0.19%	5,007	9	2
Water Heating	Water Heater (<= 55 Gal)	51.42%	3,033	1,560	342
Water Heating	Water Heater (> 55 Gal)	6.81%	3,189	217	48
Interior Lighting	General Service Screw-In	100.00%	868	868	191
Interior Lighting	Linear Lighting	100.00%	90	90	20
Interior Lighting	Exempted Screw-In	100.00%	261	261	57
Exterior Lighting	Screw-in	100.00%	253	253	56
Appliances	Clothes Washer	92.47%	91	84	18
Appliances	Clothes Dryer	50.62%	745	377	83
Appliances	Dishwasher	78.40%	414	325	71
Appliances	Refrigerator	100.00%	771	771	169
Appliances	Freezer	55.57%	620	344	76
Appliances	Second Refrigerator	20.77%	940	195	43
Appliances	Stove/Oven	70.85%	452	320	70
Appliances	Microwave	97.20%	138	134	29
Electronics	Personal Computers	65.03%	192	125	27
Electronics	Monitor	77.06%	81	62	14
Electronics	Laptops	91.59%	50	46	10
Electronics	TVs	180.64%	255	460	101
Electronics	Printer/Fax/Copier	73.42%	65	47	10
Electronics	Set-top Boxes/DVRs	166.76%	119	199	44
Electronics	Devices and Gadgets	100.00%	112	112	25
Miscellaneous	Electric Vehicles	0.18%	4,324	8	2
Miscellaneous	Pool Pump	1.93%	2,514	49	11
Miscellaneous	Pool Heater	0.48%	4,025	19	4
Miscellaneous	Furnace Fan	59.05%	187	111	24
Miscellaneous	Well pump	9.31%	642	60	13
Miscellaneous	Miscellaneous	100.00%	547	547	120
<b>Total</b>				<b>11,197</b>	<b>2,458</b>

Table 3-6 Average Market Profile for the Residential Sector, 2015, Idaho

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	33.84%	1,161	393	43
Cooling	Room AC	18.46%	386	71	8
Cooling	Air-Source Heat Pump	5.48%	1,301	71	8
Cooling	Geothermal Heat Pump	0.00%	0	0	0
Cooling	Evaporative AC	1.54%	796	12	1
Space Heating	Electric Room Heat	24.23%	5,586	1,353	149
Space Heating	Electric Furnace	12.99%	7,848	1,020	112
Space Heating	Air-Source Heat Pump	5.48%	9,220	505	56
Space Heating	Geothermal Heat Pump	0.00%	0	0	0
Water Heating	Water Heater (<= 55 Gal)	49.79%	2,910	1,449	160
Water Heating	Water Heater (> 55 Gal)	6.60%	3,059	202	22
Interior Lighting	General Service Screw-In	100.00%	967	967	107
Interior Lighting	Linear Lighting	100.00%	123	123	14
Interior Lighting	Exempted Screw-In	100.00%	226	226	25
Exterior Lighting	Screw-in	100.00%	286	286	32
Appliances	Clothes Washer	85.56%	86	73	8
Appliances	Clothes Dryer	60.89%	751	457	50
Appliances	Dishwasher	78.87%	388	306	34
Appliances	Refrigerator	100.00%	725	725	80
Appliances	Freezer	52.50%	588	309	34
Appliances	Second Refrigerator	21.15%	866	183	20
Appliances	Stove/Oven	64.06%	428	274	30
Appliances	Microwave	93.43%	129	121	13
Electronics	Personal Computers	57.60%	177	102	11
Electronics	Monitor	68.26%	75	51	6
Electronics	Laptops	95.17%	46	44	5
Electronics	TVs	177.78%	245	436	48
Electronics	Printer/Fax/Copier	67.53%	60	41	4
Electronics	Set-top Boxes/DVRs	107.21%	111	119	13
Electronics	Devices and Gadgets	100.00%	105	105	12
Miscellaneous	Electric Vehicles	0.06%	4,324	3	0
Miscellaneous	Pool Pump	1.61%	2,300	37	4
Miscellaneous	Pool Heater	0.40%	3,682	15	2
Miscellaneous	Furnace Fan	60.01%	180	108	12
Miscellaneous	Well pump	12.52%	587	73	8
Miscellaneous	Miscellaneous	100.00%	271	271	30
<b>Total</b>				<b>10,530</b>	<b>1,161</b>

## COMMERCIAL SECTOR

The total electric energy consumed by commercial customers in Avista's service area in 2015 was 2,148 GWh (WA) and 985 GWh (ID). Avista billing data, CBSA and secondary data were used to allocate this energy usage to building type segments and to develop estimates of energy intensity (annual kWh/square foot). Using the electricity use and intensity estimates, we infer floor space which is the unit of analysis in LoadMAP for the commercial sector. The values are shown in Table 3-7 (WA) and Table 3-8 (ID). The average building intensities by segment are based on regional information from the CBSA, therefore the intensity is the same both states. However, due to the different mix of building types overall end use mix is different as shown in Figure 3-9 and Figure 3-10.

Table 3-7 Commercial Sector Control Totals (2015), Washington

Segment	Electricity Sales (GWh)	% of Total Usage	Intensity (Annual kWh/SqFt)
Small Office	288	13%	15.3
Large Office	109	5%	17.4
Restaurant	72	3%	42.0
Retail	294	14%	13.7
Grocery	215	10%	46.8
College	80	4%	13.8
School	121	6%	9.7
Health	279	13%	28.8
Lodging	115	5%	15.9
Warehouse	106	5%	7.4
Miscellaneous	468	22%	13.6
<b>Total</b>	<b>2,148</b>	<b>100%</b>	<b>15.7</b>

Table 3-8 Commercial Sector Control Totals (2015), Idaho

Segment	Electricity Sales (GWh)	% of Total Usage	Intensity (Annual kWh/SqFt)
Small Office	136	6%	15.3
Large Office	17	1%	17.4
Restaurant	13	1%	42.0
Retail	169	8%	13.7
Grocery	93	4%	46.8
College	74	3%	13.8
School	111	5%	9.7
Health	107	5%	28.8
Lodging	49	2%	15.9
Warehouse	48	2%	7.4
Miscellaneous	170	8%	13.6
<b>Total</b>	<b>985</b>	<b>46%</b>	<b>14.7</b>

Figure 3-7 (WA) and Figure 3-8 (ID) show the distribution of annual electricity consumption and summer peak demand by end use across all commercial buildings. Electric usage is dominated by cooling and lighting, which comprise almost 40% of annual electricity usage. Summer peak demand is dominated by cooling.

Figure 3-9 (WA) and Figure 3-10 (ID) presents the electricity usage in GWh by end use and segment. Small offices, retail, and miscellaneous buildings use the most electricity in the service territory. As far as end uses, cooling and lighting are the major uses across all segments. Office equipment is concentrated more in the larger customers.

Figure 3-7 Commercial Sector Electricity Consumption by End Use (2015), Washington

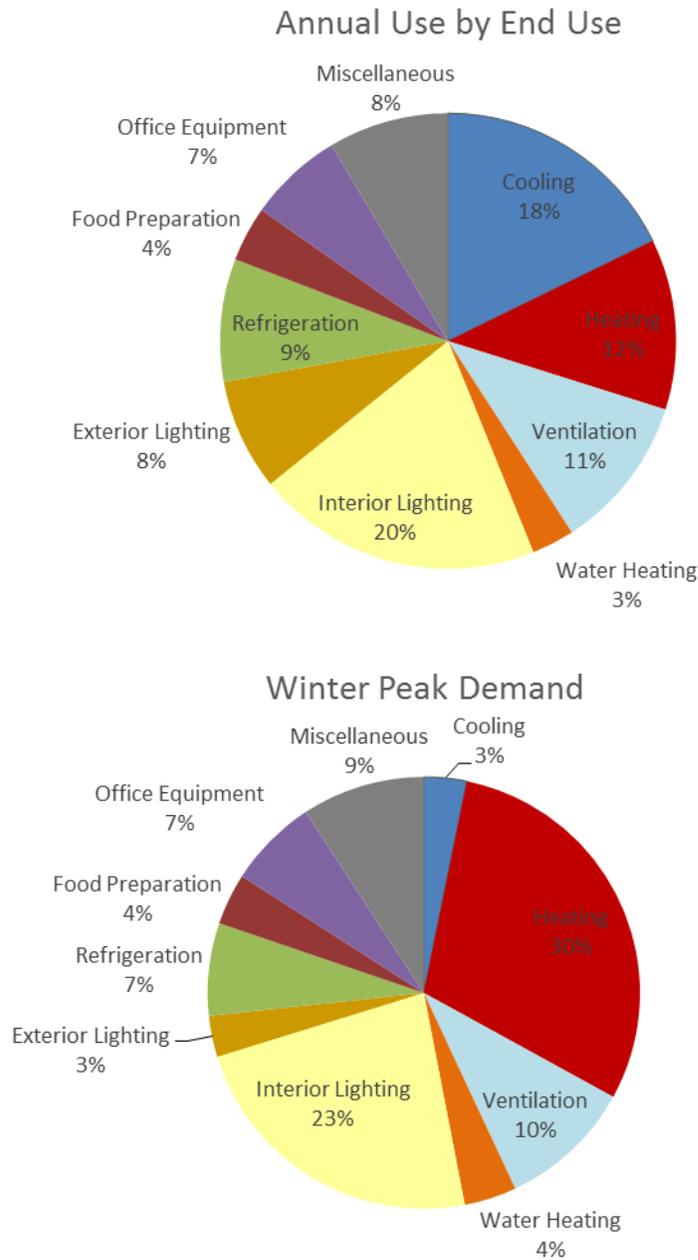


Figure 3-8 Commercial Sector Electricity Consumption by End Use (2015), Idaho

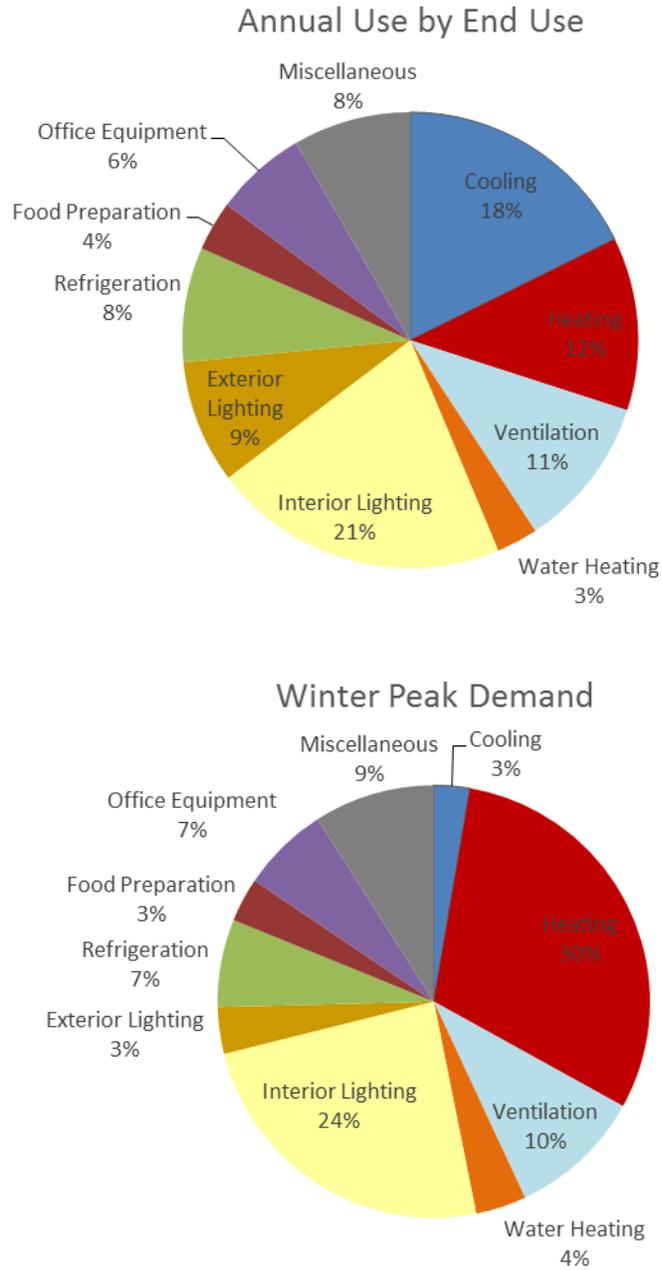


Figure 3-9 Commercial Electricity Usage by End Use Segment (GWh, 2015), Washington

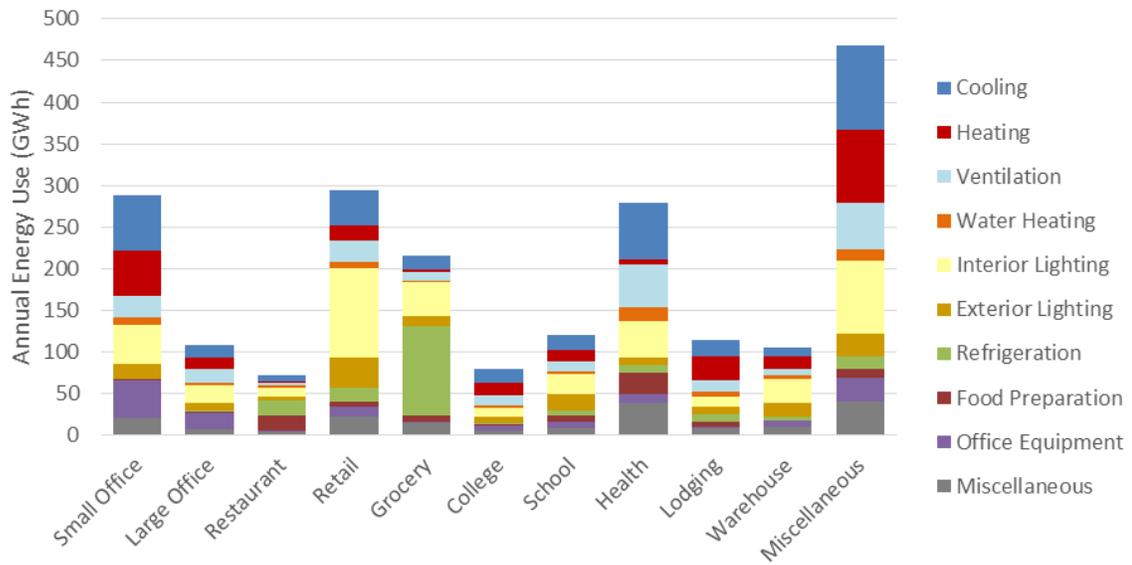


Figure 3-10 Commercial Electricity Usage by End Use Segment (GWh, 2015), Idaho

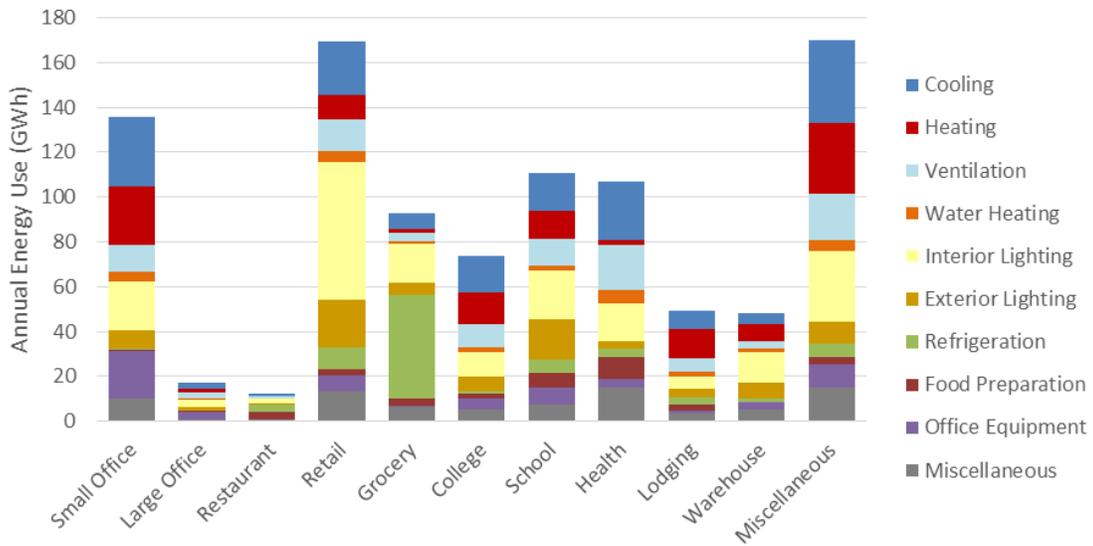


Table 3-9 (WA) and Table 3-10 (ID) show the average market profile for electricity of the commercial sector as a whole, representing a composite of all segments and buildings. Market profiles for each segment are presented in the appendix to this volume.

Table 3-9 Average Electric Market Profile for the Commercial Sector, 2015, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/sq.ft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	7.5%	4.08	0.31	42.1
Cooling	Water-Cooled Chiller	7.6%	6.55	0.50	68.1
Cooling	RTU	43.8%	3.53	1.55	211.4
Cooling	Room AC	5.2%	3.46	0.18	24.6
Cooling	Air-Source Heat Pump	6.2%	3.40	0.21	28.8
Cooling	Geothermal Heat Pump	2.3%	2.02	0.05	6.4
Heating	Electric Furnace	3.0%	9.35	0.28	38.3
Heating	Electric Room Heat	15.0%	7.24	1.09	148.9
Heating	Air-Source Heat Pump	6.2%	6.78	0.42	57.4
Heating	Geothermal Heat Pump	2.3%	4.78	0.11	15.3
Ventilation	Ventilation	100.0%	1.73	1.73	236.3
Water Heating	Water Heater	27.1%	1.76	0.48	65.1
Interior Lighting	Screw-in	100.0%	0.66	0.66	90.2
Interior Lighting	High-Bay Fixtures	100.0%	0.93	0.93	127.2
Interior Lighting	Linear Lighting	100.0%	1.60	1.60	219.1
Exterior Lighting	Screw-in	100.0%	0.28	0.28	38.6
Exterior Lighting	Area Lighting	100.0%	0.64	0.64	87.7
Exterior Lighting	Linear Lighting	100.0%	0.32	0.32	43.4
Refrigeration	Walk-in Refrigerator/Freezer	8.8%	1.96	0.17	23.6
Refrigeration	Reach-in Refrigerator/Freezer	12.3%	0.31	0.04	5.3
Refrigeration	Glass Door Display	15.6%	1.00	0.16	21.4
Refrigeration	Open Display Case	7.7%	9.75	0.76	103.3
Refrigeration	Icemaker	29.6%	0.59	0.17	23.7
Refrigeration	Vending Machine	20.2%	0.37	0.07	10.1
Food Preparation	Oven	26.0%	0.77	0.20	27.5
Food Preparation	Fryer	6.5%	1.99	0.13	17.8
Food Preparation	Dishwasher	13.2%	1.67	0.22	30.2
Food Preparation	Steamer	5.2%	0.78	0.04	5.6
Food Preparation	Hot Food Container	10.5%	0.22	0.02	3.1
Office Equipment	Desktop Computer	100.0%	0.57	0.57	77.6
Office Equipment	Laptop	98.8%	0.08	0.08	10.3
Office Equipment	Server	86.8%	0.25	0.22	29.9
Office Equipment	Monitor	100.0%	0.10	0.10	13.7
Office Equipment	Printer/Copier/Fax	100.0%	0.07	0.07	9.2
Office Equipment	POS Terminal	37.8%	0.06	0.02	3.2
Miscellaneous	Non-HVAC Motors	53.0%	0.23	0.12	16.5
Miscellaneous	Pool Pump	12.2%	0.02	0.00	0.3
Miscellaneous	Pool Heater	7.5%	0.02	0.00	0.2
Miscellaneous	Other Miscellaneous	100.0%	1.22	1.22	166.3
<b>Total</b>				<b>15.70</b>	<b>2,147.7</b>

Table 3-10 Average Electric Market Profile for the Commercial Sector, 2015, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/sq.ft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	9.0%	3.90	0.35	23.5
Cooling	Water-Cooled Chiller	6.5%	6.52	0.43	28.5
Cooling	RTU	43.1%	3.38	1.46	97.8
Cooling	Room AC	4.9%	3.38	0.17	11.2
Cooling	Air-Source Heat Pump	6.1%	3.18	0.19	13.0
Cooling	Geothermal Heat Pump	2.4%	1.85	0.04	2.9
Heating	Electric Furnace	2.4%	9.12	0.22	14.6
Heating	Electric Room Heat	14.1%	7.47	1.05	70.4
Heating	Air-Source Heat Pump	6.1%	6.71	0.41	27.5
Heating	Geothermal Heat Pump	2.4%	4.82	0.11	7.6
Ventilation	Ventilation	100.0%	1.59	1.59	106.3
Water Heating	Water Heater	26.3%	1.65	0.43	28.9
Interior Lighting	Screw-in	100.0%	0.61	0.61	41.1
Interior Lighting	High-Bay Fixtures	100.0%	0.97	0.97	65.2
Interior Lighting	Linear Lighting	100.0%	1.50	1.50	100.7
Exterior Lighting	Screw-in	100.0%	0.29	0.29	19.4
Exterior Lighting	Area Lighting	100.0%	0.63	0.63	42.4
Exterior Lighting	Linear Lighting	100.0%	0.37	0.37	24.5
Refrigeration	Walk-in Refrigerator/Freezer	8.8%	1.39	0.12	8.2
Refrigeration	Reach-in Refrigerator/Freezer	13.7%	0.28	0.04	2.5
Refrigeration	Glass Door Display	15.4%	0.87	0.13	9.0
Refrigeration	Open Display Case	8.4%	8.01	0.67	45.1
Refrigeration	Icemaker	31.6%	0.51	0.16	10.7
Refrigeration	Vending Machine	20.0%	0.34	0.07	4.6
Food Preparation	Oven	27.2%	0.67	0.18	12.1
Food Preparation	Fryer	5.2%	1.45	0.08	5.1
Food Preparation	Dishwasher	15.0%	1.32	0.20	13.2
Food Preparation	Steamer	7.5%	0.61	0.05	3.0
Food Preparation	Hot Food Container	11.0%	0.17	0.02	1.2
Office Equipment	Desktop Computer	100.0%	0.53	0.53	35.5
Office Equipment	Laptop	98.9%	0.07	0.07	4.4
Office Equipment	Server	89.1%	0.21	0.18	12.3
Office Equipment	Monitor	100.0%	0.09	0.09	6.3
Office Equipment	Printer/Copier/Fax	100.0%	0.06	0.06	4.3
Office Equipment	POS Terminal	38.9%	0.06	0.02	1.6
Miscellaneous	Non-HVAC Motors	51.6%	0.21	0.11	7.3
Miscellaneous	Pool Pump	15.7%	0.02	0.00	0.2
Miscellaneous	Pool Heater	11.8%	0.02	0.00	0.1
Miscellaneous	Other Miscellaneous	100.0%	1.09	1.09	73.1
<b>Total</b>				<b>14.71</b>	<b>985.1</b>

## INDUSTRIAL SECTOR

The total electricity used in 2015 by Avista's industrial customers was 1,355 GWh; 982 GWh (WA) and 373 GWh (ID). Avista billing data and load forecast, NEEA's IFSA, and secondary sources were used to develop estimates of energy intensity (annual kWh/employee). Using the electricity use and intensity estimates, we infer the number of employees which is the unit of analysis in LoadMAP for the industrial sector. These are shown in Table 3-11.

Table 3-11 Industrial Sector Control Totals (2015)

State	Electricity Sales (GWh)	Intensity (Annual kWh/employee)
Washington	982	58,135
Idaho	373	41,937

Figure 3-12 shows the distribution of annual electricity consumption and summer peak demand by end use for all industrial customers. Motors are the largest overall end use for the industrial sector, accounting for 54% of energy use. Note that this end use includes a wide range of industrial equipment, such as air compressors and refrigeration compressors, pumps, conveyor motors, and fans. The process end use accounts for 27% of annual energy use, which includes heating, cooling, refrigeration, and electro-chemical processes. Lighting is the next highest, followed by cooling, miscellaneous, heating and ventilation.

Table 3-12 and Table 3-13 show the composite market profile for the industrial sector.

Figure 3-11 Industrial Electricity Use by End Use (2015), All Industries, WA

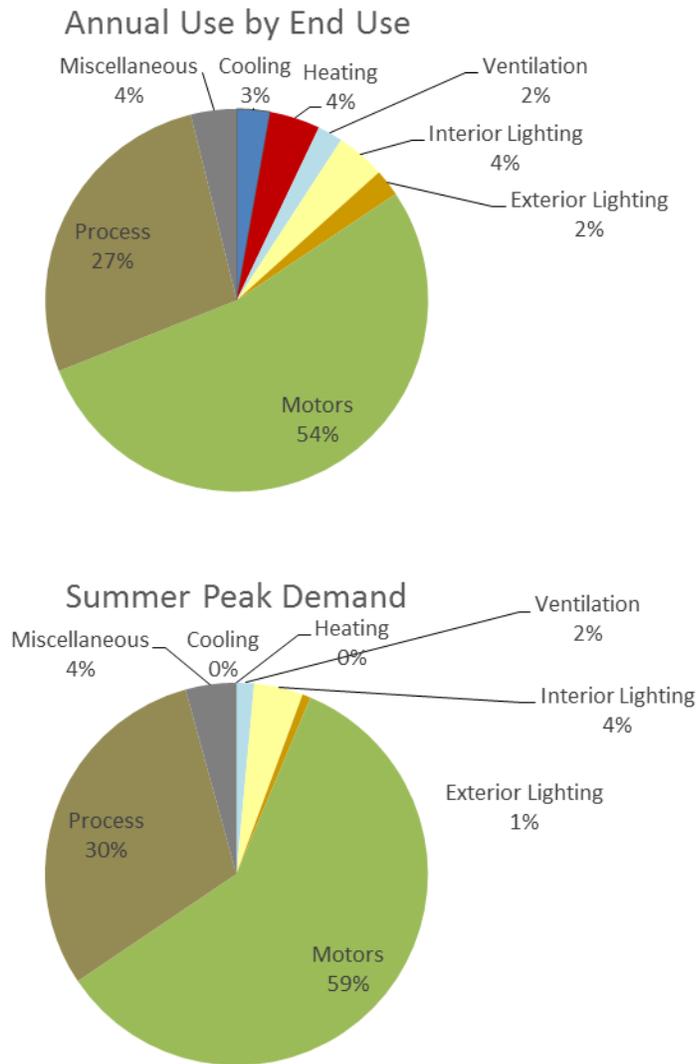


Figure 3-12 Industrial Electricity Use by End Use (2015), All Industries, ID

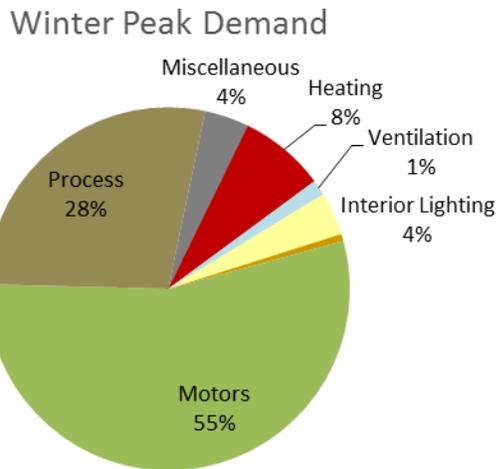
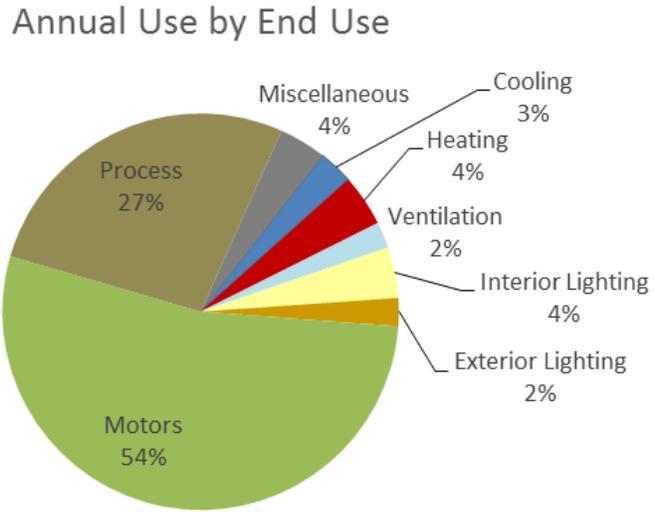


Table 3-12 Average Electric Market Profile for the Industrial Sector, 2015, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/employee)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.5%	8,461	212	3.57
Cooling	Water-Cooled Chiller	2.5%	9,699	242	4.10
Cooling	RTU	11.3%	9,133	1,029	17.38
Cooling	Air-Source Heat Pump	1.7%	8,319	143	2.41
Cooling	Geothermal Heat Pump	0.0%	5,549	0	0.00
Heating	Electric Furnace	2.1%	17,566	367	6.20
Heating	Electric Room Heat	11.3%	16,730	1,890	31.94
Heating	Air-Source Heat Pump	1.7%	13,131	226	3.81
Heating	Geothermal Heat Pump	0.0%	8,758	0	0.00
Ventilation	Ventilation	100.0%	1,233	1,233	20.83
Interior Lighting	Screw-in	100.0%	145	145	2.44
Interior Lighting	High-Bay Fixtures	100.0%	1,781	1,781	30.09
Interior Lighting	Linear Lighting	100.0%	486	486	8.21
Exterior Lighting	Screw-in	100.0%	177	177	2.99
Exterior Lighting	HID	100.0%	888	888	15.00
Exterior Lighting	Linear Lighting	100.0%	263	263	4.44
Motors	Pumps	100.0%	8,050	8,050	136.02
Motors	Fans & Blowers	100.0%	4,157	4,157	70.25
Motors	Compressed Air	100.0%	3,415	3,415	57.70
Motors	Material Handling	100.0%	14,470	14,470	244.50
Motors	Other Motors	100.0%	923	923	15.60
Process	Process Heating	100.0%	6,253	6,253	105.66
Process	Process Cooling	100.0%	2,051	2,051	34.65
Process	Process Refrigeration	100.0%	2,051	2,051	34.65
Process	Process Electrochemical	100.0%	4,063	4,063	68.65
Process	Process Other	100.0%	1,376	1,376	23.25
Miscellaneous	Miscellaneous	100.0%	2,247	2,247	37.96
<b>Total</b>				<b>58,135</b>	<b>982.31</b>

Table 3-13 Average Electric Market Profile for the Industrial Sector, 2015, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/employee)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.5%	6,171	154	1.37
Cooling	Water-Cooled Chiller	2.5%	7,074	177	1.57
Cooling	RTU	11.3%	6,662	750	6.67
Cooling	Air-Source Heat Pump	1.7%	6,068	104	0.93
Cooling	Geothermal Heat Pump	0.0%	4,047	0	0.00
Heating	Electric Furnace	2.1%	12,568	263	2.34
Heating	Electric Room Heat	11.3%	11,970	1,353	12.03
Heating	Air-Source Heat Pump	1.7%	9,395	161	1.44
Heating	Geothermal Heat Pump	0.0%	6,266	0	0.00
Ventilation	Ventilation	100.0%	891	891	7.93
Interior Lighting	Screw-in	100.0%	104	104	0.93
Interior Lighting	High-Bay Fixtures	100.0%	1,285	1,285	11.43
Interior Lighting	Linear Lighting	100.0%	350	350	3.12
Exterior Lighting	Screw-in	100.0%	128	128	1.14
Exterior Lighting	HID	100.0%	640	640	5.70
Exterior Lighting	Linear Lighting	100.0%	190	190	1.69
Motors	Pumps	100.0%	5,807	5,807	51.67
Motors	Fans & Blowers	100.0%	2,999	2,999	26.68
Motors	Compressed Air	100.0%	2,463	2,463	21.92
Motors	Material Handling	100.0%	10,438	10,438	92.87
Motors	Other Motors	100.0%	666	666	5.93
Process	Process Heating	100.0%	4,511	4,511	40.13
Process	Process Cooling	100.0%	1,479	1,479	13.16
Process	Process Refrigeration	100.0%	1,479	1,479	13.16
Process	Process Electrochemical	100.0%	2,931	2,931	26.07
Process	Process Other	100.0%	993	993	8.83
Miscellaneous	Miscellaneous	100.0%	1,621	1,621	14.42
<b>Total</b>				<b>41,937</b>	<b>373.11</b>

# 4

## **BASILINE PROJECTION**

Prior to developing estimates of energy-efficiency potential, we developed a baseline end-use projection to quantify what the consumption is likely to be in the future and in absence of any future conservation programs. The savings from past programs are embedded in the forecast, but the baseline projection assumes that those past programs cease to exist in the future. Possible savings from future programs are captured by the potential estimates.

The baseline projection incorporates assumptions about:

- Customer population and economic growth
- Appliance/equipment standards and building codes already mandated (see Chapter 2)
- Forecasts of future electricity prices and other drivers of consumption
- Trends in fuel shares and appliance saturations and assumptions about miscellaneous electricity growth

Although it aligns closely with it, the baseline projection is not Avista's official load forecast. Rather it was developed to serve as the metric against which EE potentials are measured. This chapter presents the baseline projections we developed for this study. Below, we present the baseline projections for each sector and state, which include projections of annual use in GWh and summer peak demand in MW. We also present a summary across all sectors.

Please note that the base-year for the study is 2015. Annual energy use and summer peak demand values for 2015 and half of 2016 reflect actual weather. In future years, energy use and peak demand reflect normal weather, as defined by Avista. In the figures below, the shift from actual to normal weather is apparent in the increase in energy use and peak demand in 2017 for the residential and commercial sectors. This results from the fact that 2015 was cooler than normal.

### **RESIDENTIAL SECTOR**

#### **ANNUAL USE**

Table 4-1 (WA) and Table 4-2 (ID) present the baseline projection for electricity at the end-use level for the residential sector as a whole. Overall in Washington, residential use increases from 2,458 GWh in 2015 to 2,950 GWh in 2037, an increase of 20%. Residential use in Idaho increases from 1,161 GWh in 2015 to 1,417 GWh in 2037, an increase of 22%. This reflects a substantial customer growth forecast in both states. Figure 4-1 (WA) and Figure 4-3 (ID) display the graphical representation of the baseline projection.

Figure 4-2 (WA) and Figure 4-4 (ID) present the baseline projection of annual electricity use per household. Most noticeable is that lighting use decreases throughout the time period as the lighting standards from EISA come into effect. Heating usage increases over the forecast due to going from actual weather in 2015 to normal weather in 2017 and for the rest of the forecast.

Table 4-1 Residential Baseline Sales Projection by End Use (GWh), Washington

End Use	2015	2018	2019	2022	2027	2037	% Change ('15-'37)
Cooling	151	131	132	139	150	172	14%
Heating	629	755	757	766	783	818	30%
Water Heating	390	394	394	397	401	419	7%
Interior Lighting	268	246	238	191	144	143	-47%
Exterior Lighting	56	50	48	37	25	23	-58%
Appliances	560	569	573	585	607	655	17%
Electronics	231	243	244	252	272	330	43%
Miscellaneous	174	219	238	303	354	389	123%
<b>Total</b>	<b>2,458</b>	<b>2,605</b>	<b>2,625</b>	<b>2,670</b>	<b>2,735</b>	<b>2,950</b>	<b>20.0%</b>

Figure 4-1 Residential Baseline Projection by End Use (GWh), Washington

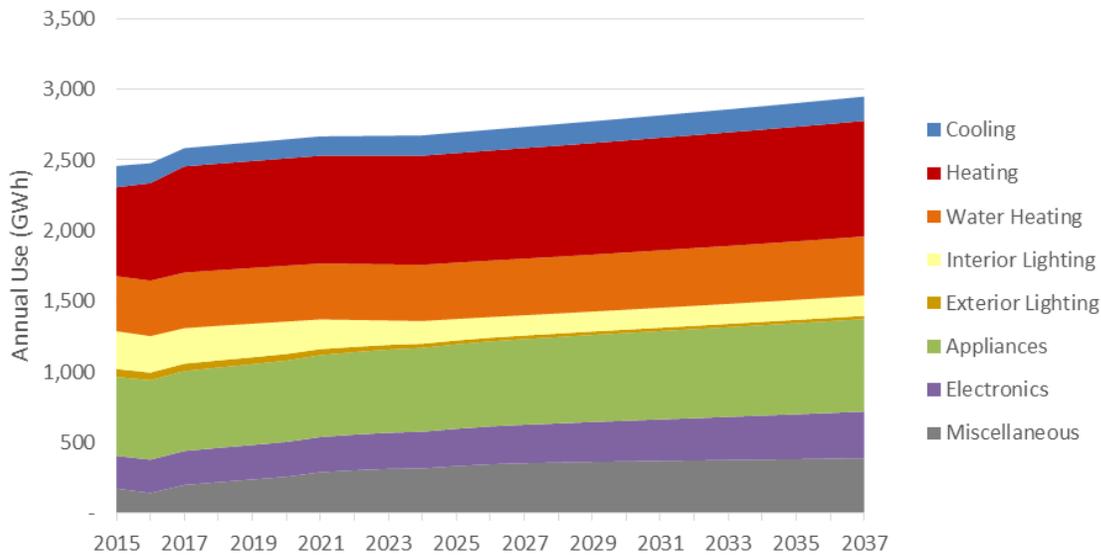


Figure 4-2 Residential Baseline Projection by End Use – Annual Use per Household, Washington

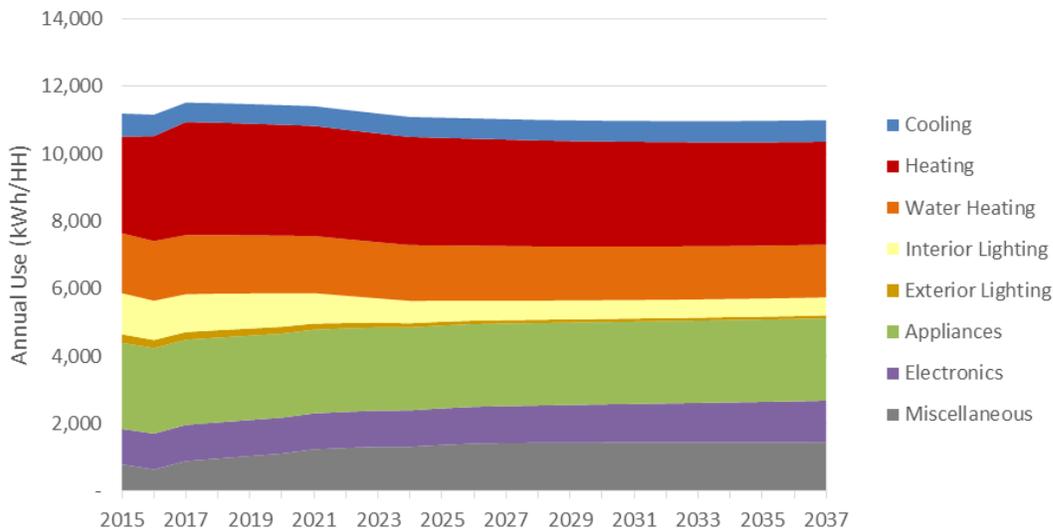


Table 4-2 Residential Baseline Sales Projection by End Use (GWh), Idaho

End Use	2015	2018	2019	2022	2027	2037	% Change ('15-'37)
Cooling	60	52	53	55	60	69	13%
Heating	317	381	383	387	396	413	30%
Water Heating	182	184	184	185	187	196	8%
Interior Lighting	145	131	126	101	75	74	-49%
Exterior Lighting	32	28	27	21	14	13	-58%
Appliances	270	275	276	282	293	317	17%
Electronics	99	105	106	111	121	149	50%
Miscellaneous	56	88	100	140	167	187	234%
<b>Total</b>	<b>1,161</b>	<b>1,244</b>	<b>1,256</b>	<b>1,283</b>	<b>1,314</b>	<b>1,417</b>	<b>22.1%</b>

Figure 4-3 Residential Baseline Projection by End Use (GWh), Idaho

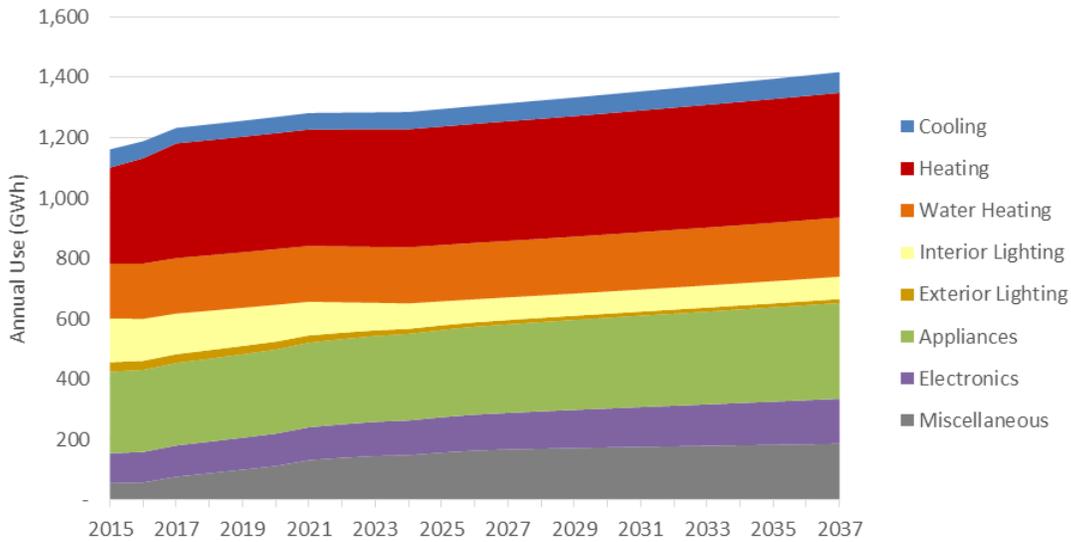
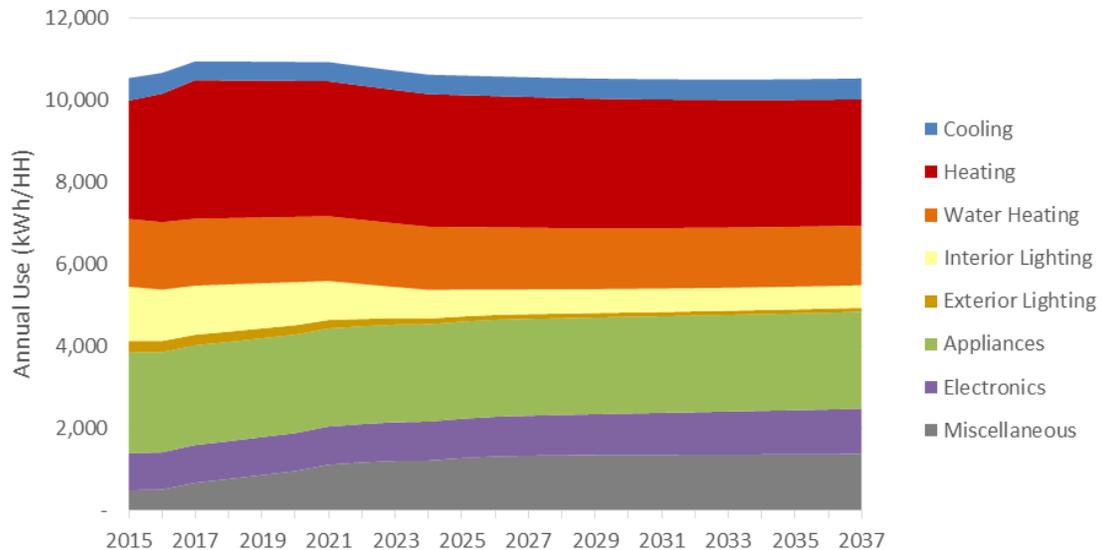


Figure 4-4 Residential Baseline Sales Projection by End Use – Annual Use per Household, Idaho



## COMMERCIAL SECTOR BASELINE PROJECTIONS

### ANNUAL USE

In Washington, annual electricity use in the commercial sector grows during the overall forecast horizon, starting at 2,148 GWh in 2015, and increasing to 2,282 in 2037, an increase of 6%. In Idaho, annual electricity use grows from 985 GWh in 2015 to 1,042 GWh in 2037, also an increase of 6%. The tables and graphs below present the baseline projection at the end-use level for the commercial sector as a whole. Usage in lighting is declining throughout the forecast, due largely to the phasing in of codes and standards such as the EISA 2007 lighting standards. Usage in commercial cooling decreases over the forecast due to going from actual weather in 2015 to weather-normal in 2017 for the forecast.

Table 4-3 Commercial Baseline Sales Projection by End Use (GWh), Washington

End Use	2015	2018	2019	2022	2027	2037	% Change (‘15-‘37)
Cooling	381	336	342	359	373	399	5%
Heating	260	320	323	332	336	346	33%
Ventilation	236	233	232	229	221	216	-9%
Water Heating	65	69	71	74	76	78	20%
Interior Lighting	436	440	441	414	400	396	-9%
Exterior Lighting	170	172	173	162	156	154	-10%
Refrigeration	187	185	184	181	174	172	-8%
Food Preparation	84	87	88	91	94	101	21%
Office Equipment	144	151	153	159	165	175	21%
Miscellaneous	183	125	113	128	164	245	34%
<b>Total</b>	<b>2,148</b>	<b>2,118</b>	<b>2,121</b>	<b>2,128</b>	<b>2,158</b>	<b>2,282</b>	<b>6.2%</b>

Table 4-4 Commercial Baseline Sales Projection by End Use (GWh), Idaho

End Use	2015	2018	2019	2022	2027	2037	% Change (‘15-‘37)
Cooling	174	153	156	163	169	181	4%
Heating	121	149	150	154	156	160	33%
Ventilation	106	105	105	104	100	99	-7%
Water Heating	29	31	31	33	34	35	20%
Interior Lighting	207	209	210	196	190	188	-9%
Exterior Lighting	86	88	89	84	81	80	-7%
Refrigeration	80	79	79	78	75	74	-7%
Food Preparation	35	36	36	37	39	41	19%
Office Equipment	64	67	68	71	74	78	22%
Miscellaneous	82	56	48	52	69	106	29%
<b>Total</b>	<b>985</b>	<b>973</b>	<b>973</b>	<b>972</b>	<b>986</b>	<b>1,042</b>	<b>5.8%</b>

Figure 4-5 Commercial Baseline Projection by End Use, Washington

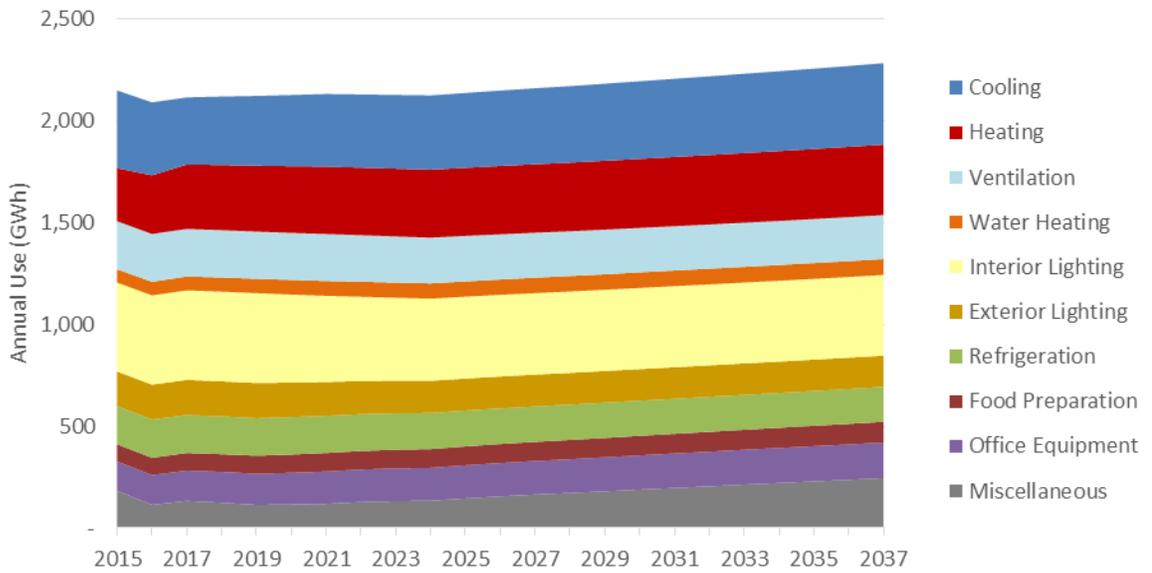
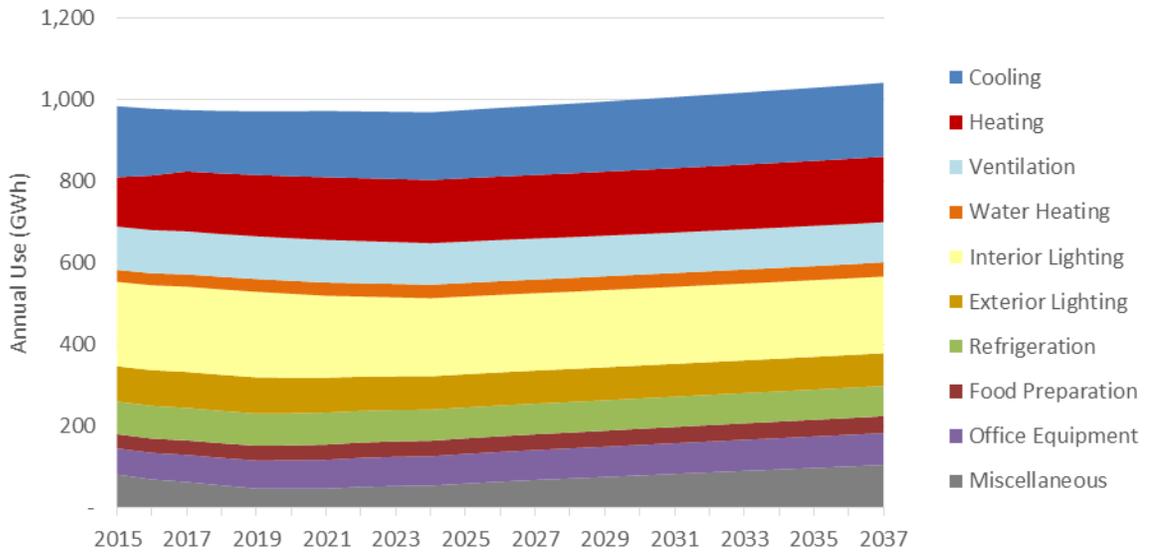


Figure 4-6 Commercial Baseline Projection by End Use, Idaho



## INDUSTRIAL SECTOR BASELINE PROJECTIONS

### ANNUAL USE

Annual industrial use increases almost 11% through the forecast horizon, driven primarily by expected customer growth. The tables and graphs below present the projection at the end-use level. Overall in Washington, industrial annual electricity use increases from 982 GWh in 2015 to 1,092 GWh in 2037. In Idaho, annual electricity use increases from 373 GWh in 2015 to 402 GWh in 2037.

Table 4-5 Industrial Baseline Projection by End Use (GWh), Washington

End Use	2015	2018	2019	2022	2027	2037	% Change ('15-'37)
Cooling	27	27	27	28	29	30	10%
Heating	42	41	42	43	44	46	11%
Ventilation	21	20	20	20	20	21	1%
Interior Lighting	41	39	39	39	39	39	-3%
Exterior Lighting	22	20	20	20	19	19	-17%
Process	267	263	267	275	282	297	11%
Motors	524	517	525	541	555	583	11%
Miscellaneous	38	41	43	47	51	56	48%
<b>Total</b>	<b>982</b>	<b>969</b>	<b>984</b>	<b>1,014</b>	<b>1,039</b>	<b>1,092</b>	<b>11.1%</b>

Table 4-6 Industrial Baseline Projection by End Use (GWh), Idaho

End Use	2015	2018	2019	2022	2027	2037	% Change ('15-'37)
Cooling	11	11	11	11	11	12	12%
Heating	16	16	16	17	17	18	13%
Ventilation	8	8	8	8	8	8	2%
Interior Lighting	15	16	16	15	15	15	-1%
Exterior Lighting	9	8	8	8	7	7	-16%
Process	101	106	106	107	109	115	13%
Motors	199	207	208	209	214	225	13%
Miscellaneous	14	16	17	18	20	22	50%
<b>Total</b>	<b>373</b>	<b>389</b>	<b>389</b>	<b>392</b>	<b>402</b>	<b>422</b>	<b>13.1%</b>

Figure 4-7 Industrial Baseline Projection by End Use (GWh), Washington

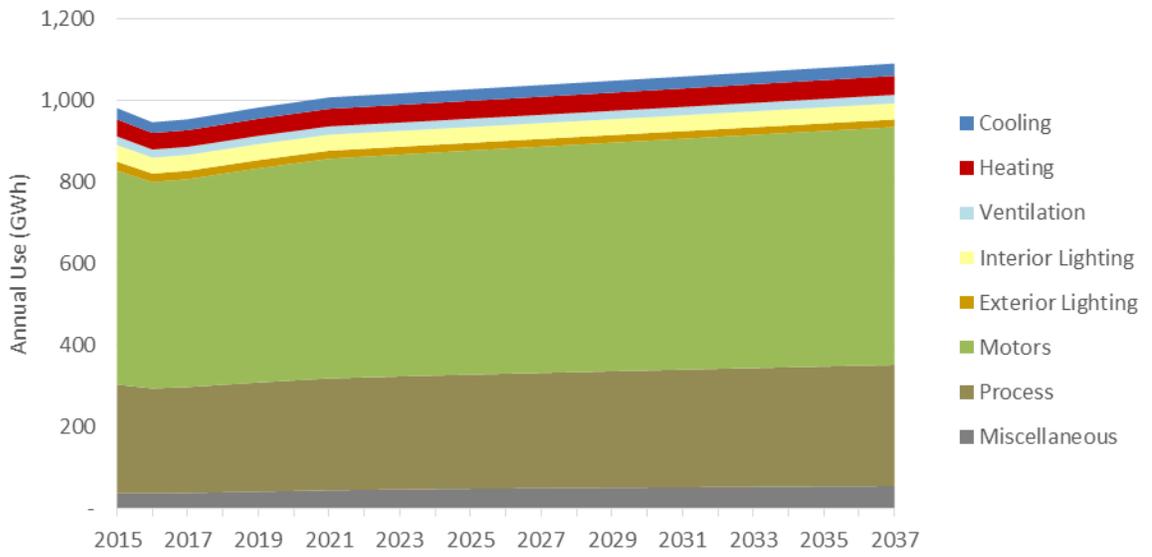
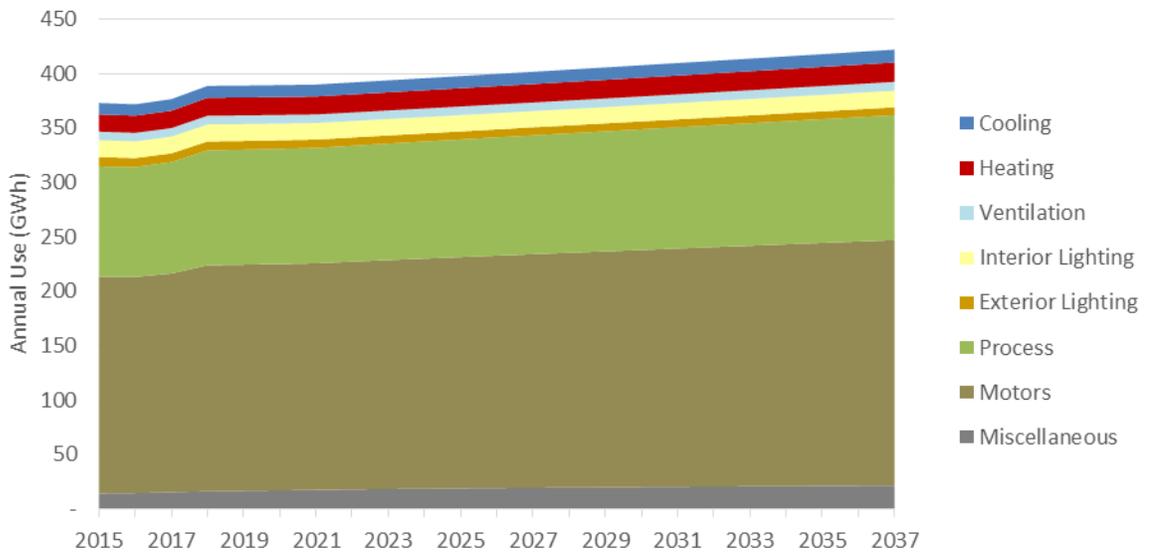


Figure 4-8 Industrial Baseline Projection by End Use (GWh), Idaho



## SUMMARY OF BASELINE PROJECTIONS ACROSS SECTORS AND STATES

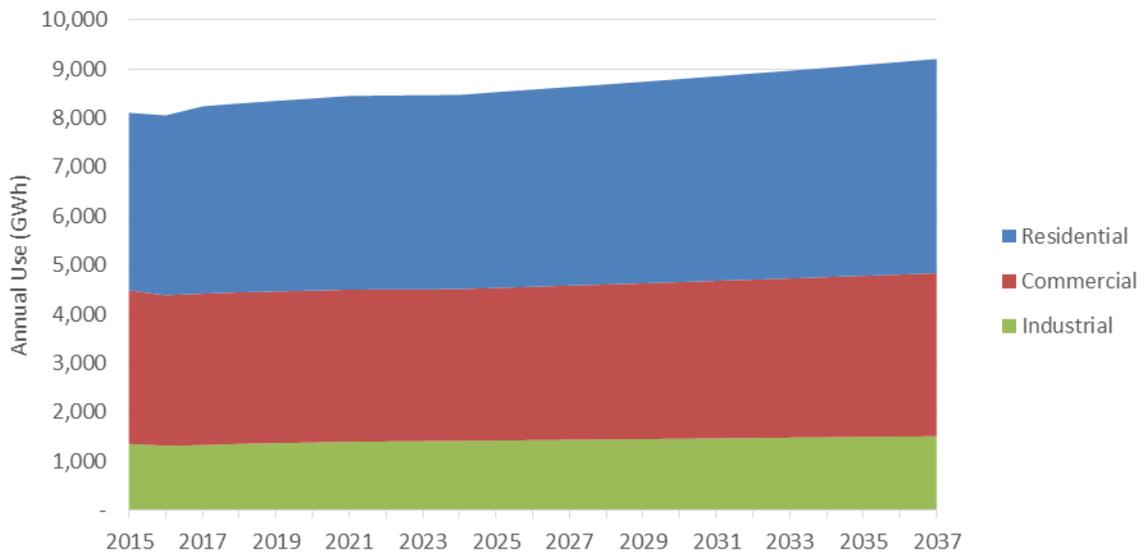
### ANNUAL USE

Table 4-7 and Figure 4-9 provide a summary of the baseline projection for annual use by sector for the entire Avista service territory. Overall, the projection shows strong growth in electricity use, driven primarily by customer growth forecasts.

Table 4-7 Baseline Projection Summary (GWh), WA and ID Combined

Sector	2015	2018	2019	2022	2027	2037	% Change ('15-'37)
Residential	3,620	3,850	3,882	3,953	4,049	4,367	21%
Commercial	3,133	3,091	3,093	3,100	3,144	3,324	6%
Industrial	1,355	1,358	1,373	1,406	1,441	1,514	12%
<b>Total</b>	<b>8,108</b>	<b>8,299</b>	<b>8,348</b>	<b>8,458</b>	<b>8,634</b>	<b>9,205</b>	<b>14%</b>

Figure 4-9 Baseline Projection Summary (GWh), WA and ID Combined



# 5

## CONSERVATION POTENTIAL

This section presents the conservation potential for Avista. This includes every measure that is considered in the measure list, regardless of delivery mechanism (program implementation, NEEA initiatives, or momentum savings).

We present the annual energy savings in GWh and aMW, as well as the summer peak demand savings in MW, for selected years. Year-by-year savings for annual energy and peak demand are available in the LoadMAP model, which was provided to Avista at the conclusion of the study.

This section begins a summary of annual energy savings across all three sectors. Then we provide details for each sector. Please note that all savings are provided at the customer meter.

### OVERALL SUMMARY OF ENERGY EFFICIENCY POTENTIAL

#### SUMMARY OF ANNUAL ENERGY SAVINGS

Table 5-1 (WA) and Table 5-2 (ID) summarize the EE savings in terms of annual energy use for all measures for three levels of potential relative to the baseline projection. Figure 5-1(WA) and Figure 5-2 (ID) displays the two levels of potential by year. Figure 5-3 (WA) and Figure 5-4 (ID) display the EE projections.

- **Technical potential** reflects the adoption of all conservation measures regardless of cost-effectiveness. For Washington, first-year savings are 133 GWh, or 2.3% of the baseline projection. Cumulative savings in 2037 are 1,373 GWh, or 21.7% of the baseline. For Idaho, first-year savings are 57 GWh, or 2.2% of the baseline projection. Cumulative savings in 2037 are 564 GWh, or 19.6% of the baseline.
- **Achievable technical potential** modifies technical potential by accounting for customer adoption constraints. In Washington, first-year savings are 63 GWh, or 1.1% of the baseline. In 2037, cumulative achievable technical savings reach 1,078 GWh, or 17.1% of the baseline projection. This results in average annual savings of 0.9% of the baseline each year. Achievable technical potential reflects 79% of technical potential throughout the forecast horizon. For Idaho, first year savings are 25 GWh or 1.0% of the baseline and by 2037 cumulative achievable technical savings reach 438 GWh, or 15.2% of the baseline. This results in average annual savings of 0.8% of the baseline each year. Achievable technical potential reflects 78% of technical potential throughout the forecast horizon.

Table 5-1 Summary of EE Potential (Annual Energy, GWh), Washington

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	5,692	5,730	5,811	5,932	6,323
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	63	133	336	664	1,078
Technical Potential	133	265	550	976	1,373
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	7.2	15.2	38.4	75.8	123.1
Technical Potential	15.2	30.2	62.8	111.4	156.7
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.1%	2.3%	5.8%	11.2%	17.1%
Technical Potential	2.3%	4.6%	9.5%	16.5%	21.7%

Table 5-2 Summary of EE Potential (Annual Energy, GWh), Idaho

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	2,606	2,618	2,647	2,702	2,882
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	25	54	132	263	438
Technical Potential	57	112	222	395	564
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	2.9	6.1	15.1	30.0	50.0
Technical Potential	6.5	12.8	25.3	45.1	64.4
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.0%	2.1%	5.0%	9.7%	15.2%
Technical Potential	2.2%	4.3%	8.4%	14.6%	19.6%

Figure 5-1 Summary of EE Potential as % of Baseline Projection (Annual Energy), Washington

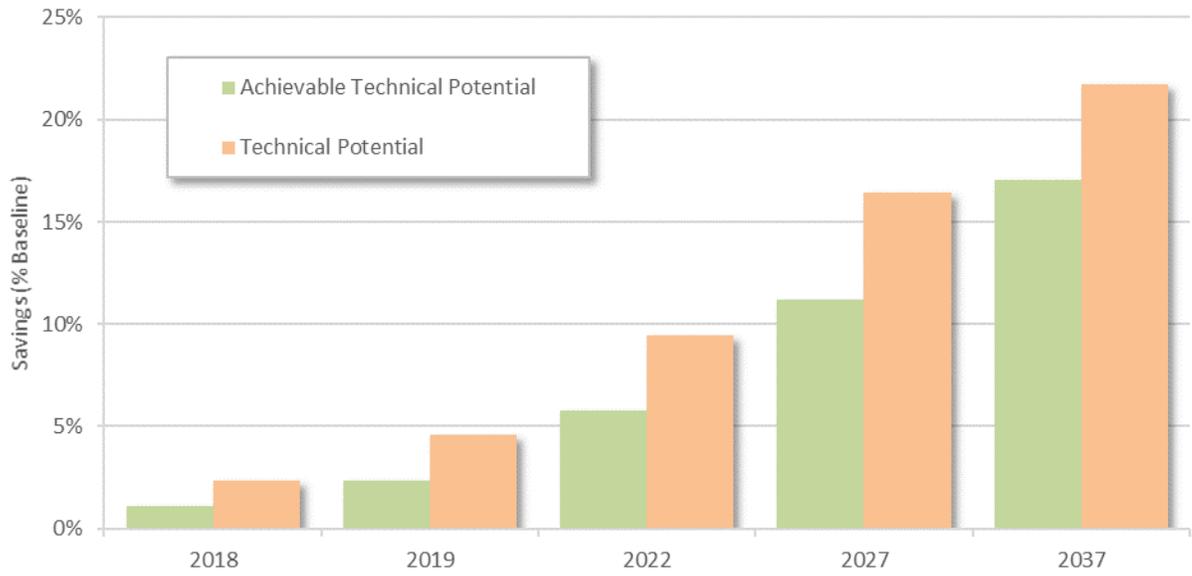


Figure 5-2 Summary of EE Potential as % of Baseline Projection (Annual Energy), Idaho



Figure 5-3 *Baseline Projection and EE Forecast Summary (Annual Energy, GWh), Washington*

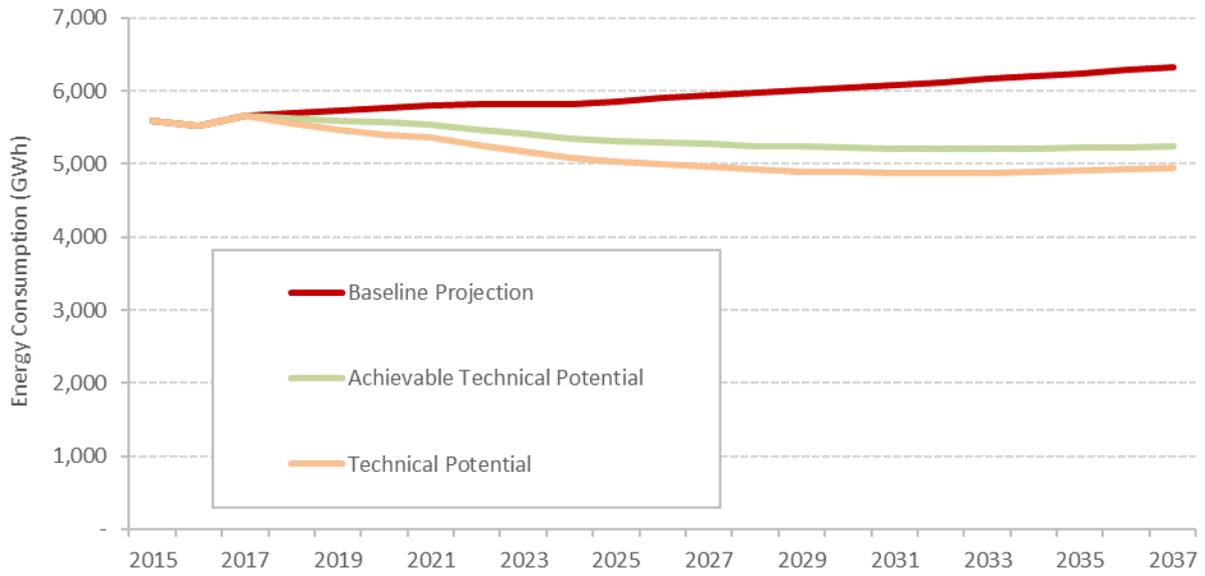
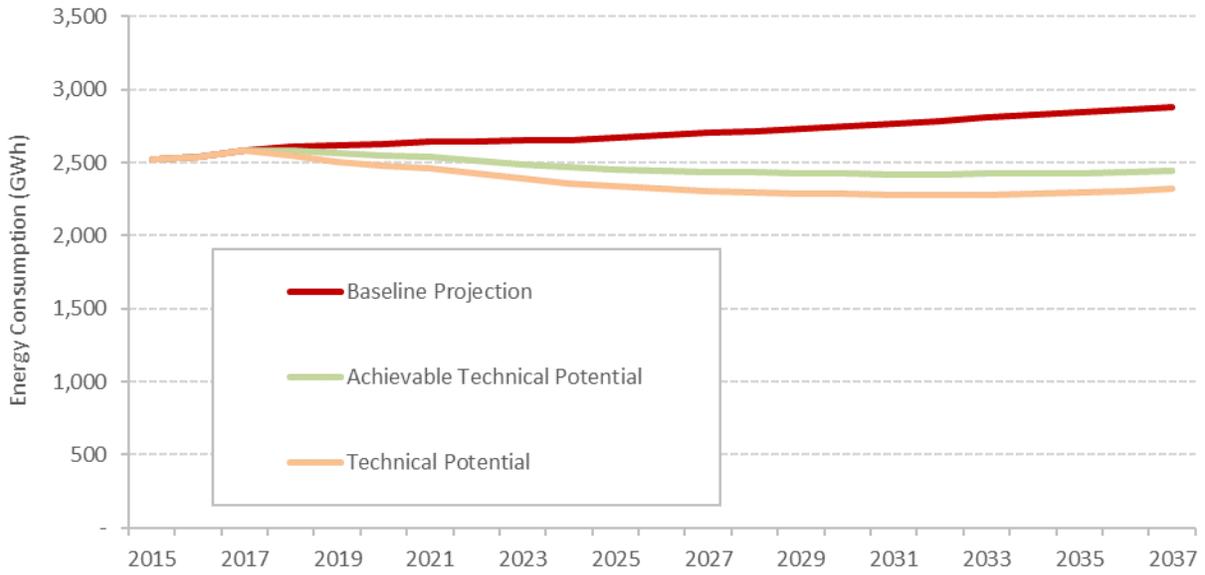


Figure 5-4 *Baseline Projection and EE Forecast Summary (Annual Energy, GWh), Idaho*



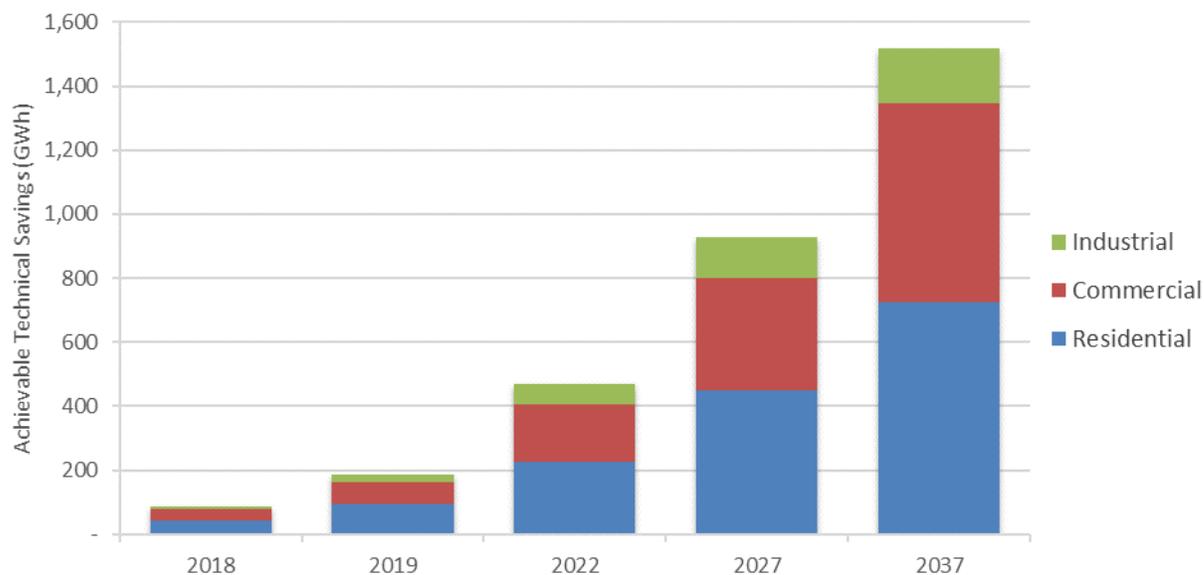
## SUMMARY OF CONSERVATION POTENTIAL BY SECTOR

Table 5-3 and Figure 5-5 summarize the range of electric achievable technical potential by sector, both states combined. The residential and commercial sectors contribute the most savings, but by 2037 the commercial sector potential begins to approach that of residential due to large lost opportunity lighting equipment and controls measures.

Table 5-3 Achievable Technical Conservation Potential by Sector (Annual Use), WA and ID

	2018	2019	2022	2027	2037
<b>Cumulative Savings (GWh)</b>					
Residential	44	94	225	448	725
Commercial	33	70	180	352	622
Industrial	11	23	63	127	170
<b>Total</b>	<b>88</b>	<b>187</b>	<b>468</b>	<b>927</b>	<b>1,516</b>
<b>Cumulative Savings (aMW)</b>					
Residential	5.1	10.7	25.7	51.2	82.7
Commercial	3.7	8.0	20.6	40.2	71.0
Industrial	1.3	2.6	7.2	14.5	19.4
<b>Total</b>	<b>10.0</b>	<b>21.3</b>	<b>53.5</b>	<b>105.8</b>	<b>173.1</b>

Figure 5-5 Achievable Technical Conservation Potential by Sector (Annual Energy, GWh)



## RESIDENTIAL CONSERVATION POTENTIAL

Table 5-4 (WA) and Table 5-5 (ID) present estimates for measure-level conservation potential for the residential sector in terms of annual energy savings. Figure 5-6 (WA) and Figure 5-7 (ID) display the two levels of potential by year. For Washington, achievable technical potential in the first year, 2018 is 29 GWh, or 1.1% of the baseline projection. By 2037, cumulative achievable technical savings are 487 GWh, or 16.5% of the baseline projection. At this level, it represents over 79% of technical potential. For Idaho, first year achievable technical savings are 16 GWh or 1.3% of the baseline and by 2037

cumulative achievable technical savings reach 238 GWh, or 16.8% of the baseline. Achievable technical potential is 79% of technical potential in 2037.

Table 5-4 Residential Conservation Potential (Annual Energy), Washington

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	2,605	2,625	2,670	2,735	2,950
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	29	61	149	300	487
Technical Potential	64	128	257	463	618
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	3.3	6.9	17.0	34.2	55.6
Technical Potential	7.3	14.6	29.4	52.8	70.5
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.1%	2.3%	5.6%	11.0%	16.5%
Technical Potential	2.4%	4.9%	9.6%	16.9%	20.9%

Table 5-5 Residential Conservation Potential (Annual Energy), Idaho

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	1,244	1,256	1,283	1,314	1,417
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	16	33	76	149	238
Technical Potential	34	67	126	225	302
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	1.8	3.7	8.7	17.0	27.2
Technical Potential	3.9	7.6	14.4	25.7	34.5
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.3%	2.6%	5.9%	11.3%	16.8%
Technical Potential	2.8%	5.3%	9.8%	17.1%	21.3%

Figure 5-6 Residential Conservation Savings as a % of the Baseline Projection (Annual Energy), Washington

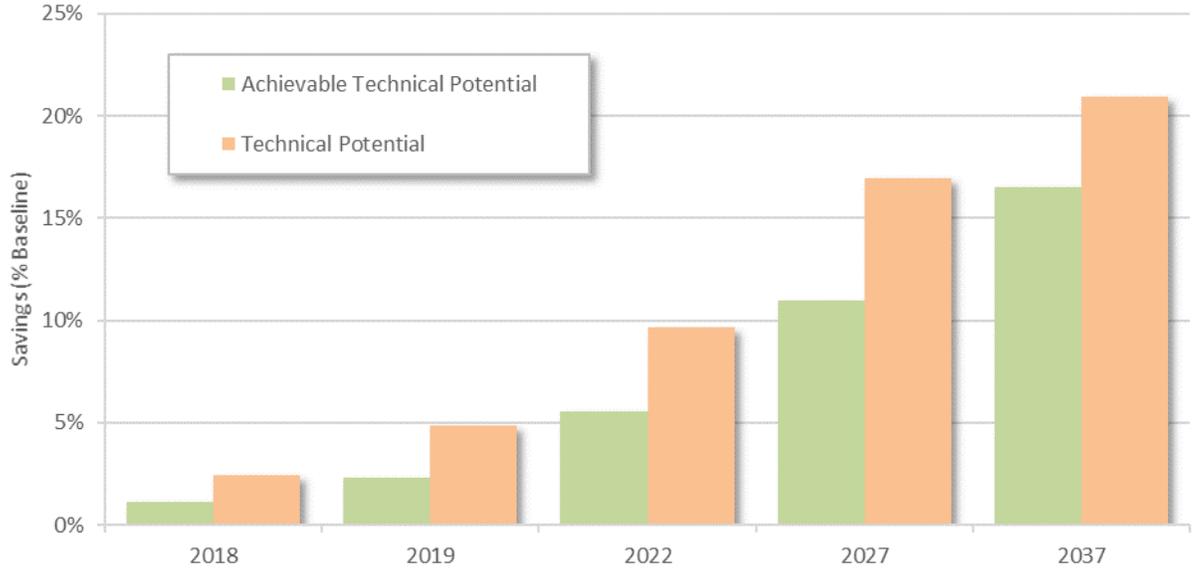
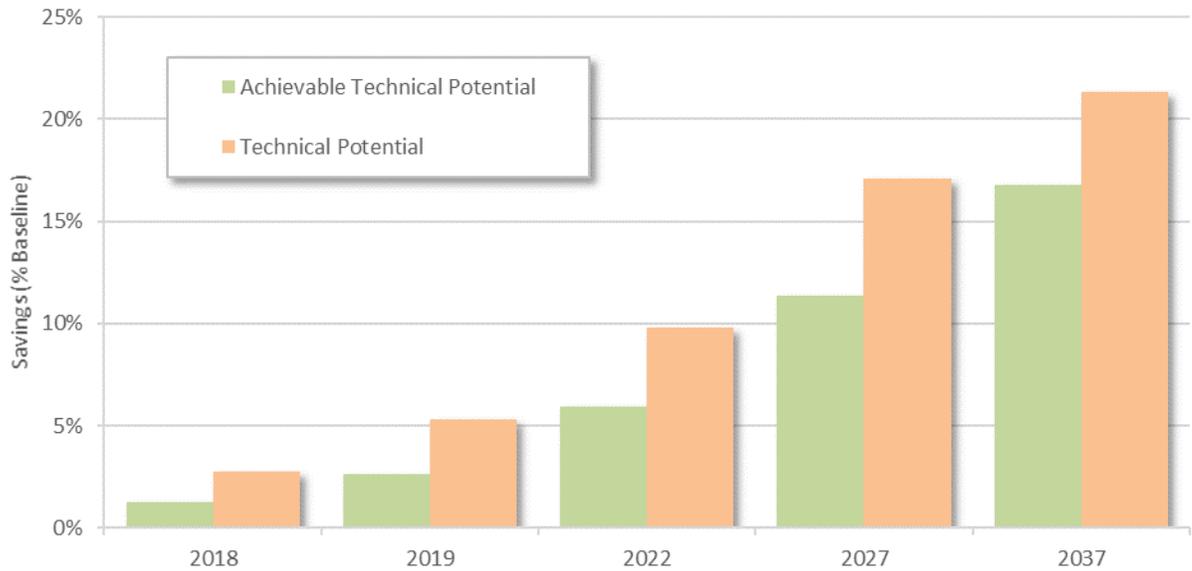


Figure 5-7 Residential Conservation Savings as a % of the Baseline Projection (Annual Energy), Idaho



Below, we present the top residential measures from the perspective of annual energy use. Table 5-6 identifies the top 20 residential measures from the perspective of annual energy savings in 2019 for Washington. The top three measures include interior general service screw-in lighting, infiltration control, and lighting occupancy sensors. The lighting measure is a result of purchases of LED lamps. Note that achievable technical savings do not screen for cost effectiveness and some measures are expected to be screened out during the IRP process.

Table 5-6 Residential Top Measures in 2019 (Annual Energy, MWh), Washington

Rank	Residential Measure	2019 Cumulative Energy Savings (MWh)	% of Total
1	Interior Lighting - General Service Lighting (LED)	6,734	11.1%
2	Building Shell - Infiltration Control	4,613	7.6%
3	Interior Lighting - Occupancy Sensors	4,443	7.3%
4	Windows - High Efficiency/ENERGY STAR	3,618	5.9%
5	Windows - Install Reflective Film	3,185	5.2%
6	Insulation - Wall Cavity Installation	3,064	5.0%
7	Interior Lighting - Exempted Lighting (LED)	2,891	4.8%
8	Ducting - Repair and Sealing	2,777	4.6%
9	Ductless Mini Split Heat Pump (Zonal)	2,410	4.0%
10	Insulation - Radiant Barrier	2,146	3.5%
11	Furnace - Conversion to Air-Source Heat Pump	2,047	3.4%
12	Thermostat - Wi-Fi/Interactive	1,873	3.1%
13	Freezer - Decommissioning and Recycling	1,755	2.9%
14	Exterior Lighting - Screw-In (LED)	1,678	2.8%
15	Insulation - Ceiling Installation	1,649	2.7%
16	Interior Lighting - General Service CFLs	1,489	2.4%
17	Insulation - Ducting	1,264	2.1%
18	Ductless Mini Split Heat Pump (Ducted Forced Air)	1,152	1.9%
19	Doors - Storm and Thermal	879	1.4%
20	Insulation - Wall Sheathing	848	1.4%
	<b>Total</b>	<b>50,514</b>	<b>83.1%</b>
	<b>Total cumulative savings in 2019</b>	<b>60,820</b>	<b>100.0%</b>

Figure 5-8 presents forecasts of cumulative energy savings for Washington. Heating, water heating, and lighting account for a substantial portion of the savings throughout the forecast horizon. Weatherization, ductless heat pumps, heat pump water heaters, and LED lighting account for a large portion of potential over the 20-year study period.

Figure 5-8 Residential Achievable Technical Savings Forecast (Cumulative GWh), Washington

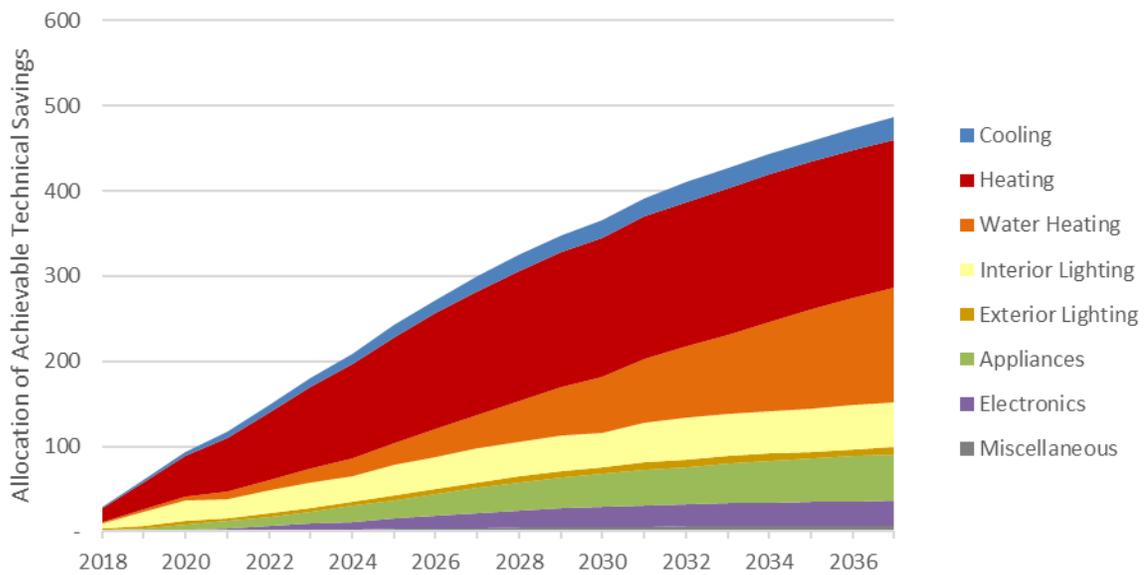


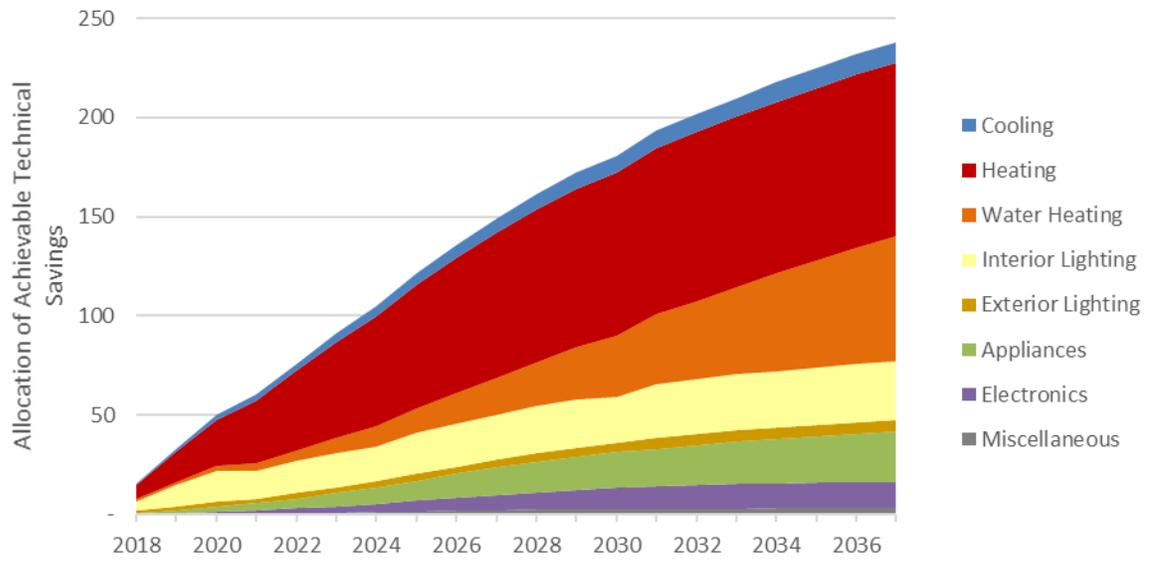
Table 5-7 shows the top residential measures from the perspective of annual energy use in Idaho in 2019. The top three measures are the same as Washington and include interior general service screw-in lighting, infiltration control, and lighting occupancy sensors. Note that achievable technical savings do not screen for cost effectiveness and some measures are expected to be screened out during the IRP process.

Table 5-7 Residential Top Measures in 2019 (Annual Energy, MWh), Idaho

Rank	Residential Measure	2019 Cumulative Energy Savings (MWh)	% of Total
1	Interior Lighting - General Service Lighting (LED)	4,173	12.7%
2	Interior Lighting - Occupancy Sensors	2,483	7.6%
3	Building Shell - Infiltration Control	2,316	7.1%
4	Interior Lighting - General Service CFLs	1,910	5.8%
5	Windows - High Efficiency/ENERGY STAR	1,810	5.5%
6	Windows - Install Reflective Film	1,543	4.7%
7	Insulation - Wall Cavity Installation	1,533	4.7%
8	Interior Lighting - Exempted Lighting	1,392	4.2%
9	Ductless Mini Split Heat Pump (Zonal)	1,387	4.2%
10	Ducting - Repair and Sealing	1,223	3.7%
11	Exterior Lighting - Screw-In	1,147	3.5%
12	Insulation - Radiant Barrier	1,049	3.2%
13	Furnace - Conversion to Air-Source Heat Pump	984	3.0%
14	Thermostat - Wi-Fi/Interactive	921	2.8%
15	Insulation - Ceiling Installation	835	2.5%
16	Freezer - Decommissioning and Recycling	793	2.4%
17	Insulation - Ducting	552	1.7%
18	Ductless Mini Split Heat Pump (Ducted Forced Air)	536	1.6%
19	Interior Lighting - Exempted CFLs	521	1.6%
20	Doors - Storm and Thermal	449	1.4%
	<b>Total</b>	<b>27,556</b>	<b>84.1%</b>
	<b>Total cumulative savings in 2019</b>	<b>32,769</b>	<b>100.0%</b>

Figure 5-9 presents forecasts of cumulative energy savings for Idaho. Results are similar to Washington where the majority of the savings come from heating and lighting measures and later in the forecast from water heating.

Figure 5-9 Residential Achievable Technical Savings Forecast (Cumulative GWh), Idaho



## COMMERCIAL CONSERVATION POTENTIAL

Table 5-8 (WA) and Table 5-9 (ID) present estimates for the two levels of conservation potential for the commercial sector from the perspective of annual energy savings and average MW.

Table 5-8 Commercial Conservation Potential (Annual Energy), WA

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	2,118	2,121	2,128	2,158	2,282
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	26	56	142	273	468
Technical Potential	58	115	234	398	604
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	3.0	6.4	16.2	31.1	53.4
Technical Potential	6.7	13.1	26.7	45.5	68.9
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	1.2%	2.6%	6.7%	12.6%	20.5%
Technical Potential	2.8%	5.4%	11.0%	18.5%	26.5%

Table 5-9 Commercial Conservation Potential (Annual Energy), Idaho

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	973	973	972	986	1,042
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	6	14	38	79	154
Technical Potential	18	36	74	127	207
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	0.7	1.7	4.4	9.0	17.6
Technical Potential	2.1	4.1	8.4	14.5	23.6
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	0.7%	1.5%	4.0%	8.0%	14.8%
Technical Potential	1.9%	3.7%	7.6%	12.9%	19.8%

Figure 5-10 (WA) and Figure 5-11 (ID) display the two levels of potential by year. For Washington, the first year of the projection, achievable technical potential is 26 GWh, or 1.2% of the baseline projection. By 2037, achievable technical savings are 468 GWh, or 20.5% of the baseline projection. Throughout the forecast horizon, achievable technical potential represents about 77% of technical potential. For Idaho, first year achievable technical savings are 6 GWh or 0.7% of the baseline and by 2037 cumulative achievable technical savings reach 154 GWh, or 14.8% of the baseline. Throughout the forecast horizon, achievable technical potential represents about 74% of technical potential.

Figure 5-10 Commercial Conservation Savings (Energy), Washington

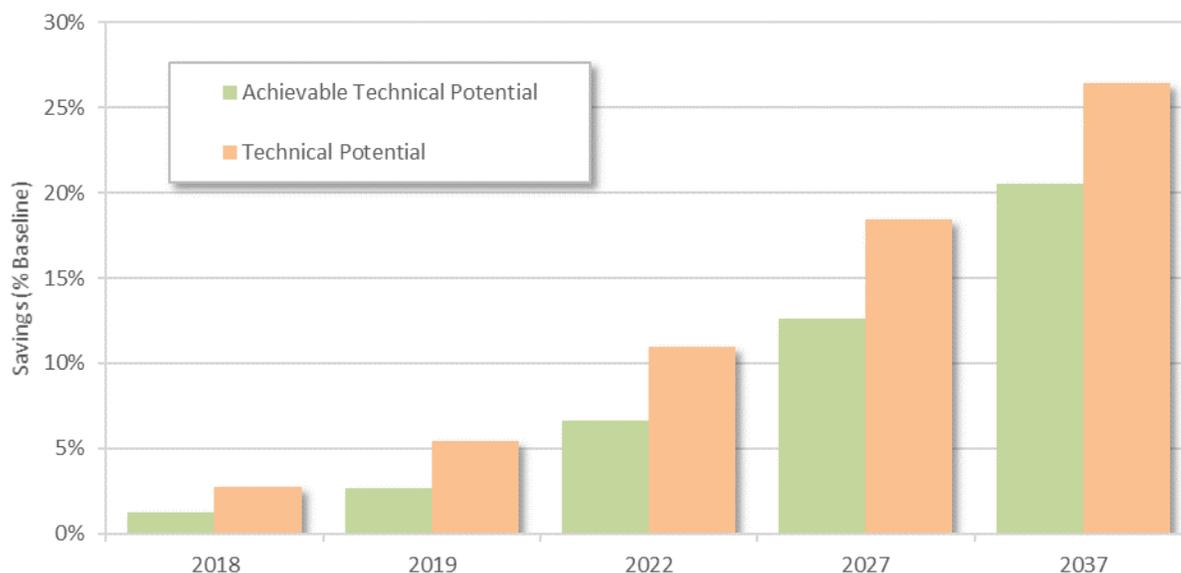
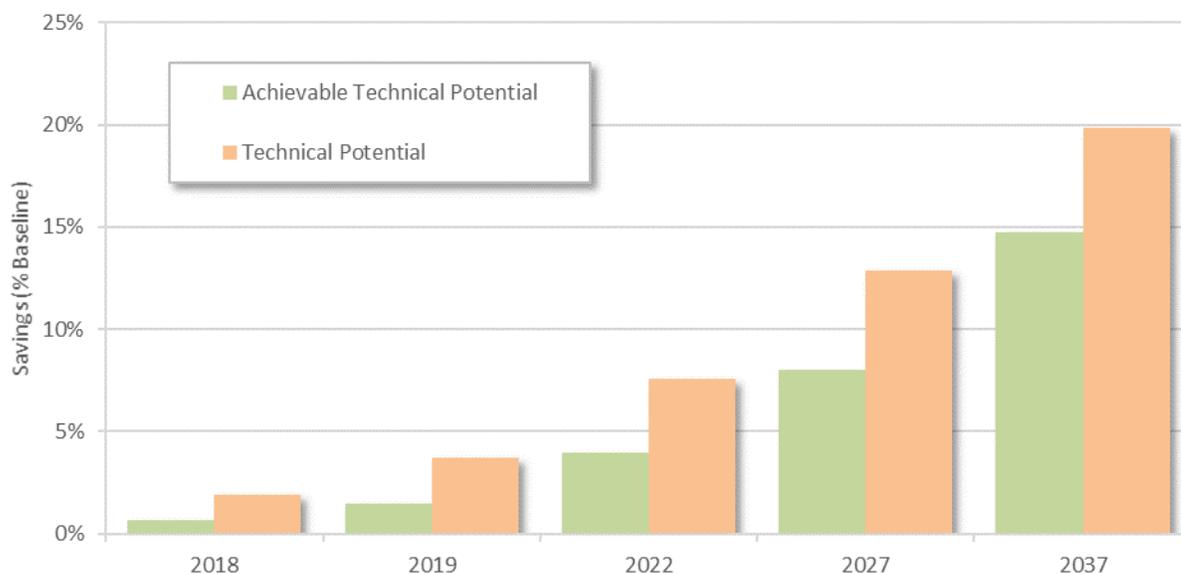


Figure 5-11 Commercial Conservation Savings (Energy), Idaho



Below, we present the top commercial measures from the perspective of annual energy use.

Table 5-10 (WA) and Table 5-11 (ID) identify the top 20 commercial-sector measures from the perspective of annual energy savings in 2019. The top measures in Washington are retrocommissioning, variable speed ventilation systems, and interior LED screw-in lighting. In Idaho, the top measures are retrocommissioning, variable speed ventilation systems, and exterior LED lighting. Significant lighting savings have already been achieved in recent years, therefore lowering the savings opportunities in the short-term. In later years, as linear fluorescent fixtures reach their end of useful life, linear LEDs become the top measure.

Figure 5-12 (WA) and Figure 5-13 (ID) present forecasts of cumulative energy savings by end use. Lighting savings from interior and exterior applications account for a substantial portion of the savings throughout the forecast horizon. Cooling savings are also substantial throughout the forecast.

Table 5-10 Commercial Top Measures in 2019 (Annual Energy, MWh), Washington

Rank	Commercial Measure	2019 Cumulative Energy Savings (MWh)	% of Total
1	Retrocommissioning	6,881	12.3%
2	Ventilation - Variable Speed Control	4,070	7.3%
3	Interior Lighting - Screw-In (LED)	3,955	7.1%
4	Insulation - Ceiling	2,552	4.6%
5	Office Equipment - Desktop Computer	2,498	4.5%
6	Exterior Lighting - Screw-In	2,288	4.1%
7	Refrigeration - Variable Speed Compressor	2,104	3.8%
8	Strategic Energy Management	1,860	3.3%
9	Refrigeration - Floating Head Pressure	1,651	3.0%
10	Interior Lighting - Linear Lighting	1,625	2.9%
11	Chiller - Chilled Water Variable-Flow System	1,588	2.8%
12	Exterior Lighting - Bi-Level Fixture	1,395	2.5%
13	Refrigeration - Demand Defrost	1,317	2.4%
14	HVAC - Economizer	1,295	2.3%
15	Commissioning	1,280	2.3%
16	Exterior Lighting - Area Lighting	1,138	2.0%
17	Ductless Mini Split Heat Pump	1,119	2.0%
18	Exterior Lighting - Photovoltaic Installation	1,035	1.9%
19	Cooling - Water-Cooled Chiller	1,018	1.8%
20	Water-Cooled Chiller - Condenser Water Reset	1,017	1.8%
	<b>Total</b>	<b>41,684</b>	<b>74.8%</b>
	<b>Total cumulative savings in 2019</b>	<b>55,744</b>	<b>100.0%</b>

Figure 5-12 Commercial Achievable Technical Savings Forecast (Cumulative GWh), Washington

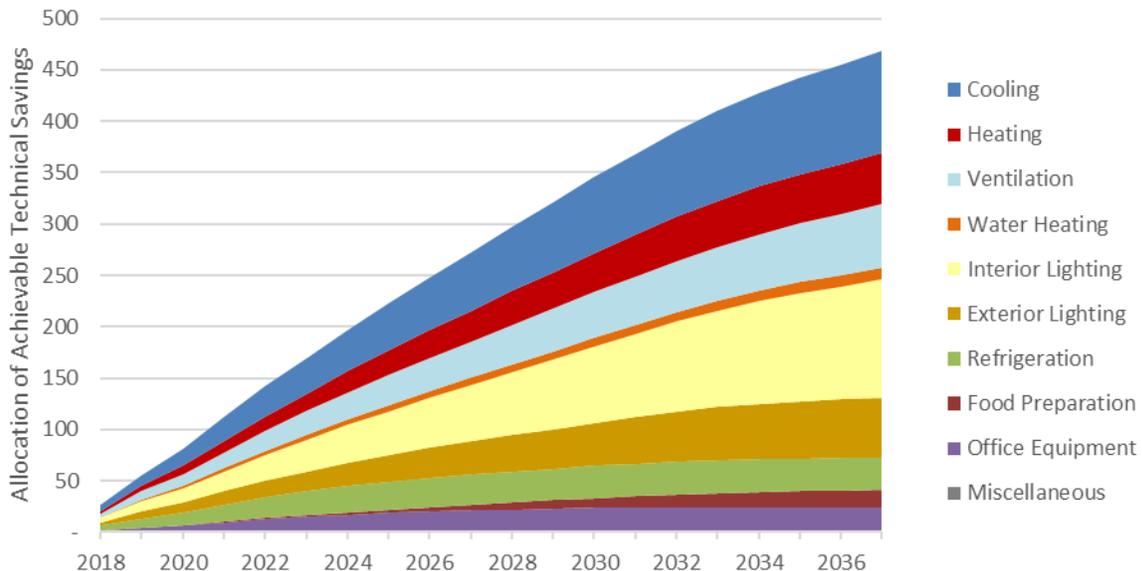
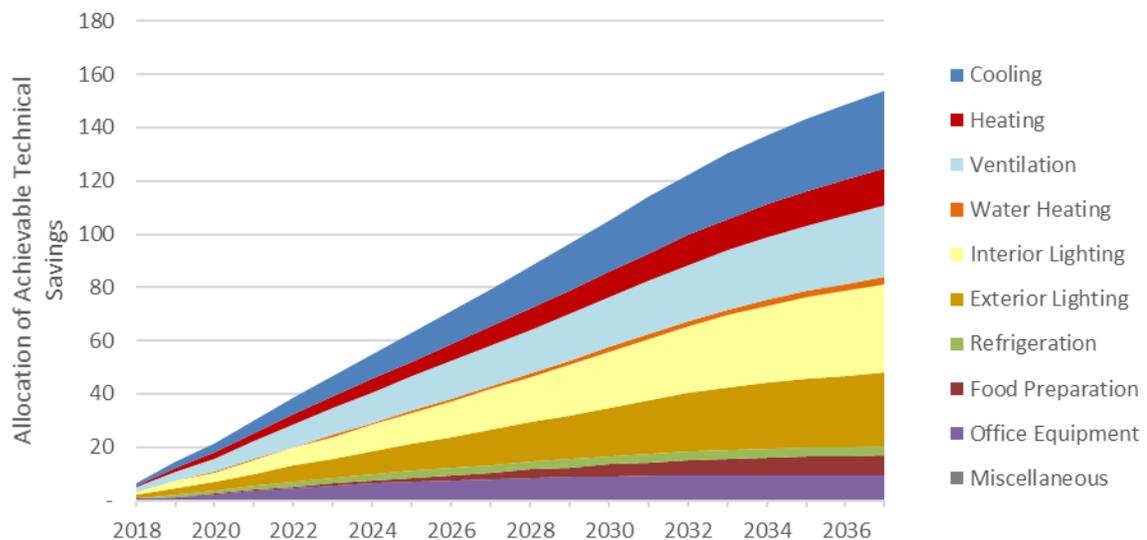


Table 5-11 Commercial Top Measures in 2019 (Annual Energy, MWh), Idaho

Rank	Commercial Measure	2019 Cumulative Energy Savings (MWh)	% of Total
1	Retrocommissioning	3,128	21.6%
2	Ventilation - Variable Speed Control	1,784	12.3%
3	Exterior Lighting - Screw-In (LED)	1,163	8.0%
4	Office Equipment - Desktop Computer	1,130	7.8%
5	Insulation - Ceiling	1,065	7.4%
6	Strategic Energy Management	903	6.2%
7	Interior Lighting - Screw-In	881	6.1%
8	Commissioning	581	4.0%
9	Exterior Lighting - Area Lighting	567	3.9%
10	Cooling - Water-Cooled Chiller	420	2.9%
11	Interior Lighting - Linear Lighting	337	2.3%
12	Interior Lighting - Interior Lighting - Networked Fixture Controls	326	2.2%
13	Exterior Lighting - Linear Lighting	300	2.1%
14	Ventilation - Ventilation	240	1.7%
15	Interior Lighting - Interior Lighting - Embedded Fixture Controls	233	1.6%
16	Ventilation - Demand Controlled	217	1.5%
17	Cooling - Air-Cooled Chiller	152	1.0%
18	Ventilation - ECM on VAV Boxes	146	1.0%
19	Interior Lighting - High-Bay Fixtures	141	1.0%
20	Cooling - RTU	109	0.8%
	<b>Total</b>	<b>13,822</b>	<b>95.5%</b>
	<b>Total cumulative savings in 2019</b>	<b>14,480</b>	<b>100.0%</b>

Figure 5-13 Commercial Achievable Technical Savings Forecast (Cumulative GWh), Idaho



## INDUSTRIAL CONSERVATION POTENTIAL

Table 5-12 (WA) and Table 5-13 (ID) present potential estimates at the measure level for the industrial sector, from the perspective of annual energy savings.

Table 5-12 *Industrial Conservation Potential (Annual Energy), WA*

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	969	984	1,014	1,039	1,092
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	8	17	46	92	124
Technical Potential	11	22	59	115	151
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	0.9	1.9	5.2	10.5	14.1
Technical Potential	1.3	2.6	6.7	13.1	17.2
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	0.8%	1.7%	4.5%	8.9%	11.3%
Technical Potential	1.1%	2.3%	5.8%	11.1%	13.8%

Table 5-13 *Industrial Conservation Potential (Annual Energy), Idaho*

	2018	2019	2022	2027	2037
<b>Baseline projection (GWh)</b>	389	389	392	402	422
<b>Cumulative Savings (GWh)</b>					
Achievable Technical Potential	3	6	17	35	46
Technical Potential	4	9	22	43	56
<b>Cumulative Savings (aMW)</b>					
Achievable Technical Potential	0.4	0.7	2.0	4.0	5.2
Technical Potential	0.5	1.0	2.5	4.9	6.4
<b>Savings as % of Baseline</b>					
Achievable Technical Potential	0.8%	1.7%	4.4%	8.6%	10.9%
Technical Potential	1.1%	2.2%	5.6%	10.7%	13.3%

Figure 5-14 (WA) and Figure 5-15 (ID) display the two levels of potential by year. For Washington, achievable technical savings in the first year, 2018, are 8 GWh, or 0.8% of the baseline projection. In 2037, savings reach 124 GWh, or 11.3% of the baseline projection. For Idaho, achievable technical savings in the first year, 2018, are 3 GWh, or 0.8% of the baseline projection. In 2037, savings reach 46 GWh, or 10.9% of the baseline projection.

Figure 5-14 Industrial Conservation Potential as a % of the Baseline Projection (Annual Energy), Washington

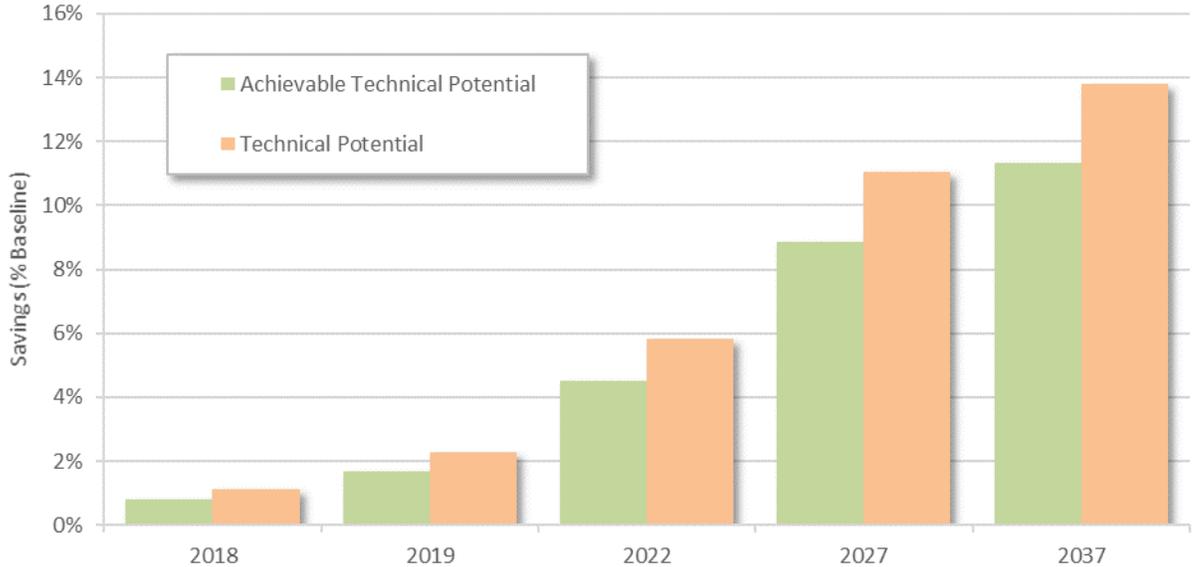
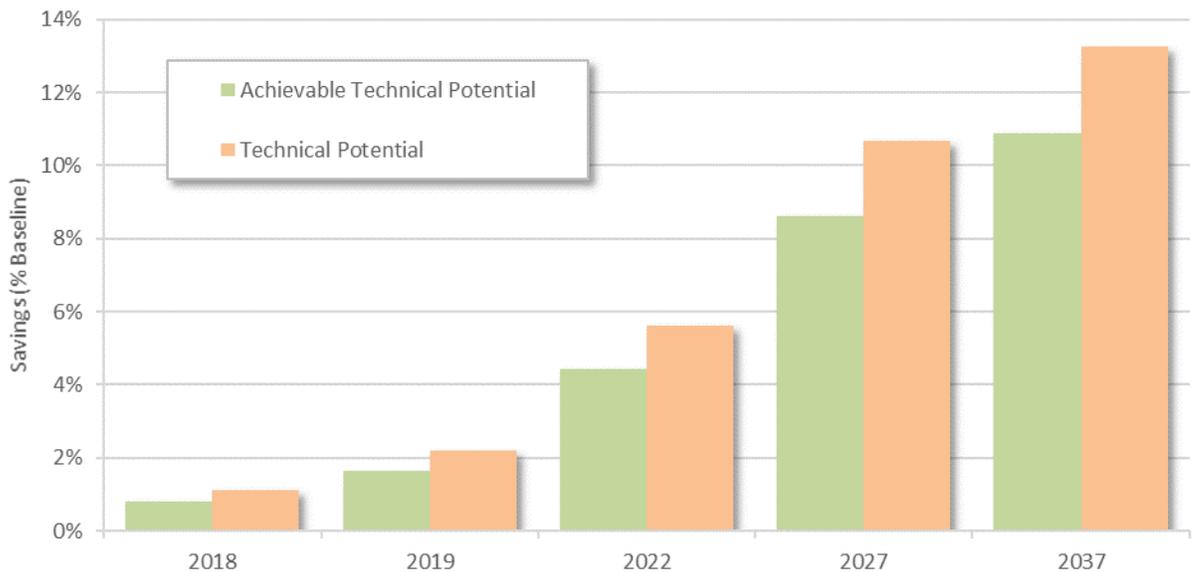


Figure 5-15 Industrial Conservation Potential as a % of the Baseline Projection (Annual Energy), Idaho



Below, we present the top industrial measures from the perspective of annual energy use.

Table 5-14 and Table 5-15 identify the top 20 industrial measures from the perspective of annual energy savings in 2017. For both states, the top measure is an upgrade on compressed air equipment. The measure with the second highest savings is the implementation of a leak management program. Retrocommissioning rounds out the top three in both states.

Figure 5-16 (WA) and Figure 5-17 (ID) present forecasts of energy savings by end use as a percent of total annual savings and cumulative savings. Motor-related measures account for a substantial portion of the savings throughout the forecast horizon. The share of savings by end use remains fairly similar throughout the forecast period.

Table 5-14 Industrial Top Measures in 2019 (Annual Energy, GWh), Washington

Rank	Industrial Measure	2019 Cumulative Energy Savings (MWh)	% of Total
1	Compressed Air - Equipment Upgrade	2,682	16.2%
2	Compressed Air - Leak Management Program	1,355	8.2%
3	Retrocommissioning	1,229	7.4%
4	Fan System - Variable Speed Drive	812	4.9%
5	Material Handling - Variable Speed Drive	658	4.0%
6	Compressed Air - System Controls	607	3.7%
7	Destratification Fans (HVLS)	510	3.1%
8	Refrigeration - System Optimization	494	3.0%
9	Fan System - Flow Optimization	467	2.8%
10	Motors - Synchronous Belts	428	2.6%
11	Pumping System - Equipment Upgrade	403	2.4%
12	HVAC - Economizer	392	2.4%
13	Switch from Belt Drive to Direct Drive	333	2.0%
14	Refrigeration - Floating Head Pressure	308	1.9%
15	Pumping System - System Optimization	289	1.7%
16	Compressed Air - Variable Speed Drive	289	1.7%
17	Transformer - High Efficiency	283	1.7%
18	Kraft: Efficient Agitator	265	1.6%
19	Pumping System - Variable Speed Drive	261	1.6%
20	Exterior Lighting - Enhanced Controls	251	1.5%
<b>Total</b>		<b>12,316</b>	<b>74.3%</b>
<b>Total cumulative savings in 2019</b>		<b>16,568</b>	<b>100.0%</b>

Figure 5-16 Industrial Achievable Technical Savings Forecast (Cumulative GWh), Washington

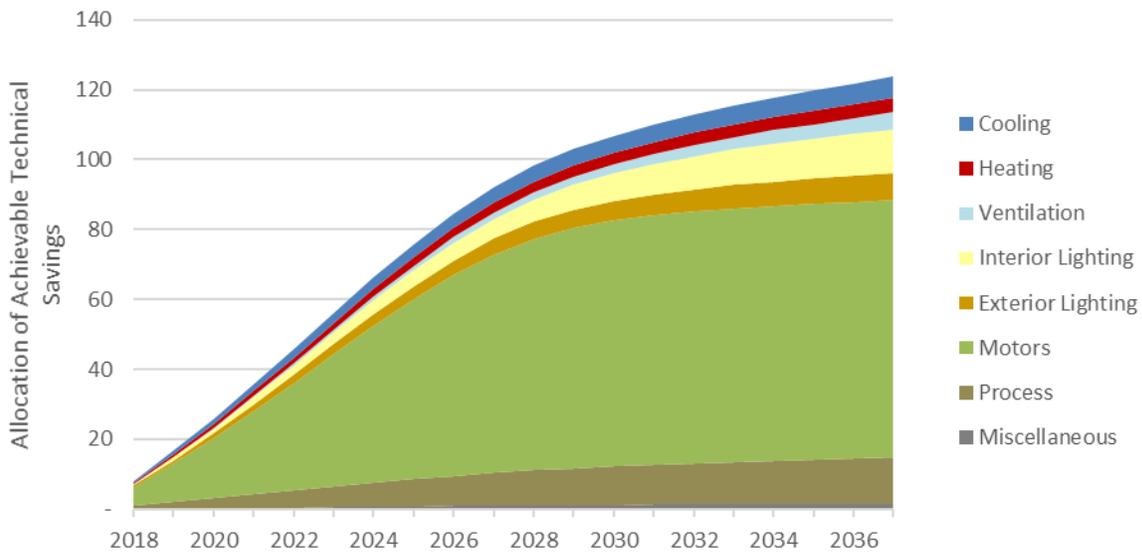
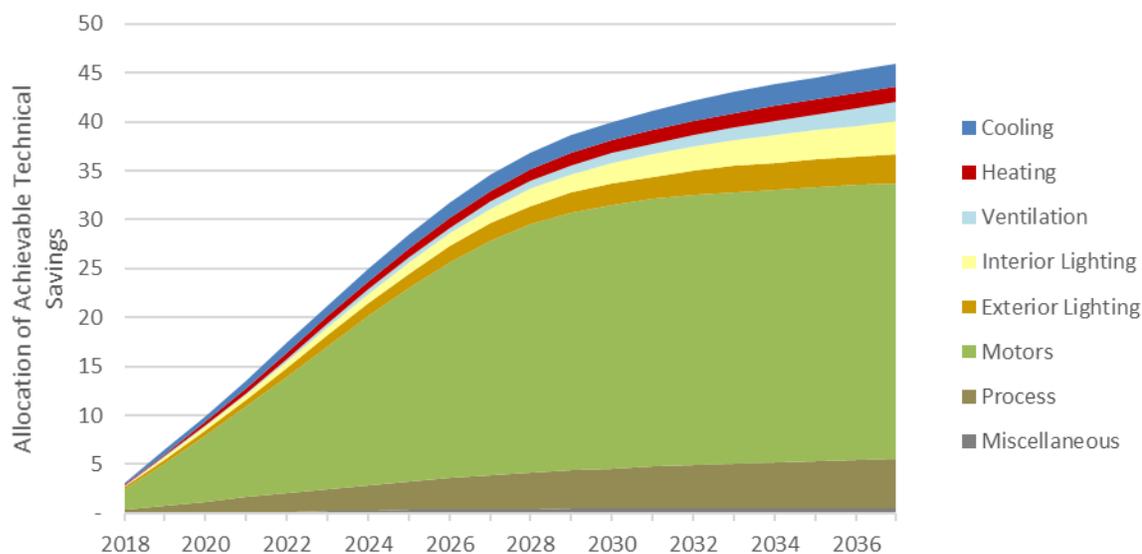


Table 5-15 Industrial Top Measures in 2019 (Annual Energy, GWh), Idaho

Rank	Industrial Measure	2019 Cumulative Energy Savings (MWh)	% of Total
1	Compressed Air - Equipment Upgrade	1,070	16.7%
2	Compressed Air - Leak Management Program	540	8.4%
3	Retrocommissioning	480	7.5%
4	Fan System - Variable Speed Drive	318	5.0%
5	Material Handling - Variable Speed Drive	261	4.1%
6	Compressed Air - System Controls	242	3.8%
7	Destratification Fans (HVLS)	205	3.2%
8	Refrigeration - System Optimization	197	3.1%
9	Fan System - Flow Optimization	185	2.9%
10	Motors - Synchronous Belts	171	2.7%
11	Pumping System - Equipment Upgrade	159	2.5%
12	HVAC - Economizer	158	2.5%
13	Switch from Belt Drive to Direct Drive	134	2.1%
14	Refrigeration - Floating Head Pressure	123	1.9%
15	Pumping System - System Optimization	118	1.8%
16	Compressed Air - Variable Speed Drive	113	1.8%
17	Transformer - High Efficiency	112	1.7%
18	Pumping System - Variable Speed Drive	104	1.6%
19	Exterior Lighting - Enhanced Controls	99	1.5%
20	Insulation - Ceiling	90	1.4%
	<b>Total</b>	<b>4,878</b>	<b>75.9%</b>
	<b>Total cumulative savings in 2019</b>	<b>6,425</b>	<b>100.0%</b>

Figure 5-17 Industrial Achievable Technical Savings Forecast (Annual Energy, GWh), Idaho





# 6

## DEMAND RESPONSE POTENTIAL

In 2014, AEG and The Brattle Group performed an assessment of demand response potential for Avista's commercial and industrial (C&I) sectors. As part of this conservation potential assessment, Avista asked AEG to update the DR analysis for C&I sectors in Washington and Idaho.

The updated analysis provides demand response potential and cost estimates for the 20-year planning horizon of 2018-2037 to inform the development of Avista's 2017 Integrated Resource Plan (IRP). It primarily seeks to develop reliable estimates of the magnitude, timing, and costs of DR resources likely available to Avista over the 20-year planning horizon. The analysis focuses on resources assumed achievable during the planning horizon, recognizing known market dynamics that may hinder resource acquisition. DR analysis results will also be incorporated into subsequent DR planning and program development efforts.

This section describes our analysis approach and the data sources used to develop potential and cost estimates. The following three steps broadly outline our analysis approach:

1. Segment C&I customers for DR analysis and develop market characteristics (customer count and coincident peak demand values) by segment for the base year and planning period.
2. Identify and describe the relevant DR programs and develop assumptions on key program parameters for potential and cost analysis.
3. Assess achievable potential by DR program for the 2018-2037 planning period and estimate program budgets and levelized costs.

### MARKET CHARACTERIZATION

The first step in the DR analysis was to segment C&I customers and develop characteristics for each segment. The two relevant characteristics for DR potential analysis are the number of eligible customers in each market segment and their coincident peak demand values.

### MARKET SEGMENTATION

Similar to the 2014 analysis, we used Avista's rate schedules as the basis for C&I customer segmentation: by state and customer class. Table 6-1 summarizes the market segmentation we developed for this study.

Table 6-1 Market Segmentation

Market Dimensions	Segmentation Variable	Description
1	State	Idaho Washington
2	Customer Class	By rate schedule: <b>General Service:</b> Rate Schedule 11 <b>Large General Service:</b> Rate Schedule 21 <b>Extra Large General Service:</b> Rate Schedule 25 <sup>11</sup>

We excluded Avista's two largest industrial customers from our analysis because they are so large and unique that a segment-based modeling approach is not appropriate for them. To accurately estimate demand reduction potential for these customers, we would need to develop a detailed understanding of their industrial processes and associated possibilities for load reduction. We would also need to develop specific DR potential estimates for each customer. Avista may wish to engage with these large customers directly to gauge interest in participating in DR programs.

#### CUSTOMER COUNT BY SEGMENT

Once the customer segments were defined, we developed customer count and coincident peak demand values for the three C&I segments. We developed these estimates separately by state for Washington and Idaho. We considered 2015 as the base year for the study, since this is the most recent year with a full 12 months of available customer data. This also coincides with the base year used for the CPA study. The forecast years are 2018 to 2037.

Avista provided the number of customers by rate schedules for Washington and Idaho over the 2015-2021 timeframe. We used this data to calculate the average annual growth rate. We then applied these same average annual growth rates to develop customer projections over the rest of the study timeframe, 2022-2037. The average annual growth rate for C&I sector as a whole is 1.1%. Table 6-2 below shows the number of customers by state for the base year and selected future years.

Table 6-2 Baseline C&amp;I Customer Forecast by State and Customer Class

Customer Class	2015	2018	2019	2020	2027	2037
<b>Washington</b>						
General Service	21,818	22,827	23,102	23,387	25,469	28,772
Large General Service	1,941	1,840	1,840	1,840	1,840	1,840
Extra Large General Service	20	20	20	20	20	20
<b>Total C&amp;I</b>	<b>23,779</b>	<b>24,687</b>	<b>24,962</b>	<b>25,247</b>	<b>27,330</b>	<b>30,632</b>
<b>Idaho</b>						
General Service	15,595	16,155	16,339	16,528	17,925	20,130
Large General Service	1,130	1,123	1,123	1,123	1,123	1,123
Extra Large General Service	9	10	10	10	10	10
<b>Total C&amp;I</b>	<b>16,735</b>	<b>17,288</b>	<b>17,472</b>	<b>17,661</b>	<b>19,058</b>	<b>21,263</b>

<sup>11</sup> Excluding the two largest Schedule 25 and Schedule 25P customers.

## FORECASTS OF WINTER PEAK

### System Peak Demand

Avista provided us with the 2015 system winter peak value and forecast for 2016 through 2037. Table 6-3 shows the system peak for the base year and selected futures years. The “weather sensitive” peak is defined by Avista as the overall system peak demand minus the demand for Avista’s largest industrial customers. The system peak is expected to increase by 9.5% by 2037, an average annual increase of 0.4%.

Table 6-3 Baseline System Winter Peak Forecast (MW @Generator) <sup>12</sup>

Peak Demand	2015	2018	2019	2020	2030	2037
Overall System Peak	1,696	1,710	1,717	1,724	1,795	1,845
Weather-sensitive Peak	1,562	1,576	1,583	1,590	1,660	1,711

### Coincident Peak Demand by Segment

To develop the coincident peak forecast for each segment, we started with electricity sales by customer class. Avista provided electricity sales by rate schedule for the years 2015 through 2021. For the remaining years of the forecast, 2022 through 2037, we projected electricity sales using the average annual growth rate over the 2015 through 2021 timeframe.

Next, we relied on electricity sales and coincident peak demand values for 2010 provided in the 2010 load research study conducted by Avista to calculate the load factors for General Service, Large General Service, and Extra Large General Service customers for Washington and Idaho. We then applied the load factors to the 2015 electricity sales data to derive coincident peak demand estimates for the three segments. Table 6-4 below shows the load factors and coincident peak values for the base year and selected future years.

Table 6-4 Load Factors and Baseline Coincident Peak Forecast by Segment (MW @Meter)

Customer Class	Load Factor	2015	2018	2019	2020	2027	2037
<b>Washington</b>							
General Service	0.80	78	79	80	80	85	89
Large General Service	0.82	195	192	193	193	194	197
Extra Large General Service	0.79	98	92	94	95	103	117
<b>Total C&amp;I</b>		<b>371</b>	<b>364</b>	<b>366</b>	<b>368</b>	<b>382</b>	<b>406</b>
<b>Idaho</b>							
General Service	0.64	61	61	62	63	68	77
Large General Service	0.75	106	97	97	96	94	91
Extra Large General Service	0.79	47	55	55	55	54	53
<b>Total C&amp;I</b>		<b>213</b>	<b>213</b>	<b>213</b>	<b>214</b>	<b>216</b>	<b>220</b>

## EQUIPMENT END USE SATURATION

Another key component of market characterization for DR analysis is electric space heating and water heating saturation data. This is required to further segment the market and identify eligible customers for direct control of electric space heating and water heating equipment. The relevant space heating equipment for DR analysis are central furnaces and heat pumps. We obtained saturation data from the CPA study, which had updated figures from the 2014 NEEA Commercial Building Stock Assessment

<sup>12</sup> The system peak forecast shown here is the net native load forecast from data provided by Avista, excluding the two largest industrial loads.

(CBSA). Table 6-5 and Table 6-6 below show saturation estimates by state and customer class. We assumed water heating and electric space heating saturation values remain constant over the analysis timeframe.

Table 6-5 *Electric Space Heating and Water Heating Saturation by Customer Class, Washington*

End Use Saturation by Equipment Type	General Service	Large General Service
<b>Space Heating Saturation for Washington</b>		
Central Furnace	1.8%	5.6%
Air-Source Heat Pump	8.8%	5.2%
Geothermal Heat Pump	3.6%	2.2%
<b>Total (Applicable for DR Analysis)</b>	<b>14.2%</b>	<b>12.9%</b>
<b>Water Heating Saturation for Washington</b>		
All equipment	40.1%	23.7%

Table 6-6 *Electric Space Heating and Water Heating Saturation by Customer Class, Idaho*

End Use Saturation by Equipment Type	General Service	Large General Service
<b>Space Heating Saturation for Idaho</b>		
Central Furnace	1.7%	5.3%
Air-Source Heat Pump	9.0%	4.5%
Geothermal Heat Pump	3.6%	1.8%
<b>Total (Applicable for DR Analysis)</b>	<b>14.2%</b>	<b>11.6%</b>
<b>Water Heating Saturation for Idaho</b>		
All equipment	43.7%	24.5%

## DR PROGRAM DESCRIPTIONS

This section identifies and describes the relevant DR programs for Avista. The programs are the same as the 2014 study and this section highlights the key features for each program and presents assumptions on program parameters that are required for potential and cost calculations. Program features describe characteristics such as targeted customer segment, typical end uses controlled, available hours, event notification and duration, type of response, incentive levels to participants, metering requirements and mechanisms for program delivery. In addition to these characteristics, this section presents participation, impact, and cost assumptions for each program. These assumptions serve as a foundation for potential and cost analysis results presented later in this section.

### RELEVANT DR PROGRAMS

Table 6-7 presents the DR programs included in our analysis. These programs are the same as the 2014 study. The DR programs can be classified into two types: non-pricing programs and pricing programs.

- Non-pricing programs represent firm, dispatchable resources that Avista could count on to fulfill system resource requirements when needed. The two types of non-pricing programs included in our analysis are Direct Load Control (DLC) and Firm Curtailment (FC) programs. DLC programs target space heating and water heating equipment usage, as described below.
- Dynamic pricing options, on the other hand, represent non-firm resources that may not be available for dispatch when needed. The pricing option considered to be relevant for Avista is Critical Peak Pricing (CPP).

Table 6-7 Relevant DR Programs for Avista

Category	Program	Applicable Customer Class
Non-pricing	Direct Load Control	General Service (GS)
		Large General Service (LGS)
	Firm Curtailment	Large General Service (LGS) Extra Large General Service (XLGS)
Pricing	Critical Peak Pricing	General Service (GS)
		Large General Service (LGS)
		Extra Large General Service (XLGS)

#### DIRECT LOAD CONTROL PROGRAM

The DLC program targets Avista's General Service and Large General Service customers in Washington and Idaho. This program directly controls electric space heating load in winter and water heating load throughout the year for these customers through a load control switch or a programmable thermostat for space heating. The two types of space heating equipment that can be controlled are central electric furnaces and heat pumps, which would be cycled on and off during the events. Water heaters would be completely turned off during the DR event period. Water heaters of all sizes are eligible for control. Table 6-8 below describes key DLC program attributes.

Table 6-8 *Direct Load Control Program Features*

<b>Program Attributes</b>	<b>Description</b>	<b>Comments</b>
<b>Targeted Segment</b>	General Service and Large General Service customers in WA and ID with eligible electric space heating and water heating equipment	Only heat pump and central furnaces are eligible for DLC. The combined saturation is 14.2% for GS and 12.9% for LGS in Washington. For Idaho, the saturation is 14.2% in GS and 11.6% in LGS. Electric water heating saturation is 40.1% in GS and 23.7% in LGS for Washington. For Idaho, the saturation is 43.7% in GS, and 24.5% in LGS.
<b>Resource Availability</b>	Space heating is controlled during the winter months (October-April). Most events are likely to be called during the months of December-February when demand is high. Water heating is controlled throughout the year.	October through April are the winter months for Avista. System peak usually occurs in December and demand is significantly high during January and February. Therefore, most events are likely to be called during December to February.
<b>Event Notification</b>	Day ahead event notification via email, phone, or SMS.	Avista peaks happen during the early morning hours so participants need to be provided with day ahead notification.
<b>Maximum Annual Event Hours</b>	60 hours	Based on Duke Energy Carolinas DLC program.
<b>Event Duration</b>	Event duration can range from 4 to 6 hours.	Based on Duke Energy Carolinas and Florida Power and Light's DLC program information.
<b>Type of Response</b>	Space heaters can be cycled or completely turned off during the event period or the temperature can be set using a Programmable Communicating Thermostat. Water heaters are completely shut off during the event period.	
<b>Delivery Mechanism</b>	Avista is responsible for delivering the program.	Most DLC programs in the industry are delivered directly by the utility.
<b>Participant Incentive</b>	\$60 annual payment for space heating control during the winter; \$50 annual payment for water heating control throughout the year.	Incentive payments to DLC customers are typically in the \$20-\$100 range. Our assumption is at the midpoint of this range for space heating control. For water heating control, we assumed \$4/month incentive for control all year round.
<b>Metering Requirements</b>	Customers can participate with existing meters.	Interval meters are not required to participate.

### *Direct Load Control Program Assumptions*

The key parameters required to estimate potential for a DLC program are participation rate, per participant load reduction and program costs. We have described below our assumptions of these parameters.

#### **Participation Rate**

The DLC program is offered to General Service and Large General Service customers with eligible space heating and water heating equipment. We used information from the most successful programs

identified in the FERC survey to develop these assumptions. Table 6-9 below shows participation rates assumptions.

*Table 6-9 DLC Participation Rates (% of eligible customers)*

Customer Class	Unit	2018	2019	2020	2021	2022-37
Participation Rates	% of eligible customers	1.5%	4.5%	9.0%	13.5%	15.0%

### DLC Load Reduction

Table 6-10 presents the per participant load reduction for space heating and water heating control and explains the basis for these assumptions.

*Table 6-10 Per Participant Impact Assumptions for Direct Load Control Program*

End Use and Customer Class	Value (kW)	Basis for Assumption
<b>Space Heating Control</b>		
General Service	1.50	Values are assumed to be 25% higher than residential impacts from Puget Sound Energy (PSE) residential DLC pilot.
Large General Service	15.0	Assumed to be 15% of the class average coincident demand of 100 kW.
<b>Water Heating Control</b>		
General Service	0.47	Values are assumed to be 25% higher than residential impacts from Puget Sound Energy (PSE) residential DLC pilot.
Large General Service	10.0	Assumed to be 10% of the class average coincident demand of 100 kW.

### Program Costs

Table 6-11 presents itemized cost assumptions for the DLC program and the basis for the assumptions.

Table 6-11 DLC Program Cost Assumptions

Assumption	Unit	Value	Basis for Assumption
<b>Program Development Cost</b>	\$/program	\$150,000	We assumed that 1 FTE (@\$150,000 annual cost) is required to develop the DLC program for both WA and ID and the cost is equally split between the two customer classes for each state.
<b>Program Administration Cost</b>	\$/year	\$150,000	We assumed 1 FTE annual cost for DLC program administration for WA and ID, split equally between the two customer classes.
<b>Annual Marketing and Recruitment Costs (GS)</b>	\$/new participant	\$100	Standard assumption for residential customers is \$50. For small commercial customers, we assumed costs to be 25% higher than the costs for residential.
<b>Annual Marketing and Recruitment Costs (Large GS)</b>	\$/new participant	\$133	We assumed 33% higher costs for Large General Service customers than comparable costs for General Service Customers.
<b>Cost of Equip + Install for Space Heating Control (GS)</b>	\$/new participant	\$375	Load control switch capital cost = \$100. Average of 1.25 control units per customer. Implies capital cost per participant = \$125. Switch installation cost = \$125. License and permit-related costs = \$125 per participant (25% higher than equivalent cost for residential customers at \$100).
<b>Cost of Equip + Install for Space Heating Control (Large GS)</b>	\$/new participant	\$550	Control switch capital and installation cost = \$200. License and permit-related costs = \$150 per participant.
<b>Cost of Equip + Install for Water Heating Control (GS)</b>	\$/new participant	\$350	Load control switch capital cost = \$100. Switch installation cost = \$125. One water heating control unit per participant. Implies cost per participant is \$225. License and permit-related costs = \$125 per participant (25% higher than equivalent cost for residential customers at \$100).
<b>Cost of Equip + Install for Water Heating Control (Large GS)</b>	\$/new participant	\$450	Load control switch capital and installation cost = \$150 each. License and permit-related costs = \$150 per participant (50% higher than equivalent cost for residential customers at \$100).
<b>Annual O&amp;M Cost (GS)</b>	\$/participant per year	\$15	Annual O&M cost = 10% of the control equipment cost.
<b>Annual O&amp;M Cost (Large GS)</b>	\$/participant per year	\$20	Annual O&M cost = 10% of the control equipment cost.
<b>Per participant annual incentive for Space Heating (GS)</b>	\$/participant per year	\$60	Incentive payments to DLC customers are typically in the \$20-\$100 range. Assumed values are at the midpoint of this range.
<b>Per participant annual incentive for Space Heating Control (Large GS)</b>	\$/participant per year	\$160	\$1.5/kW monthly incentive payment. For an average 15 kW of reduction per participant, this translates into \$160 total incentive payment over seven winter months.
<b>Per participant annual incentive for Water Heating control</b>	\$/participant per year	\$50	\$4/month incentive payment to participants. Water heaters are controlled throughout the year.

## Other Assumptions

Table 6-12 presents itemized cost assumptions for the DLC program and the basis for the assumptions.

*Table 6-12 DLC Program Lifetime and Capacity Derating Factor*

<b>Assumption</b>	<b>Unit</b>	<b>Value</b>	<b>Basis for Assumption</b>
Program Life	Years	8	The DLC program life is tied to the life of the switch. We assumed the control switch life to be 8 years.
Capacity derating factor	Factor	0.8	Capacity derating values generally range from 0.6 to 1.0. We assumed the de-rating factor to be at the midpoint of this range, with a value of 0.8.

## FIRM CURTAILMENT PROGRAM

The Firm Curtailment program targets Large General Service and Extra Large General Service customers in Avista's service territory. Under this program, participating customers agree to reduce demand by a specific amount or curtail their consumption to a pre-specified level. In return, they receive a fixed incentive payment in the form of capacity credits or reservation payments (typically expressed as \$/kW-month or \$/kW-year). Customers are paid to be on-call even though actual load curtailments may not occur. The amount of capacity payment typically varies with the firm reliability-commitment level. In addition to the fixed capacity payment, participants receive a payment for energy reduction. Because the program includes a contractual agreement for a specified level of load reduction, enrolled loads represent a firm resource and can be counted toward installed capacity (ICAP) requirements. Penalties may be assessed for under-performance or non-performance.

Table 6-13 below describes the key attributes for a Firm Curtailment program.

Table 6-13 Firm Curtailment Program Features

Program Attributes	Description	Comments
<b>Targeted Segment</b>	Large General Service and Extra Large General Service customers	C&I customers with a minimum of load of 100 kW are suitable for participation.
<b>Resource Availability</b>	Program is available year-round	Firm curtailment programs are available all year round.
	During the winter months of October to April, events can be called anytime between 6 AM to 10AM and 4PM to 8 PM on weekdays.	Events can be called to address dual peak during the winter season.
	During the summer months of May to September, events can be called anytime between 12 noon to 7 PM on weekdays.	Events can be called to address the late afternoon and early evening peak during summer.
<b>Event Notification</b>	Day ahead notification via email, phone or SMS.	Typically, events are called either a day in advance or 30 minutes prior to the event. Participants prefer day-ahead notification.
<b>Maximum Annual Event Hours</b>	60 hours	Typical specification in the industry.
<b>Event Duration</b>	Events can range from 1-8 hours.	Typical specification in the industry.
<b>Type of Response</b>	Non-essential load is curtailed; participants can also shift their usage to backup generators. Participants can either respond manually or have automated response strategies.	Program implementation experience.
<b>Delivery Mechanism</b>	The program is delivered through a third party.	Most utilities deliver Firm Curtailment programs through third parties.
<b>Delivery Cost</b>	Delivery cost consists of two components: 1) \$/kW-year capacity payment to the third-party at \$70/kW-year 2) Energy payment to the third party at \$110/MWh; Internal program administration cost for Avista is assumed to be approximately 10% of the capacity delivery cost. This increases the overall per kW delivery cost to \$77/kW-year.	Based on third party program implementation experience, capacity delivery cost is in the \$60-80/kW range and energy delivery cost is in the \$75-150/MWh range. We are using the midpoint of the ranges. We also assumed additional utility administrative costs to account program management, regulatory filings, internal book keeping, etc. These costs are estimated to be 10% of the capacity delivery cost.
<b>Participant Incentive</b>	The third party is responsible for payment of incentives to participants, so incentive cost is part of the delivery cost.	
<b>Metering and Communication Requirements</b>	Preferable to have 5-minute interval data but 15-minute or hourly data are sufficient. Participants should be able to receive and confirm curtailment requests in real time.	Typical specification for this type of program.

### ***Firm Curtailment Program Assumptions***

They key parameters required to estimate potential for a Firm Curtailment program are participation rate, per participant load reduction and program costs.

#### **Program Participation Rate**

Table 6-14 below shows Firm Curtailment participation assumptions. Based on industry experience, we estimate the program will ramp up to a steady-state participation level over three years, which is the typical contract duration for third-party delivered programs.

As noted in the table above, customers may use back-up generation to achieve load reduction under this program. We estimate that roughly one fourth of the load reduction achieved through this option would be provided by customers with backup generation.

*Table 6-14 Firm Curtailment Program Participation Rates (% of eligible customers)*

<b>Customer Class</b>	<b>Unit</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022-37</b>
Participation Rates	% of eligible customers	7.4%	14.9%	22.3%	22.3%	22.3%

#### **Per Participant Load Reduction**

Table 6-15 below presents the assumed per participant load reduction for the Firm Curtailment program and explains the basis for this assumption. Customers respond by curtailing a variety of end uses customized for their circumstances. Some customers also use back-up generators to achieve the load shed. Therefore, the estimates we present here may overlap with peak load reduction estimates Avista is developing in a separate study.

*Table 6-15 Per Participant Load Reduction Assumption for Firm Curtailment Program*

<b>Assumption</b>	<b>Unit</b>	<b>Value</b>	<b>Basis for Assumption</b>
Per-participant load reduction for Large General Service & Extra Large General Service	% of enrolled load	21%	Weighted average impact estimates from aggregator DR programs administered by CA utilities (Ref: 2012 Statewide Load Impact Evaluation of California Aggregator Demand Response Programs Volume 1: Ex-post and Ex-Ante Load Impacts; Christensen Associates Energy Consulting; April 1, 2013). We combined these estimates with data from the 2012 FERC National Survey database of DR programs.

#### **Program Costs**

Table 6-16 presents cost assumptions for the Firm Curtailment program. We developed these cost assumptions in consultation with industry experts. The delivery cost shown in the table represents Avista's all-in payment to the contracted third party for delivering a fixed amount of load reduction. It consists of two components: a capacity component and an energy component. The third party is responsible for all program costs including incentive payments to participants. Typically, 50 percent of the delivery cost is passed through as incentive payment to participants. Other than the third-party delivery costs, we assumed that Avista would incur additional internal administration costs for deploying this program.

Table 6-16 Firm Curtailment Program Cost Assumptions

Assumption	Unit	Value	Basis for Assumption
<b>Program Delivery Cost (administered by third party)</b>	\$/kW-year	\$77	Based on third-party program implementation experience, delivery cost is expected to be in the range of \$60-80/kW and we assumed the midpoint. This is inclusive of all costs to run the program, including equipment purchase and installation costs, maintenance costs, network communications costs, sales and marketing costs, and payments to the customer. Avista would also incur administrative costs for program management, regulatory filings, internal book keeping, etc. These costs were estimated to be 10% of the capacity delivery costs.
<b>Payment for energy delivery</b>	\$/kWh	\$0.11	Based on third-party program implementation experience, energy dispatch prices typically fall in the \$75-150/MWh range. Our assumed price level is at the midpoint of this range.

### Other Assumptions

The other key parameters needed for potential and cost analysis are program life and capacity derating factor. Table 6-17 below describes these assumptions for the Firm Curtailment program.

Table 6-17 Firm Curtailment Program Lifetime and Capacity Derating Factor

Assumption	Unit	Value	Basis for Assumption
Program Life	Years	3	Typical contract duration for third-party delivered Firm Curtailment programs.
Capacity derating factor	Factor	0.8	Capacity derating values generally range from 0.6 to 1.0. We assumed the de-rating factor to be at the midpoint of this range, with a value 0.8.

### CRITICAL PEAK PRICING

The Critical Peak Pricing (CPP) option involves significantly higher prices during relatively short critical peak periods on event days only to encourage customers to reduce their usage. CPP is usually offered in conjunction with a time-of-use rate, which implies at least three time periods: critical peak, on peak and off peak. The customer incentive is a more heavily discounted rate during off-peak hours throughout the year (relative a standard TOU rate). Event days are dispatched on relatively short notice (day ahead or day of) typically for a limited number of days during the year. Over time, event-trigger criteria become well-established so that customers can expect events based on hot weather or other factors. Events can also be called during times of system contingencies or emergencies. The CPP rate included here is based on a 6:1 peak to off-peak price ratio assumption. We assumed that this rate is offered to all three C&I classes.

We considered two types of offerings for CPP. With an **opt-in** rate, participants voluntarily enroll in the rate. With an **opt-out** rate, all customers are placed on the time-varying rate, but they may opt-out and select another rate if they so desire. Table 6-18 describes the features of a CPP rate program.

Table 6-18 Critical Peak Pricing Program Features

Program Attributes	Description	Comments
<b>Targeted Segment</b>	General Service and Large General Service customers.	Customers of all sizes are eligible to participate in a CPP program.
<b>Type of Offer</b>	Two types of offers are possible: <ol style="list-style-type: none"> <li>1. CPP is offered as a voluntary rate to all customer classes with opt-in provision.</li> <li>2. CPP is offered as a default rate to all customer classes with opt-out provision.</li> </ol>	
<b>Resource Availability</b>	CPP events can be called any time during the year, based on system requirements.	
<b>Event Notification</b>	Day ahead event notification via email, phone, or SMS.	Participants can be notified on either a day-ahead or day-of basis, but day-ahead is preferred.
<b>Maximum Number of CPP Events in a Year</b>	10 to 15	Avista can choose to call more events during winter and fewer or none during summer, as needed.
<b>Maximum Annual Event Hours</b>	60 hours	Industry experience.
<b>Event Duration</b>	Typical event duration is 4 hours.	Industry experience.
<b>Type of Response</b>	Load curtailment and shifting to backup generators. Enabling technology can enhance response. For GS and LGS, enabling technology is assumed to PCT. For Extra Large General Service, enabling technology is assumed to be Auto-DR.	
<b>Delivery Mechanism</b>	Avista is responsible for delivering the program.	
<b>Participant Incentive</b>	The critical peak to off-peak price differential induces participant to reduce usage during critical peak periods. The off-peak rate is lower than the participant's standard rate.	
<b>Metering Requirements</b>	AMI is required for metering and settlement.	

### *Critical Peak Pricing Program Assumptions*

The key parameters required to estimate potential for CPP are participation rate, per participant load reduction and costs for deploying these rates. Below we described our assumptions for these parameters.

#### **Program Participation Rate**

We have defined participation rates for two pricing options, assuming independent offers of CPP rates: voluntary, opt-in CPP rates to all customers and default CPP rates with opt-out.

Table 6-19 presents assumed participation rates for C&I customers in independent CPP rate offerings. We assumed that participation ramps up over a five-year timeframe to reach a steady-state level. For

the opt-in offer, ramp up to steady-state participation follows an “S-shaped” diffusion curve, in which the participation growth rate accelerates over the first half of the five-year period and then slows over the second half. A similar but inverse S-shaped diffusion curve is used to account for the rate at which customers opt out of the default rate.

Participation in CPP rates requires advanced metering infrastructure (AMI). Avista’s Extra Large General Service customers have sophisticated telemetry and communications infrastructure in place and may be offered CPP rates immediately. For the other two customer classes, CPP is not yet available. Therefore, we assumed that CPP rates can be offered to General Service and Large General Service customers at a later date, when AMI rollout is completed.

The participation assumptions are based on Brattle’s extensive database on pricing program and pilot experiences.

*Table 6-19 Critical Peak Pricing Program Participation Rates (% of eligible customers)*

Customer Class	Start Yr.	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yrs. 5-19	Comments
<b>Opt-in</b>							
General Service & Large General Service	2021	1.8%	5.4%	10.8%	16.2%	18.0%	Standalone participation estimates represent average enrollment rates in independent rate offerings across full scale deployments and market research studies.
Extra Large General Service	2018	1.8%	5.4%	10.8%	16.2%	18.0%	
<b>Opt-out</b>							
General Service & Large General Service	2021	100%	96.0%	85.7%	65.8%	63.0%	(Source: Brattle’s Pricing Program Database)
Extra Large General Service	2018	100%	96.0%	85.7%	65.8%	63.0%	

### Percentage of Customers with Enabling Technology in CPP Rates

Studies have shown that impacts from dynamic pricing programs vary, according to whether customers have enabling technology to automate their response. For General Service and Large General Service customers, the enabling technology is a programmable communicating thermostat (PCT). For Extra Large General Service customers, the enabling technology is Automated Demand Response (Auto-DR), implemented through energy management and control systems. Table 6-20 shows the percentage of CPP participants equipped with enabling technology for the opt-in and opt-out cases.

*Table 6-20 Percentage of CPP Participants with Enabling Technology (% of total participants)*

Option	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yrs. 5-19
Opt-in CPP	25%	25%	25%	25%	25%
Opt-out CPP	2%	4%	6%	8%	10%

### Per Participant Load Reduction

Table 6-21 below presents assumed per participant load reduction in CPP rates by customer class. The assumed impact values are based on a 6:1 critical peak to off-peak price ratio. Estimated load reductions with enabling technology are significantly higher than those achieved without enabling technology use.

Table 6-21 Per Participant Load Reduction in CPP Rates by Customer Class

Customer Class	Value	Comments
GS without enabling technology	0.6%	
GS with enabling technology	12.5%	These impacts assume 6:1 critical peak to off-peak price ratio. Source: Brattle's Database on Pricing Programs.
Large GS without enabling technology	7.3%	
Large GS with enabling technology	11.7%	
Extra Large GS without enabling technology	8.4%	
Extra Large GS with enabling technology	15.6%	

### Program Costs

The major cost components for implementation of time varying rates are the fixed annual costs for administering the rates and providing billing analysis. For an opt-out offer, additional call center staff may be required during the initial program years to handle the relatively large volume of calls from customers defaulted to these rates.

Table 6-22 below shows cost assumptions for deployment of opt-in and opt-out CPP rates. The cost items for the CPP program are similar to those for TOU rates. A major portion of CPP program costs is enabling technology purchase and installation for a fraction of the total participants.

Table 6-22 CPP Program Cost Assumptions for Opt-in and Opt-out Offers

Item	Unit	Value	Comments
<b>Costs Applicable to Opt-in and Opt-out</b>			
Program Development Cost	\$/program	\$170,000	One FTE at \$170,000 annual cost for program development.
Annual Program Administration Cost	\$/year	\$170,000	One FTE at \$170,000 annual cost to administer the CPP rates.
Billing Analyst Cost	\$/year	\$105,000	One billing analyst at \$105,000 in the call center to provide customer service.
Enabling Technology Cost	\$/GS participant	\$375	We assumed per participant PCT capital and installation cost is the same as DLC.
	\$/LGS participant	\$550	We assumed per participant PCT capital and installation cost is the same as DLC.
	\$/kW load reduction for XLGS participant	\$200	Based on Auto-DR enablement costs from a CA utility.
Billing system upgrade	\$	\$7.5 million	Avista provided this estimate.
<b>Additional Costs Applicable to Opt-in</b>			
Per Customer Annual Marketing/Recruitment Cost	\$/new GS participant	\$100	Same as DLC program marketing cost.
	\$/new LGS participant	\$133	For LGS customers, costs are assumed to be a third higher than costs for GS customers.
	\$/new XLGS participant	\$250	For XLGS customers, costs are assumed to be approximately double the costs for LGS customers.
<b>Additional Costs Applicable to Opt-out</b>			
Additional call center staff	\$/yr. for first two program years	\$255,000	We assumed that 3 additional call center staff at \$85,000 each annual cost to handle customer calls for an opt-out rate.
Per Customer Annual Marketing/Recruitment Cost	\$/new GS participant	\$10	For opt-out CPP rates, these costs are assumed to be one-tenth of the costs for opt-in CPP rates.
	\$/new LGS participant	\$15	
	\$/new XLGS participant	\$25	

### Other Assumptions

The other key parameters needed for potential and cost analysis are program life and capacity derating factor. Table 6-23 below describes these assumptions for the pricing options.

Table 6-23 Program Lifetime and Capacity Derating Factor for Pricing Options

Assumption	Unit	Value	Basis for Assumption
Program Life	Years	20	Program life is tied to the life of the interval meter.
Capacity derating factor	Factor	0.5	Load reductions from pricing options are less firm than load reductions from non-pricing options. Therefore, we assumed capacity derating factor to be lower at 0.5.

## OTHER CROSS-CUTTING ASSUMPTIONS

In addition to the above program-specific assumptions, there are three that affect all programs:

- **Discount rate.** We used a nominal discount rate of 5.21% to calculate the net present value (NPV) of costs over the useful life of each DR program. All cost results are shown in nominal dollars. We assumed 1.86% inflation rate for escalating costs.
- **Line losses.** Avista provided a line loss factor of 6.5% to convert estimated demand savings at the customer meter level to demand savings at the generator level. In the next section, we report our analysis results at the generator level.
- **Snapback.** In this context, snapback refers to the amount of energy savings that result from DR programs. We have assumed in this analysis that the amount of kWh savings from DR programs is negligible since most of the reduction during events is typically shifted to other times of day, either before or after the event.

## DR POTENTIAL AND COST ESTIMATES

This section presents analysis results on demand savings and cost estimates for DR programs. We developed savings estimates in two ways:

- We conducted an independent assessment of DR options which considered each option as a standalone offering. As such, this approach does not account for participation overlaps among DR options targeted at the same customer segment and therefore savings and cost results for individual DR options are not additive. The standalone analysis results help provide a comparative assessment of individual DR options and costs and are useful for selection of DR options in a program portfolio.
- At the very end of this section, we present high-level results in 2037 after considering integrated effects that occur if more than one DR option is offered to Avista customers.

All potential results presented in this section represent capacity savings in terms of equivalent generation capacity after derating factors have been applied.

### POTENTIAL RESULTS

Figure 6-1 and Table 6-24 show demand savings from individual DR options for selected years of the analysis. These savings represent combined savings from DR options in Avista's Washington and Idaho service territories.

Key findings include:

- The firm curtailment option has the highest savings potential and approximately 2.9%-3.0% of estimated C&I peak demand from 2020 onward. We assumed that Avista offers this option to Large General Service and Extra Large General Service customers immediately and participation ramps up to a steady state within 3 years. Therefore, potential remains almost steady from that time onward. The savings for this program are slightly higher than the previous study's estimate of 2.7-2.8%, due to the increase in the number of customers in the territory.
- An opt-out CPP offer has second highest savings potential at approximately 2.2% of C&I peak demand from 2025 onward. We assumed that Avista could offer this as a default rate to all customer classes after AMI deployment is completed. Participation ramps up over a five-year timeframe and reaches a steady state by 2025. Only Extra Large General Service customers are assumed to have the necessary metering infrastructure in place and could be offered a CPP rate immediately. The increase in the number of customers also accounts for the increase in savings for this program from the previous study, up from 2%.
- DLC for General Service and Large General Service customers provides the third highest savings potential at approximately 0.6% of C&I peak demand from 2021 onward. This is offered in 2018 and ramps up to steady-state participation levels by 2022. The savings for this program are down

from 1% in the previous study, due to the updated equipment saturations as described in Table 6-5 and Table 6-6.

- Savings potential from opt-in CPP are approximately 0.7% of the system peak from 2024.

Figure 6-1 Summary of Potential Analysis for Avista (MW @Generator)

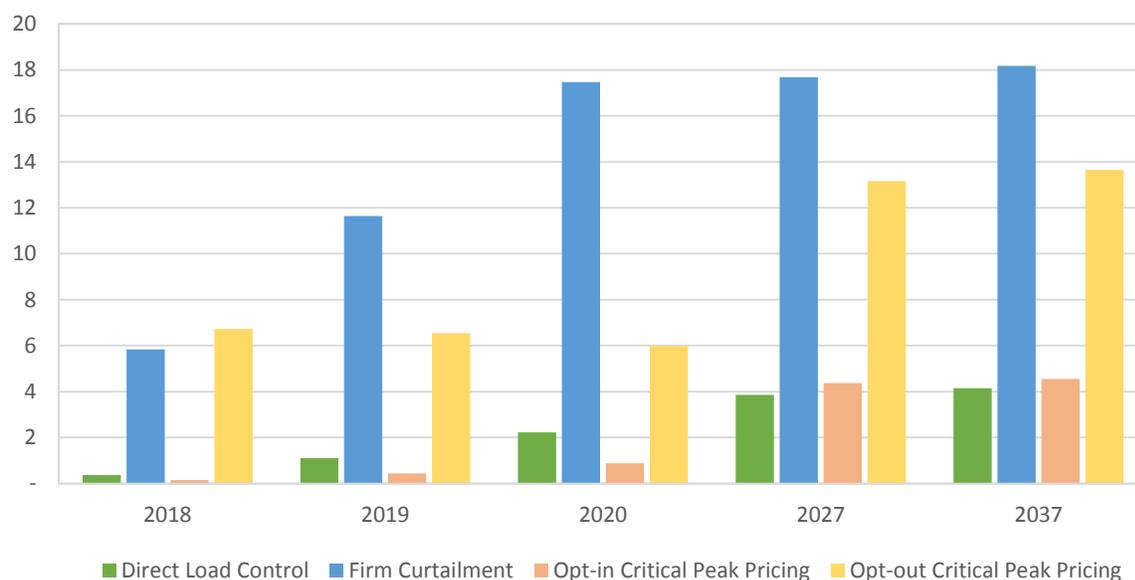


Table 6-24 Achievable DR Potential by Option for Avista (MW @Generator)

	2018	2019	2020	2027	2037
<b>Total System Peak (MW)</b>	<b>1,710</b>	<b>1,717</b>	<b>1,724</b>	<b>1,773</b>	<b>1,845</b>
<b>Weather Sensitive Peak (MW)</b>	<b>1,576</b>	<b>1,583</b>	<b>1,590</b>	<b>1,639</b>	<b>1,711</b>
<b>Estimated C&amp;I Peak (MW)</b>	<b>577</b>	<b>579</b>	<b>581</b>	<b>598</b>	<b>627</b>
<b>Achievable Potential (MW)</b>					
Direct Load Control	0.37	1.10	2.22	3.86	4.15
Firm Curtailment	5.84	11.64	17.46	17.68	18.18
Opt-in Critical Peak Pricing	0.14	0.44	0.88	4.37	4.55
Opt-out Critical Peak Pricing	6.72	6.55	5.98	13.16	13.64
<b>Achievable Potential (% of C&amp;I Peak)</b>					
Direct Load Control	0.06%	0.19%	0.38%	0.65%	0.66%
Firm Curtailment	1.01%	2.01%	3.00%	2.95%	2.90%
Opt-in Critical Peak Pricing	0.03%	0.08%	0.15%	0.73%	0.73%
Opt-out Critical Peak Pricing	1.16%	1.13%	1.03%	2.20%	2.18%

Table 6-25 and Table 6-26 show demand savings by individual DR option for the states of Washington and Idaho separately.

Table 6-25 Achievable DR Potential by Option for Washington (MW @Generator)

	2018	2019	2020	2027	2037
<b>Total System Peak (MW)</b>	<b>1,710</b>	<b>1,717</b>	<b>1,724</b>	<b>1,773</b>	<b>1,845</b>
<b>Weather Sensitive Peak (MW)</b>	<b>1,576</b>	<b>1,583</b>	<b>1,590</b>	<b>1,639</b>	<b>1,711</b>
<b>Estimated C&amp;I Peak (MW)</b>	<b>364</b>	<b>366</b>	<b>368</b>	<b>382</b>	<b>406</b>
<b>Achievable Potential (MW)</b>					
Direct Load Control	0.22	0.66	1.33	2.31	2.47
Firm Curtailment	3.81	7.61	11.46	11.81	12.46
Opt-in Critical Peak Pricing	0.09	0.28	0.56	2.86	3.04
Opt-out Critical Peak Pricing	4.22	4.13	3.81	8.68	9.22
<b>Achievable Potential (% of C&amp;I Peak)</b>					
Direct Load Control	0.06%	0.18%	0.36%	0.60%	0.61%
Firm Curtailment	1.05%	2.08%	3.12%	3.09%	3.07%
Opt-in Critical Peak Pricing	0.02%	0.08%	0.15%	0.75%	0.75%
Opt-out Critical Peak Pricing	1.16%	1.13%	1.03%	2.27%	2.27%

Table 6-26 Achievable DR Potential by Option for Idaho (MW @Generator)

	2018	2019	2020	2027	2037
<b>Total System Peak (MW)</b>	<b>1,710</b>	<b>1,717</b>	<b>1,724</b>	<b>1,773</b>	<b>1,845</b>
<b>Weather Sensitive Peak (MW)</b>	<b>1,576</b>	<b>1,583</b>	<b>1,590</b>	<b>1,639</b>	<b>1,711</b>
<b>Estimated C&amp;I Peak (MW)</b>	<b>213</b>	<b>213</b>	<b>214</b>	<b>216</b>	<b>220</b>
<b>Achievable Potential (MW)</b>					
Direct Load Control	0.15	0.44	0.89	1.55	1.67
Firm Curtailment	2.03	4.03	6.01	5.87	5.71
Opt-in Critical Peak Pricing	0.05	0.16	0.32	1.52	1.51
Opt-out Critical Peak Pricing	2.50	2.42	2.19	4.48	4.43
<b>Achievable Potential (% of C&amp;I Peak)</b>					
Direct Load Control	0.07%	0.21%	0.42%	0.72%	0.76%
Firm Curtailment	0.95%	1.89%	2.81%	2.72%	2.59%
Opt-in Critical Peak Pricing	0.03%	0.08%	0.15%	0.70%	0.69%
Opt-out Critical Peak Pricing	1.17%	1.13%	1.02%	2.08%	2.01%

## COST RESULTS

Table 6-27 presents total utility costs for deployment of individual DR options over the 2016-2037 timeframe. It also shows the average annual cost and the levelized costs per kW of equivalent generation capacity over 2016-2037. We show the 2037 savings potential from DR options for reference purposes.

Table 6-27 DR Program Costs and Potential

DR Option	2037 MW Potential	2018-2037 Cumulative Utility Spend (Million \$)	2018-2037 Avg. Spend per Year (Million \$)	2018-2037 Levelized Cost (\$/kW-year)
Direct Load Control	4.15	\$12.11	\$0.61	\$183.75
Firm Curtailment	18.18	\$40.57	\$2.03	\$119.71
Opt-in Critical Peak Pricing	4.55	\$23.81	\$1.19	\$356.57
Opt-out Critical Peak Pricing	13.64	\$24.86	\$1.24	\$95.00

Key findings include:

- The Firm Curtailment option delivers the highest savings at approximately \$118.6/kW-year cost. The cumulative costs to Avista over a 20-year planning period for realizing 18 MW of savings in 2037 is around \$40.5 million. Capacity-based and energy-based payments to the third-party constitutes the major cost component for this option. In addition, Avista incurs a relatively small amount of internal administrative costs for managing the third party.
- Opt-out CPP has lowest levelized cost among all the DR options. It delivers 13.6 MW of savings in 2037 at \$95/kW-year. We estimate that Avista would need to spend approximately \$25 million over 2018-2037 to deploy a default CPP rate to all customer classes. Enabling technology purchase and installation costs for enhancing customer response is a large part of CPP deployment costs.
- Opt-in CPP has a cost of \$357/kW-year and is significantly higher than the opt-out CPP option. The major cost component for an opt-in CPP offer is the annual fixed program administration cost for administering the rate. This cost is spread over the smaller number of customers who choose to participate in this rate.
- Direct Load Control provides third highest savings, 4.15 MW in 2037, at a relatively high cost of \$184/kW-year. The significant cost components for DLC program implementation are associated with purchase and installation of enabling technology and with program marketing and outreach activities. There are also additional permitting and licensing fees that Avista customers must incur.

Table 6-28 and Table 6-29 present the utility costs for deployment of individual DR options over the 2016-2037 timeframe for Washington and Idaho, respectively.

Table 6-28 DR Program Costs and Potential, Washington

DR Option	2037 MW Potential	2018-2037 Cumulative Utility Spend (Million \$)	2018-2037 Avg. Spend per Year (Million \$)	2018-2037 Levelized Cost (\$/kW-year)
Direct Load Control	2.48	\$6.63	\$0.33	\$168.46
Firm Curtailment	12.46	\$27.21	\$1.36	\$119.87
Opt-in Critical Peak Pricing	3.04	\$12.18	\$0.61	\$279.40
Opt-out Critical Peak Pricing	9.22	\$12.73	\$0.64	\$74.18

Table 6-29 DR Program Costs and Potential, Idaho

DR Option	2037 MW Potential	2018-2037 Cumulative Utility Spend (Million \$)	2018-2037 Avg. Spend per Year (Million \$)	2018-2037 Levelized Cost (\$/kW-year)
Direct Load Control	1.67	\$5.48	\$0.27	\$206.47
Firm Curtailment	5.71	\$13.36	\$0.67	\$119.39
Opt-in Critical Peak Pricing	1.51	\$11.63	\$0.58	\$503.04
Opt-out Critical Peak Pricing	4.43	\$12.14	\$0.61	\$135.05

### INTEGRATED RESULTS

The above analysis assumes that the programs are offered on a stand-alone basis. That is, only one program, and not the others, is offered to Avista customers. If Avista offered more than one program, then the potential for double counting exists. To address this possibility, we created a participation hierarchy to define the order in which the programs are taken by customers. Then we computed the savings and costs under this scenario. We assumed the following hierarchy:

1. Direct Load Control
2. Firm Curtailment
3. Opt-in CPP or Opt-out CPP

Table 6-30 shows the potential estimates in 2037, as well as the costs, if more than one program is offered. The savings and costs for DLC remain unchanged, since it is the first in the hierarchy. However, the savings for Firm Curtailment and CPP are slightly lower as are the cumulative and average program costs. Levelized costs for Firm Curtailment are slightly lower as well, but the levelized cost for CPP are higher because the program costs are spread across a smaller amount of savings.

Table 6-30 DR Program Costs and Potential – Interactive

DR Option	2037 MW Potential	2018-2037 Cumulative Utility Spend (Million \$)	2018-2037 Avg. Spend per Year (Million \$)	2018-2037 Levelized Cost (\$/kW-year)
Direct Load Control	4.15	\$12.11	\$0.61	\$183.75
Firm Curtailment	17.77	\$40.57	\$2.03	\$119.71
Opt-in Critical Peak Pricing	3.57	\$23.56	\$1.18	\$448.72
Opt-out Critical Peak Pricing	10.58	\$24.58	\$1.23	\$119.72

Table 6-31 and Table 6-32 show the potential cost and savings estimates in 2037 for the interactive analysis by state.

Table 6-31 DR Program Costs and Potential – Interactive, Washington

DR Option	2037 MW Potential	2018-2037 Cumulative Utility Spend (Million \$)	2018-2037 Avg. Spend per Year (Million \$)	2018-2037 Levelized Cost (\$/kW-year)
Direct Load Control	2.48	\$6.63	\$0.33	\$168.46
Firm Curtailment	12.19	\$27.21	\$1.36	\$119.87
Opt-in Critical Peak Pricing	2.38	\$12.03	\$0.60	\$352.17
Opt-out Critical Peak Pricing	713	\$12.56	\$0.63	\$93.51

Table 6-32 DR Program Costs and Potential – Interactive, Idaho

DR Option	2037 MW Potential	2018-2037 Cumulative Utility Spend (Million \$)	2018-2037 Avg. Spend per Year (Million \$)	2018-2037 Levelized Cost (\$/kW-year)
Direct Load Control	1.67	\$5.48	\$0.27	\$206.47
Firm Curtailment	5.58	\$13.36	\$0.67	\$119.39
Opt-in Critical Peak Pricing	1.20	\$11.52	\$0.58	\$630.07
Opt-out Critical Peak Pricing	3.45	\$12.02	\$0.60	\$169.80

## **MARKET PROFILES**

This appendix presents the market profiles for each sector and segment for Washington, followed by Idaho.

Table A-1 Residential Single Family Electric Market Profile, Washington

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	48.3%	1,525.20	737.19	98.40
Cooling	Room AC	15.2%	463.56	70.29	9.38
Cooling	Evaporative AC	1.3%	1,100.12	14.32	1.91
Cooling	Air-Source Heat Pump	8.1%	1,597.80	129.49	17.28
Heating	Air-Source Heat Pump	8.1%	11,611.80	941.03	125.61
Cooling	Geothermal Heat Pump	0.3%	1,410.60	4.21	0.56
Heating	Geothermal Heat Pump	0.3%	5,117.40	15.26	2.04
Heating	Electric Furnace	7.3%	15,423.51	1,129.52	150.77
Heating	Electric Room Heat	6.3%	13,546.80	855.98	114.26
Water Heating	Water Heater (<= 55 Gal)	43.0%	3,866.30	1,661.33	221.76
Water Heating	Water Heater (> 55 Gal)	5.7%	4,065.36	231.47	30.90
Interior Lighting	General Service Lighting	100.0%	1,037.41	1,037.41	138.48
Interior Lighting	Linear Lighting	100.0%	115.49	115.49	15.42
Interior Lighting	Exempted Lighting	100.0%	389.36	389.36	51.97
Exterior Lighting	Screw-In	100.0%	390.50	390.50	52.13
Appliances	Refrigerator	100.0%	826.64	826.64	110.34
Appliances	Second Refrigerator	29.6%	962.88	284.78	38.01
Appliances	Freezer	59.2%	659.01	390.10	52.07
Appliances	Clothes Washer	96.4%	97.03	93.55	12.49
Appliances	Clothes Dryer	38.8%	871.72	338.55	45.19
Appliances	Dishwasher	82.1%	441.53	362.64	48.41
Appliances	Stove/Oven	67.3%	509.28	342.61	45.73
Appliances	Microwave	98.0%	147.14	144.19	19.25
Electronics	Personal Computers	81.4%	199.81	162.68	21.71
Electronics	Monitor	96.5%	84.25	81.28	10.85
Electronics	Laptops	113.3%	52.61	59.59	7.95
Electronics	Printer/Fax/Copier	86.5%	67.82	58.66	7.83
Electronics	TVs	209.5%	253.00	530.05	70.75
Electronics	Set-top Boxes/DVRs	203.2%	124.80	253.66	33.86
Electronics	Devices and Gadgets	100.0%	119.92	119.92	16.01
Miscellaneous	Electric Vehicles	0.3%	4,324.00	12.58	1.68
Miscellaneous	Pool Heater	0.8%	4,044.55	31.29	4.18
Miscellaneous	Pool Pump	3.1%	2,526.09	78.17	10.43
Miscellaneous	Furnace Fan	76.1%	209.73	159.65	21.31
Miscellaneous	Well Pump	14.9%	645.15	96.09	12.83
Miscellaneous	Miscellaneous	100.0%	744.99	744.99	99.44
<b>Total</b>				<b>12,894.5</b>	<b>1,721.2</b>

Table A-2 Residential Multifamily Electric Market Profile, Washington

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	16.3%	355.38	57.99	0.71
Cooling	Room AC	48.1%	282.13	135.58	1.67
Cooling	Evaporative AC	0.9%	292.86	2.66	0.03
Cooling	Air-Source Heat Pump	4.3%	355.33	15.17	0.19
Heating	Air-Source Heat Pump	4.3%	1,525.63	65.13	0.80
Cooling	Geothermal Heat Pump	0.0%	313.70	-	-
Heating	Geothermal Heat Pump	0.0%	672.35	-	-
Heating	Electric Furnace	7.7%	2,786.23	213.54	2.63
Heating	Electric Room Heat	74.4%	2,447.21	1,821.81	22.40
Water Heating	Water Heater (<= 55 Gal)	65.9%	2,205.31	1,453.96	17.88
Water Heating	Water Heater (> 55 Gal)	8.7%	2,318.85	202.57	2.49
Interior Lighting	General Service Lighting	100.0%	572.65	572.65	7.04
Interior Lighting	Linear Lighting	100.0%	43.06	43.06	0.53
Interior Lighting	Exempted Lighting	100.0%	33.02	33.02	0.41
Exterior Lighting	Screw-In	100.0%	0.01	0.01	0.00
Appliances	Refrigerator	100.0%	715.36	715.36	8.80
Appliances	Second Refrigerator	3.0%	833.25	25.29	0.31
Appliances	Freezer	47.1%	571.74	269.03	3.31
Appliances	Clothes Washer	84.7%	82.99	70.31	0.86
Appliances	Clothes Dryer	71.0%	599.33	425.44	5.23
Appliances	Dishwasher	72.4%	382.79	277.21	3.41
Appliances	Stove/Oven	75.5%	356.68	269.33	3.31
Appliances	Microwave	96.0%	127.95	122.81	1.51
Electronics	Personal Computers	35.9%	173.75	62.38	0.77
Electronics	Monitor	42.5%	73.26	31.17	0.38
Electronics	Laptops	50.3%	45.75	23.02	0.28
Electronics	Printer/Fax/Copier	50.0%	58.97	29.51	0.36
Electronics	TVs	127.0%	268.95	341.49	4.20
Electronics	Set-top Boxes/DVRs	105.9%	108.52	114.91	1.41
Electronics	Devices and Gadgets	100.0%	104.27	104.27	1.28
Miscellaneous	Electric Vehicles	0.0%	4,324.00	-	-
Miscellaneous	Pool Heater	0.0%	3,517.00	-	-
Miscellaneous	Pool Pump	0.0%	2,196.60	-	-
Miscellaneous	Furnace Fan	19.1%	74.65	14.27	0.18
Miscellaneous	Well Pump	0.0%	556.00	-	-
Miscellaneous	Miscellaneous	100.0%	223.75	223.75	2.75
<b>Total</b>				<b>7,736.7</b>	<b>95.1</b>

Table A-3 Residential Manufactured Home Electric Market Profile, Washington

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	31.3%	556.00	174.15	1.38
Cooling	Room AC	28.6%	439.25	125.70	0.99
Cooling	Evaporative AC	1.7%	354.05	6.16	0.05
Cooling	Air-Source Heat Pump	5.1%	556.00	28.51	0.23
Heating	Air-Source Heat Pump	5.1%	6,330.00	324.62	2.57
Cooling	Geothermal Heat Pump	0.0%	489.50	-	-
Heating	Geothermal Heat Pump	0.0%	2,900.25	-	-
Heating	Electric Furnace	51.5%	7,693.65	3,960.21	31.30
Heating	Electric Room Heat	4.1%	6,757.50	275.67	2.18
Water Heating	Water Heater (<= 55 Gal)	63.5%	2,370.29	1,505.43	11.90
Water Heating	Water Heater (> 55 Gal)	8.4%	2,492.32	209.74	1.66
Interior Lighting	General Service Lighting	100.0%	643.13	643.13	5.08
Interior Lighting	Linear Lighting	100.0%	68.13	68.13	0.54
Interior Lighting	Exempted Lighting	100.0%	119.65	119.65	0.95
Exterior Lighting	Screw-In	100.0%	142.66	142.66	1.13
Appliances	Refrigerator	100.0%	679.45	679.45	5.37
Appliances	Second Refrigerator	20.7%	791.42	163.67	1.29
Appliances	Freezer	61.3%	545.58	334.35	2.64
Appliances	Clothes Washer	91.4%	80.02	73.16	0.58
Appliances	Clothes Dryer	66.7%	898.03	599.43	4.74
Appliances	Dishwasher	71.1%	365.62	259.91	2.05
Appliances	Stove/Oven	83.0%	510.08	423.61	3.35
Appliances	Microwave	95.3%	121.55	115.85	0.92
Electronics	Personal Computers	46.4%	165.06	76.55	0.61
Electronics	Monitor	55.0%	69.60	38.25	0.30
Electronics	Laptops	80.0%	43.46	34.77	0.27
Electronics	Printer/Fax/Copier	59.0%	56.02	33.07	0.26
Electronics	TVs	159.1%	272.78	433.89	3.43
Electronics	Set-top Boxes/DVRs	106.2%	103.10	109.49	0.87
Electronics	Devices and Gadgets	100.0%	99.06	99.06	0.78
Miscellaneous	Electric Vehicles	0.1%	4,324.00	6.33	0.05
Miscellaneous	Pool Heater	0.0%	3,341.15	-	-
Miscellaneous	Pool Pump	0.0%	2,086.77	-	-
Miscellaneous	Furnace Fan	85.3%	158.46	135.13	1.07
Miscellaneous	Well Pump	0.0%	428.45	-	-
Miscellaneous	Miscellaneous	100.0%	405.31	405.31	3.20
<b>Total</b>				<b>11,605.0</b>	<b>91.7</b>

Table A-4 Residential Low Income Electric Market Profile, Washington

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	19.6%	480.40	94.08	6.20
Cooling	Room AC	44.3%	345.68	153.18	10.09
Cooling	Evaporative AC	1.0%	368.35	3.72	0.24
Cooling	Air-Source Heat Pump	4.6%	483.79	22.11	1.46
Heating	Air-Source Heat Pump	4.6%	2,412.87	110.25	7.26
Cooling	Geothermal Heat Pump	0.0%	426.85	0.07	0.00
Heating	Geothermal Heat Pump	0.0%	1,075.48	0.18	0.01
Heating	Electric Furnace	21.9%	3,673.49	803.75	52.94
Heating	Electric Room Heat	53.8%	3,226.50	1,735.28	114.29
Water Heating	Water Heater (<= 55 Gal)	64.4%	2,142.41	1,379.61	90.87
Water Heating	Water Heater (> 55 Gal)	8.5%	2,252.71	192.21	12.66
Interior Lighting	General Service Lighting	100.0%	605.80	605.80	39.90
Interior Lighting	Linear Lighting	100.0%	49.59	49.59	3.27
Interior Lighting	Exempted Lighting	100.0%	61.59	61.59	4.06
Exterior Lighting	Screw-In	100.0%	35.92	35.92	2.37
Appliances	Refrigerator	100.0%	679.76	679.76	44.77
Appliances	Second Refrigerator	6.2%	791.79	49.45	3.26
Appliances	Freezer	49.1%	543.46	266.94	17.58
Appliances	Clothes Washer	86.0%	79.03	67.99	4.48
Appliances	Clothes Dryer	68.8%	609.68	419.18	27.61
Appliances	Dishwasher	72.8%	363.90	265.07	17.46
Appliances	Stove/Oven	75.8%	360.04	272.81	17.97
Appliances	Microwave	96.0%	121.55	116.73	7.69
Electronics	Personal Computers	39.5%	165.06	65.19	4.29
Electronics	Monitor	46.8%	69.60	32.57	2.15
Electronics	Laptops	56.8%	43.46	24.67	1.62
Electronics	Printer/Fax/Copier	53.0%	56.02	29.68	1.95
Electronics	TVs	134.8%	254.54	342.99	22.59
Electronics	Set-top Boxes/DVRs	111.4%	103.10	114.89	7.57
Electronics	Devices and Gadgets	100.0%	99.06	99.06	6.52
Miscellaneous	Electric Vehicles	0.0%	4,324.00	-	-
Miscellaneous	Pool Heater	0.0%	3,341.15	1.46	0.10
Miscellaneous	Pool Pump	0.2%	2,086.77	3.66	0.24
Miscellaneous	Furnace Fan	28.7%	90.41	25.99	1.71
Miscellaneous	Well Pump	0.8%	518.83	4.38	0.29
Miscellaneous	Miscellaneous	100.0%	223.36	223.36	14.71
<b>Total</b>				<b>8,353.1</b>	<b>550.2</b>

Table A-5 Commercial Small Office Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.5%	4.73	0.02	0.45
Cooling	Water-Cooled Chiller	0.0%	5.36	-	-
Cooling	RTU	74.3%	3.91	2.90	54.69
Cooling	Room AC	2.7%	4.02	0.11	2.04
Cooling	Air-Source Heat Pump	9.1%	3.91	0.36	6.70
Heating	Air-Source Heat Pump	9.1%	6.04	0.55	10.35
Cooling	Geothermal Heat Pump	3.6%	2.38	0.08	1.60
Heating	Geothermal Heat Pump	3.6%	4.59	0.16	3.08
Heating	Electric Furnace	1.6%	7.15	0.11	2.17
Heating	Electric Room Heat	31.0%	6.81	2.11	39.74
Ventilation	Ventilation	100.0%	1.37	1.37	25.81
Water Heating	Water Heater	46.4%	1.03	0.48	8.99
Interior Lighting	Screw-In	100.0%	0.35	0.35	6.64
Interior Lighting	Linear Lighting	100.0%	1.76	1.76	33.18
Interior Lighting	High-Bay Fixtures	100.0%	0.32	0.32	5.94
Exterior Lighting	Screw-In	100.0%	0.18	0.18	3.41
Exterior Lighting	Linear Lighting	100.0%	0.20	0.20	3.75
Exterior Lighting	Area Lighting	100.0%	0.59	0.59	11.06
Refrigeration	Walk-In Refrigerator/Freezer	0.0%	2.70	-	-
Refrigeration	Reach-In Refrigerator/Freezer	1.6%	0.61	0.01	0.18
Refrigeration	Glass Door Display	0.5%	0.62	0.00	0.05
Refrigeration	Open Display Case	0.5%	3.68	0.02	0.32
Refrigeration	Icemaker	0.5%	1.02	0.00	0.09
Refrigeration	Vending Machine	0.2%	0.48	0.00	0.02
Food Preparation	Oven	2.7%	1.69	0.05	0.87
Food Preparation	Fryer	0.0%	2.44	-	-
Food Preparation	Dishwasher	0.0%	3.36	-	-
Food Preparation	Hot Food Container	0.0%	0.46	-	-
Food Preparation	Steamer	0.0%	2.46	-	-
Office Equipment	Desktop Computer	100.0%	1.37	1.37	25.74
Office Equipment	Laptop	100.0%	0.21	0.21	3.97
Office Equipment	Monitor	100.0%	0.24	0.24	4.54
Office Equipment	Server	100.0%	0.40	0.40	7.57
Office Equipment	Printer/Copier/Fax	100.0%	0.19	0.19	3.52
Office Equipment	POS Terminal	17.2%	0.11	0.02	0.35
Miscellaneous	Non-HVAC Motors	22.0%	0.25	0.05	1.03
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	1.06	1.06	19.98
<b>Total</b>				<b>15.3</b>	<b>287.8</b>

Table A-6 Commercial Large Office Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	15.1%	2.42	0.37	2.30
Cooling	Water-Cooled Chiller	9.3%	2.68	0.25	1.57
Cooling	RTU	49.0%	2.95	1.45	9.09
Cooling	Room AC	2.6%	3.04	0.08	0.50
Cooling	Air-Source Heat Pump	8.3%	2.95	0.25	1.55
Heating	Air-Source Heat Pump	8.3%	4.35	0.36	2.28
Cooling	Geothermal Heat Pump	7.2%	1.80	0.13	0.81
Heating	Geothermal Heat Pump	7.2%	3.45	0.25	1.56
Heating	Electric Furnace	1.6%	4.75	0.08	0.47
Heating	Electric Room Heat	30.5%	4.53	1.38	8.67
Ventilation	Ventilation	100.0%	2.74	2.74	17.20
Water Heating	Water Heater	45.2%	0.91	0.41	2.59
Interior Lighting	Screw-In	100.0%	0.55	0.55	3.46
Interior Lighting	Linear Lighting	100.0%	2.59	2.59	16.24
Interior Lighting	High-Bay Fixtures	100.0%	0.25	0.25	1.58
Exterior Lighting	Screw-In	100.0%	0.17	0.17	1.04
Exterior Lighting	Linear Lighting	100.0%	0.30	0.30	1.90
Exterior Lighting	Area Lighting	100.0%	1.01	1.01	6.34
Refrigeration	Walk-In Refrigerator/Freezer	2.0%	1.51	0.03	0.19
Refrigeration	Reach-In Refrigerator/Freezer	14.0%	0.34	0.05	0.30
Refrigeration	Glass Door Display	4.0%	0.35	0.01	0.09
Refrigeration	Open Display Case	4.0%	2.06	0.08	0.52
Refrigeration	Icemaker	4.0%	0.57	0.02	0.14
Refrigeration	Vending Machine	2.1%	0.27	0.01	0.04
Food Preparation	Oven	10.0%	0.71	0.07	0.44
Food Preparation	Fryer	1.0%	1.02	0.01	0.06
Food Preparation	Dishwasher	12.0%	1.41	0.17	1.06
Food Preparation	Hot Food Container	1.0%	0.19	0.00	0.01
Food Preparation	Steamer	1.0%	1.03	0.01	0.06
Office Equipment	Desktop Computer	100.0%	1.56	1.56	9.80
Office Equipment	Laptop	100.0%	0.24	0.24	1.51
Office Equipment	Monitor	100.0%	0.28	0.28	1.73
Office Equipment	Server	100.0%	0.92	0.92	5.77
Office Equipment	Printer/Copier/Fax	100.0%	0.14	0.14	0.89
Office Equipment	POS Terminal	57.6%	0.02	0.01	0.07
Miscellaneous	Non-HVAC Motors	89.6%	0.23	0.21	1.32
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	0.93	0.93	5.81
<b>Total</b>				<b>17.4</b>	<b>109.0</b>

Table A-7 Commercial Restaurant Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.3%	3.75	0.01	0.02
Cooling	Water-Cooled Chiller	0.0%	4.14	-	-
Cooling	RTU	71.5%	4.71	3.36	5.80
Cooling	Room AC	5.9%	4.84	0.28	0.49
Cooling	Air-Source Heat Pump	7.4%	4.71	0.35	0.60
Heating	Air-Source Heat Pump	7.4%	5.60	0.41	0.72
Cooling	Geothermal Heat Pump	4.0%	2.87	0.11	0.20
Heating	Geothermal Heat Pump	4.0%	3.95	0.16	0.27
Heating	Electric Furnace	2.5%	7.94	0.20	0.35
Heating	Electric Room Heat	0.2%	7.56	0.02	0.03
Ventilation	Ventilation	100.0%	2.57	2.57	4.44
Water Heating	Water Heater	15.1%	9.16	1.39	2.39
Interior Lighting	Screw-In	100.0%	2.08	2.08	3.59
Interior Lighting	Linear Lighting	100.0%	2.24	2.24	3.86
Interior Lighting	High-Bay Fixtures	100.0%	1.37	1.37	2.36
Exterior Lighting	Screw-In	100.0%	0.63	0.63	1.09
Exterior Lighting	Linear Lighting	100.0%	0.48	0.48	0.83
Exterior Lighting	Area Lighting	100.0%	1.68	1.68	2.89
Refrigeration	Walk-In Refrigerator/Freezer	74.0%	6.82	5.05	8.70
Refrigeration	Reach-In Refrigerator/Freezer	7.0%	3.06	0.21	0.37
Refrigeration	Glass Door Display	77.6%	1.57	1.22	2.10
Refrigeration	Open Display Case	26.0%	9.31	2.42	4.18
Refrigeration	Icemaker	75.9%	2.57	1.95	3.37
Refrigeration	Vending Machine	0.0%	1.21	-	-
Food Preparation	Oven	21.0%	4.66	0.98	1.69
Food Preparation	Fryer	82.0%	6.75	5.53	9.54
Food Preparation	Dishwasher	52.5%	4.64	2.44	4.20
Food Preparation	Hot Food Container	84.0%	0.64	0.53	0.92
Food Preparation	Steamer	16.0%	3.40	0.54	0.94
Office Equipment	Desktop Computer	100.0%	0.36	0.36	0.62
Office Equipment	Laptop	100.0%	0.04	0.04	0.08
Office Equipment	Monitor	100.0%	0.06	0.06	0.11
Office Equipment	Server	50.0%	0.43	0.21	0.37
Office Equipment	Printer/Copier/Fax	100.0%	0.08	0.08	0.14
Office Equipment	POS Terminal	65.0%	0.11	0.07	0.13
Miscellaneous	Non-HVAC Motors	20.0%	0.62	0.12	0.21
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	2.78	2.78	4.79
<b>Total</b>				<b>42.0</b>	<b>72.4</b>

Table A-8 Commercial Retail Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.8%	3.39	0.03	0.60
Cooling	Water-Cooled Chiller	0.5%	3.84	0.02	0.42
Cooling	RTU	58.1%	2.80	1.63	34.97
Cooling	Room AC	5.5%	3.06	0.17	3.63
Cooling	Air-Source Heat Pump	2.1%	2.80	0.06	1.28
Heating	Air-Source Heat Pump	2.1%	4.75	0.10	2.17
Cooling	Geothermal Heat Pump	2.0%	1.71	0.03	0.73
Heating	Geothermal Heat Pump	2.0%	3.23	0.06	1.39
Heating	Electric Furnace	0.9%	5.93	0.06	1.21
Heating	Electric Room Heat	11.1%	5.65	0.63	13.44
Ventilation	Ventilation	100.0%	1.17	1.17	25.14
Water Heating	Water Heater	38.2%	0.95	0.36	7.78
Interior Lighting	Screw-In	100.0%	1.36	1.36	29.17
Interior Lighting	Linear Lighting	100.0%	1.74	1.74	37.41
Interior Lighting	High-Bay Fixtures	100.0%	1.89	1.89	40.71
Exterior Lighting	Screw-In	100.0%	0.45	0.45	9.58
Exterior Lighting	Linear Lighting	100.0%	0.30	0.30	6.49
Exterior Lighting	Area Lighting	100.0%	0.95	0.95	20.47
Refrigeration	Walk-In Refrigerator/Freezer	2.0%	2.42	0.05	1.04
Refrigeration	Reach-In Refrigerator/Freezer	1.6%	0.54	0.01	0.19
Refrigeration	Glass Door Display	16.3%	0.56	0.09	1.95
Refrigeration	Open Display Case	14.0%	3.30	0.46	9.93
Refrigeration	Icemaker	7.1%	0.91	0.06	1.40
Refrigeration	Vending Machine	22.8%	0.43	0.10	2.10
Food Preparation	Oven	4.0%	2.97	0.12	2.56
Food Preparation	Fryer	0.0%	4.30	-	-
Food Preparation	Dishwasher	2.0%	5.92	0.12	2.55
Food Preparation	Hot Food Container	1.0%	0.81	0.01	0.17
Food Preparation	Steamer	0.0%	4.34	-	-
Office Equipment	Desktop Computer	100.0%	0.26	0.26	5.66
Office Equipment	Laptop	100.0%	0.04	0.04	0.87
Office Equipment	Monitor	100.0%	0.05	0.05	1.00
Office Equipment	Server	82.0%	0.15	0.13	2.73
Office Equipment	Printer/Copier/Fax	100.0%	0.03	0.03	0.62
Office Equipment	POS Terminal	73.8%	0.08	0.06	1.31
Miscellaneous	Non-HVAC Motors	40.2%	0.26	0.10	2.23
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	0.96	0.96	20.71
<b>Total</b>				<b>13.7</b>	<b>293.6</b>

Table A-9 Commercial Grocery Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.5%	5.06	0.03	0.13
Cooling	Water-Cooled Chiller	0.3%	5.72	0.02	0.09
Cooling	RTU	75.2%	4.18	3.14	14.46
Cooling	Room AC	3.5%	4.29	0.15	0.69
Cooling	Air-Source Heat Pump	3.3%	3.69	0.12	0.56
Heating	Air-Source Heat Pump	3.3%	3.15	0.10	0.48
Cooling	Geothermal Heat Pump	0.5%	1.56	0.01	0.04
Heating	Geothermal Heat Pump	0.5%	2.02	0.01	0.05
Heating	Electric Furnace	9.8%	5.88	0.58	2.65
Heating	Electric Room Heat	1.8%	5.60	0.10	0.47
Ventilation	Ventilation	100.0%	2.03	2.03	9.33
Water Heating	Water Heater	17.5%	2.13	0.37	1.72
Interior Lighting	Screw-In	100.0%	1.13	1.13	5.21
Interior Lighting	Linear Lighting	100.0%	5.07	5.07	23.33
Interior Lighting	High-Bay Fixtures	100.0%	2.84	2.84	13.05
Exterior Lighting	Screw-In	100.0%	0.58	0.58	2.67
Exterior Lighting	Linear Lighting	100.0%	0.63	0.63	2.90
Exterior Lighting	Area Lighting	100.0%	1.42	1.42	6.55
Refrigeration	Walk-In Refrigerator/Freezer	16.0%	5.02	0.80	3.69
Refrigeration	Reach-In Refrigerator/Freezer	83.1%	0.32	0.27	1.23
Refrigeration	Glass Door Display	95.6%	3.30	3.16	14.53
Refrigeration	Open Display Case	95.6%	19.57	18.72	86.12
Refrigeration	Icemaker	66.6%	0.27	0.18	0.83
Refrigeration	Vending Machine	36.5%	0.25	0.09	0.43
Food Preparation	Oven	11.0%	0.59	0.07	0.30
Food Preparation	Fryer	87.0%	0.86	0.74	3.43
Food Preparation	Dishwasher	54.9%	1.18	0.65	2.98
Food Preparation	Hot Food Container	73.0%	0.16	0.12	0.54
Food Preparation	Steamer	20.0%	0.86	0.17	0.80
Office Equipment	Desktop Computer	100.0%	0.15	0.15	0.69
Office Equipment	Laptop	64.0%	0.02	0.01	0.07
Office Equipment	Monitor	100.0%	0.03	0.03	0.12
Office Equipment	Server	100.0%	0.09	0.09	0.41
Office Equipment	Printer/Copier/Fax	100.0%	0.02	0.02	0.08
Office Equipment	POS Terminal	95.9%	0.06	0.06	0.26
Miscellaneous	Non-HVAC Motors	34.6%	0.69	0.24	1.09
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	2.89	2.89	13.28
<b>Total</b>				<b>46.8</b>	<b>215.2</b>

Table A-10 Commercial College Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	27.1%	4.69	1.27	7.41
Cooling	Water-Cooled Chiller	5.0%	6.95	0.35	2.03
Cooling	RTU	39.5%	3.04	1.20	7.00
Cooling	Room AC	2.9%	3.12	0.09	0.53
Cooling	Air-Source Heat Pump	3.8%	3.03	0.12	0.68
Heating	Air-Source Heat Pump	3.8%	8.69	0.33	1.94
Cooling	Geothermal Heat Pump	0.9%	1.85	0.02	0.10
Heating	Geothermal Heat Pump	0.9%	6.73	0.06	0.37
Heating	Electric Furnace	0.0%	12.25	-	-
Heating	Electric Room Heat	19.1%	11.66	2.23	12.99
Ventilation	Ventilation	100.0%	1.97	1.97	11.48
Water Heating	Water Heater	15.1%	2.69	0.40	2.36
Interior Lighting	Screw-In	100.0%	0.17	0.17	0.97
Interior Lighting	Linear Lighting	100.0%	1.50	1.50	8.72
Interior Lighting	High-Bay Fixtures	100.0%	0.37	0.37	2.18
Exterior Lighting	Screw-In	100.0%	0.31	0.31	1.82
Exterior Lighting	Linear Lighting	100.0%	0.70	0.70	4.09
Exterior Lighting	Area Lighting	100.0%	0.21	0.21	1.20
Refrigeration	Walk-In Refrigerator/Freezer	7.7%	0.39	0.03	0.17
Refrigeration	Reach-In Refrigerator/Freezer	13.4%	0.17	0.02	0.14
Refrigeration	Glass Door Display	8.0%	0.09	0.01	0.04
Refrigeration	Open Display Case	4.8%	0.53	0.03	0.15
Refrigeration	Icemaker	28.2%	0.29	0.08	0.48
Refrigeration	Vending Machine	8.8%	0.14	0.01	0.07
Food Preparation	Oven	24.7%	0.50	0.12	0.72
Food Preparation	Fryer	1.1%	0.73	0.01	0.05
Food Preparation	Dishwasher	16.3%	1.00	0.16	0.95
Food Preparation	Hot Food Container	10.6%	0.14	0.01	0.08
Food Preparation	Steamer	11.9%	0.73	0.09	0.51
Office Equipment	Desktop Computer	100.0%	0.61	0.61	3.58
Office Equipment	Laptop	100.0%	0.03	0.03	0.17
Office Equipment	Monitor	100.0%	0.11	0.11	0.63
Office Equipment	Server	100.0%	0.07	0.07	0.42
Office Equipment	Printer/Copier/Fax	100.0%	0.08	0.08	0.49
Office Equipment	POS Terminal	95.6%	0.02	0.02	0.13
Miscellaneous	Non-HVAC Motors	88.8%	0.18	0.16	0.95
Miscellaneous	Pool Pump	58.8%	0.01	0.01	0.04
Miscellaneous	Pool Heater	58.8%	0.01	0.01	0.05
Miscellaneous	Miscellaneous	100.0%	0.82	0.82	4.78
<b>Total</b>				<b>13.8</b>	<b>80.4</b>

Table A-11 Commercial School Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	21.5%	2.55	0.55	6.79
Cooling	Water-Cooled Chiller	5.0%	3.78	0.19	2.34
Cooling	RTU	30.3%	1.65	0.50	6.20
Cooling	Room AC	2.3%	1.70	0.04	0.48
Cooling	Air-Source Heat Pump	9.3%	1.65	0.15	1.90
Heating	Air-Source Heat Pump	9.3%	6.57	0.61	7.56
Cooling	Geothermal Heat Pump	4.5%	1.00	0.05	0.57
Heating	Geothermal Heat Pump	4.5%	5.09	0.23	2.87
Heating	Electric Furnace	0.0%	9.26	-	-
Heating	Electric Room Heat	2.8%	8.82	0.25	3.11
Ventilation	Ventilation	100.0%	1.05	1.05	12.96
Water Heating	Water Heater	13.6%	1.46	0.20	2.46
Interior Lighting	Screw-In	100.0%	0.16	0.16	1.97
Interior Lighting	Linear Lighting	100.0%	0.88	0.88	10.94
Interior Lighting	High-Bay Fixtures	100.0%	0.90	0.90	11.21
Exterior Lighting	Screw-In	100.0%	0.27	0.27	3.39
Exterior Lighting	Linear Lighting	100.0%	0.68	0.68	8.46
Exterior Lighting	Area Lighting	100.0%	0.61	0.61	7.60
Refrigeration	Walk-In Refrigerator/Freezer	19.0%	0.45	0.09	1.07
Refrigeration	Reach-In Refrigerator/Freezer	33.0%	0.20	0.07	0.83
Refrigeration	Glass Door Display	19.7%	0.10	0.02	0.25
Refrigeration	Open Display Case	11.9%	0.62	0.07	0.91
Refrigeration	Icemaker	69.7%	0.34	0.24	2.95
Refrigeration	Vending Machine	21.8%	0.16	0.03	0.43
Food Preparation	Oven	61.4%	0.29	0.18	2.18
Food Preparation	Fryer	2.6%	0.41	0.01	0.14
Food Preparation	Dishwasher	40.4%	0.57	0.23	2.86
Food Preparation	Hot Food Container	26.3%	0.08	0.02	0.25
Food Preparation	Steamer	29.6%	0.42	0.12	1.54
Office Equipment	Desktop Computer	100.0%	0.43	0.43	5.31
Office Equipment	Laptop	100.0%	0.03	0.03	0.33
Office Equipment	Monitor	100.0%	0.08	0.08	0.94
Office Equipment	Server	100.0%	0.10	0.10	1.25
Office Equipment	Printer/Copier/Fax	100.0%	0.05	0.05	0.58
Office Equipment	POS Terminal	11.5%	0.01	0.00	0.02
Miscellaneous	Non-HVAC Motors	43.7%	0.12	0.05	0.64
Miscellaneous	Pool Pump	32.9%	0.01	0.00	0.04
Miscellaneous	Pool Heater	32.9%	0.01	0.00	0.05
Miscellaneous	Miscellaneous	100.0%	0.61	0.61	7.54
<b>Total</b>				<b>9.7</b>	<b>120.9</b>

Table A-12 Commercial Health Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	16.7%	6.05	1.01	9.80
Cooling	Water-Cooled Chiller	66.7%	7.93	5.29	51.40
Cooling	RTU	11.0%	5.80	0.64	6.18
Cooling	Room AC	0.4%	5.96	0.02	0.22
Cooling	Air-Source Heat Pump	1.1%	5.79	0.06	0.60
Heating	Air-Source Heat Pump	1.1%	9.62	0.10	0.99
Cooling	Geothermal Heat Pump	0.4%	3.53	0.01	0.13
Heating	Geothermal Heat Pump	0.4%	7.06	0.03	0.26
Heating	Electric Furnace	0.1%	14.08	0.02	0.15
Heating	Electric Room Heat	3.6%	13.41	0.49	4.75
Ventilation	Ventilation	100.0%	5.33	5.33	51.78
Water Heating	Water Heater	32.0%	4.99	1.59	15.49
Interior Lighting	Screw-In	100.0%	1.21	1.21	11.73
Interior Lighting	Linear Lighting	100.0%	2.63	2.63	25.57
Interior Lighting	High-Bay Fixtures	100.0%	0.78	0.78	7.55
Exterior Lighting	Screw-In	100.0%	0.12	0.12	1.15
Exterior Lighting	Linear Lighting	100.0%	0.22	0.22	2.15
Exterior Lighting	Area Lighting	100.0%	0.56	0.56	5.42
Refrigeration	Walk-In Refrigerator/Freezer	33.0%	1.34	0.44	4.29
Refrigeration	Reach-In Refrigerator/Freezer	50.0%	0.30	0.15	1.46
Refrigeration	Glass Door Display	8.6%	0.31	0.03	0.26
Refrigeration	Open Display Case	6.7%	1.83	0.12	1.18
Refrigeration	Icemaker	21.1%	0.50	0.11	1.03
Refrigeration	Vending Machine	27.9%	0.24	0.07	0.64
Food Preparation	Oven	62.2%	1.72	1.07	10.37
Food Preparation	Fryer	14.2%	2.48	0.35	3.42
Food Preparation	Dishwasher	30.9%	3.41	1.06	10.26
Food Preparation	Hot Food Container	12.3%	0.47	0.06	0.56
Food Preparation	Steamer	3.6%	2.50	0.09	0.88
Office Equipment	Desktop Computer	100.0%	0.68	0.68	6.64
Office Equipment	Laptop	100.0%	0.04	0.04	0.41
Office Equipment	Monitor	100.0%	0.12	0.12	1.17
Office Equipment	Server	100.0%	0.16	0.16	1.56
Office Equipment	Printer/Copier/Fax	100.0%	0.07	0.07	0.73
Office Equipment	POS Terminal	51.0%	0.05	0.03	0.27
Miscellaneous	Non-HVAC Motors	74.1%	0.36	0.27	2.60
Miscellaneous	Pool Pump	3.9%	0.01	0.00	0.00
Miscellaneous	Pool Heater	5.7%	0.01	0.00	0.00
Miscellaneous	Miscellaneous	100.0%	3.74	3.74	36.33
<b>Total</b>				<b>28.8</b>	<b>279.4</b>

Table A-13 Commercial Lodging Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.1%	1.44	0.03	0.22
Cooling	Water-Cooled Chiller	7.5%	1.88	0.14	1.02
Cooling	RTU	16.3%	3.20	0.52	3.77
Cooling	Room AC	40.6%	3.29	1.33	9.64
Cooling	Air-Source Heat Pump	18.0%	3.20	0.58	4.16
Heating	Air-Source Heat Pump	18.0%	5.36	0.96	6.96
Cooling	Geothermal Heat Pump	3.4%	2.76	0.09	0.68
Heating	Geothermal Heat Pump	3.4%	3.48	0.12	0.86
Heating	Electric Furnace	1.5%	5.85	0.09	0.63
Heating	Electric Room Heat	53.2%	5.57	2.97	21.45
Ventilation	Ventilation	100.0%	1.89	1.89	13.66
Water Heating	Water Heater	10.5%	6.41	0.67	4.87
Interior Lighting	Screw-In	100.0%	0.98	0.98	7.09
Interior Lighting	Linear Lighting	100.0%	0.57	0.57	4.13
Interior Lighting	High-Bay Fixtures	100.0%	0.20	0.20	1.48
Exterior Lighting	Screw-In	100.0%	0.24	0.24	1.74
Exterior Lighting	Linear Lighting	100.0%	0.04	0.04	0.29
Exterior Lighting	Area Lighting	100.0%	1.02	1.02	7.38
Refrigeration	Walk-In Refrigerator/Freezer	3.0%	1.09	0.03	0.24
Refrigeration	Reach-In Refrigerator/Freezer	19.0%	0.25	0.05	0.34
Refrigeration	Glass Door Display	40.0%	0.25	0.10	0.73
Refrigeration	Open Display Case	0.0%	1.49	-	-
Refrigeration	Icemaker	88.9%	0.82	0.73	5.30
Refrigeration	Vending Machine	57.8%	0.39	0.22	1.62
Food Preparation	Oven	24.0%	0.69	0.17	1.20
Food Preparation	Fryer	4.0%	1.00	0.04	0.29
Food Preparation	Dishwasher	39.0%	1.38	0.54	3.89
Food Preparation	Hot Food Container	10.0%	0.19	0.02	0.14
Food Preparation	Steamer	4.0%	1.01	0.04	0.29
Office Equipment	Desktop Computer	100.0%	0.17	0.17	1.22
Office Equipment	Laptop	100.0%	0.03	0.03	0.19
Office Equipment	Monitor	100.0%	0.03	0.03	0.22
Office Equipment	Server	100.0%	0.10	0.10	0.72
Office Equipment	Printer/Copier/Fax	100.0%	0.02	0.02	0.13
Office Equipment	POS Terminal	38.9%	0.03	0.01	0.07
Miscellaneous	Non-HVAC Motors	91.3%	0.19	0.17	1.26
Miscellaneous	Pool Pump	66.7%	0.03	0.02	0.14
Miscellaneous	Pool Heater	2.9%	0.04	0.00	0.01
Miscellaneous	Miscellaneous	100.0%	0.97	0.97	6.98
<b>Total</b>				<b>15.9</b>	<b>115.0</b>

Table A-14 Commercial Warehouse Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.5%	3.83	0.10	1.37
Cooling	Water-Cooled Chiller	2.5%	4.39	0.11	1.57
Cooling	RTU	11.3%	3.76	0.42	6.05
Cooling	Room AC	1.1%	3.87	0.04	0.59
Cooling	Air-Source Heat Pump	1.7%	3.76	0.06	0.92
Heating	Air-Source Heat Pump	1.7%	5.94	0.10	1.46
Cooling	Geothermal Heat Pump	0.0%	2.29	-	-
Heating	Geothermal Heat Pump	0.0%	4.52	-	-
Heating	Electric Furnace	2.1%	7.94	0.17	2.37
Heating	Electric Room Heat	11.3%	7.57	0.85	12.20
Ventilation	Ventilation	100.0%	0.56	0.56	7.96
Water Heating	Water Heater	38.3%	0.57	0.22	3.09
Interior Lighting	Screw-In	100.0%	0.13	0.13	1.80
Interior Lighting	Linear Lighting	100.0%	0.42	0.42	6.04
Interior Lighting	High-Bay Fixtures	100.0%	1.55	1.55	22.14
Exterior Lighting	Screw-In	100.0%	0.15	0.15	2.20
Exterior Lighting	Linear Lighting	100.0%	0.23	0.23	3.27
Exterior Lighting	Area Lighting	100.0%	0.77	0.77	11.04
Refrigeration	Walk-In Refrigerator/Freezer	1.1%	4.20	0.05	0.66
Refrigeration	Reach-In Refrigerator/Freezer	2.0%	0.94	0.02	0.27
Refrigeration	Glass Door Display	0.0%	0.97	-	-
Refrigeration	Open Display Case	0.0%	5.73	-	-
Refrigeration	Icemaker	8.3%	1.58	0.13	1.87
Refrigeration	Vending Machine	6.9%	0.74	0.05	0.73
Food Preparation	Oven	0.0%	0.26	-	-
Food Preparation	Fryer	0.0%	0.38	-	-
Food Preparation	Dishwasher	2.0%	0.53	0.01	0.15
Food Preparation	Hot Food Container	0.0%	0.07	-	-
Food Preparation	Steamer	0.0%	0.39	-	-
Office Equipment	Desktop Computer	100.0%	0.21	0.21	2.96
Office Equipment	Laptop	100.0%	0.03	0.03	0.37
Office Equipment	Monitor	100.0%	0.04	0.04	0.52
Office Equipment	Server	89.0%	0.24	0.22	3.10
Office Equipment	Printer/Copier/Fax	100.0%	0.02	0.02	0.32
Office Equipment	POS Terminal	6.1%	0.07	0.00	0.06
Miscellaneous	Non-HVAC Motors	49.9%	0.15	0.07	1.07
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	0.69	0.69	9.86
<b>Total</b>				<b>7.4</b>	<b>106.0</b>

Table A-15 Commercial Miscellaneous Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Air-Cooled Chiller	7.8%	4.84	0.38	12.99
Cooling	Water-Cooled Chiller	4.0%	5.48	0.22	7.61
Cooling	RTU	45.9%	4.00	1.84	63.14
Cooling	Room AC	4.1%	4.11	0.17	5.81
Cooling	Air-Source Heat Pump	7.2%	4.00	0.29	9.88
Cooling	Geothermal Heat Pump	7.2%	9.11	0.65	22.51
Heating	Electric Furnace	1.9%	2.44	0.05	1.59
Heating	Electric Room Heat	1.9%	7.06	0.13	4.60
Heating	Air-Source Heat Pump	7.5%	10.98	0.82	28.33
Heating	Geothermal Heat Pump	8.9%	10.46	0.93	32.03
Ventilation	Ventilation	100.0%	1.65	1.65	56.57
Water Heating	Water Heater	12.4%	3.13	0.39	13.38
Interior Lighting	Screw-in	100.0%	0.54	0.54	18.57
Interior Lighting	High-Bay Fixtures	100.0%	1.44	1.44	49.67
Interior Lighting	Linear Lighting	100.0%	0.55	0.55	18.97
Exterior Lighting	Screw-in	100.0%	0.30	0.30	10.48
Exterior Lighting	Area Lighting	100.0%	0.27	0.27	9.32
Exterior Lighting	Linear Lighting	100.0%	0.22	0.22	7.72
Refrigeration	Walk-in Refrigerator/Freezer	9.0%	1.16	0.10	3.59
Refrigeration	Reach-in Refrigerator/Freezer	0.0%	0.26	-	-
Refrigeration	Glass Door Display	15.0%	0.27	0.04	1.38
Refrigeration	Open Display Case	0.0%	1.59	-	-
Refrigeration	Icemaker	41.6%	0.44	0.18	6.26
Refrigeration	Vending Machine	28.6%	0.41	0.12	4.05
Food Preparation	Oven	46.1%	0.45	0.21	7.14
Food Preparation	Fryer	4.1%	0.65	0.03	0.92
Food Preparation	Dishwasher	4.1%	0.90	0.04	1.26
Food Preparation	Steamer	10.0%	0.12	0.01	0.42
Food Preparation	Hot Food Container	2.4%	0.66	0.02	0.54
Office Equipment	Desktop Computer	100.0%	0.45	0.45	15.35
Office Equipment	Laptop	100.0%	0.07	0.07	2.37
Office Equipment	Server	100.0%	0.08	0.08	2.71
Office Equipment	Monitor	66.0%	0.26	0.17	5.96
Office Equipment	Printer/Copier/Fax	100.0%	0.05	0.05	1.68
Office Equipment	POS Terminal	22.7%	0.07	0.02	0.55
Miscellaneous	Non-HVAC Motors	59.9%	0.20	0.12	4.14
Miscellaneous	Pool Pump	11.6%	0.03	0.00	0.12
Miscellaneous	Pool Heater	5.6%	0.04	0.00	0.08
Miscellaneous	Other Miscellaneous	100.0%	1.06	1.06	36.28
<b>Total</b>				<b>13.6</b>	<b>468.0</b>

Table A-16 Industrial Electric Market Profile, Washington

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Empl.)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.5%	8,460.54	211.51	3.57
Cooling	Water-Cooled Chiller	2.5%	9,698.76	242.47	4.10
Cooling	RTU	11.3%	9,132.91	1,028.55	17.38
Cooling	Air-Source Heat Pump	1.7%	8,318.63	142.89	2.41
Heating	Air-Source Heat Pump	1.7%	13,130.99	225.54	3.81
Cooling	Geothermal Heat Pump	0.0%	5,548.53	-	-
Heating	Geothermal Heat Pump	0.0%	8,758.37	-	-
Heating	Electric Furnace	2.1%	17,566.44	366.97	6.20
Heating	Electric Room Heat	11.3%	16,729.94	1,890.42	31.94
Ventilation	Ventilation	100.0%	1,232.58	1,232.58	20.83
Interior Lighting	Screw-In	100.0%	144.67	144.67	2.44
Interior Lighting	Linear Lighting	100.0%	485.74	485.74	8.21
Interior Lighting	High-Bay Fixtures	100.0%	1,780.69	1,780.69	30.09
Exterior Lighting	Screw-In	100.0%	177.19	177.19	2.99
Exterior Lighting	Linear Lighting	100.0%	262.71	262.71	4.44
Exterior Lighting	Area Lighting	100.0%	887.87	887.87	15.00
Motors	Pumps	100.0%	8,050.05	8,050.05	136.02
Motors	Fans & Blowers	100.0%	4,157.41	4,157.41	70.25
Motors	Compressed Air	100.0%	3,414.80	3,414.80	57.70
Motors	Material Handling	100.0%	14,469.97	14,469.97	244.50
Motors	Other Motors	100.0%	923.27	923.27	15.60
Process	Process Heating	100.0%	6,253.25	6,253.25	105.66
Process	Process Cooling	100.0%	2,050.68	2,050.68	34.65
Process	Process Refrigeration	100.0%	2,050.68	2,050.68	34.65
Process	Process Electrochemical	100.0%	4,062.60	4,062.60	68.65
Process	Process Other	100.0%	1,376.02	1,376.02	23.25
Miscellaneous	Miscellaneous	100.0%	2,246.54	2,246.54	37.96
<b>Total</b>				<b>58,135.1</b>	<b>982.3</b>

Table A-17 Residential Single Family Electric Market Profile, Idaho

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	38.7%	1,461.65	565.36	37.91
Cooling	Room AC	12.3%	444.24	54.43	3.65
Cooling	Evaporative AC	1.6%	1,054.28	16.85	1.13
Cooling	Air-Source Heat Pump	7.0%	1,531.23	107.65	7.22
Heating	Air-Source Heat Pump	7.0%	10,966.70	770.98	51.70
Cooling	Geothermal Heat Pump	0.0%	1,351.83	-	-
Heating	Geothermal Heat Pump	0.0%	4,833.10	-	-
Heating	Electric Furnace	7.3%	14,566.65	1,070.26	71.77
Heating	Electric Room Heat	9.8%	12,794.20	1,249.67	83.80
Water Heating	Water Heater (<= 55 Gal)	44.0%	3,530.10	1,553.21	104.15
Water Heating	Water Heater (> 55 Gal)	5.8%	3,711.85	216.40	14.51
Interior Lighting	General Service Lighting	100.0%	1,171.88	1,171.88	78.58
Interior Lighting	Linear Lighting	100.0%	167.67	167.67	11.24
Interior Lighting	Exempted Lighting	100.0%	324.64	324.64	21.77
Exterior Lighting	Screw-In	100.0%	435.52	435.52	29.20
Appliances	Refrigerator	100.0%	754.76	754.76	50.61
Appliances	Second Refrigerator	29.6%	879.15	260.02	17.44
Appliances	Freezer	66.4%	601.71	399.83	26.81
Appliances	Clothes Washer	95.6%	88.59	84.68	5.68
Appliances	Clothes Dryer	66.0%	795.92	525.67	35.25
Appliances	Dishwasher	81.3%	403.14	327.79	21.98
Appliances	Stove/Oven	58.7%	464.99	273.08	18.31
Appliances	Microwave	95.5%	134.35	128.24	8.60
Electronics	Personal Computers	64.0%	182.44	116.78	7.83
Electronics	Monitor	75.9%	76.92	58.35	3.91
Electronics	Laptops	102.8%	48.04	49.40	3.31
Electronics	Printer/Fax/Copier	77.8%	61.92	48.16	3.23
Electronics	TVs	202.6%	239.94	486.02	32.59
Electronics	Set-top Boxes/DVRs	122.6%	113.95	139.65	9.36
Electronics	Devices and Gadgets	100.0%	109.49	109.49	7.34
Miscellaneous	Electric Vehicles	0.1%	4,324.00	4.17	0.28
Miscellaneous	Pool Heater	0.6%	3,692.85	23.80	1.60
Miscellaneous	Pool Pump	2.6%	2,306.43	59.45	3.99
Miscellaneous	Furnace Fan	70.5%	209.73	147.87	9.92
Miscellaneous	Well Pump	20.0%	589.05	117.81	7.90
Miscellaneous	Miscellaneous	100.0%	274.28	274.28	18.39
<b>Total</b>				<b>12,093.8</b>	<b>811.0</b>

Table A-18 Residential Multifamily Electric Market Profile, Idaho

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	22.6%	373.14	84.20	0.46
Cooling	Room AC	31.4%	296.23	92.95	0.50
Cooling	Evaporative AC	1.9%	307.50	5.78	0.03
Cooling	Air-Source Heat Pump	2.2%	373.10	8.26	0.04
Heating	Air-Source Heat Pump	2.2%	1,678.19	37.15	0.20
Cooling	Geothermal Heat Pump	0.0%	329.39	-	-
Heating	Geothermal Heat Pump	0.0%	739.59	-	-
Heating	Electric Furnace	16.4%	3,064.86	503.35	2.72
Heating	Electric Room Heat	59.5%	2,691.93	1,602.34	8.66
Water Heating	Water Heater (<= 55 Gal)	57.4%	2,205.31	1,266.40	6.84
Water Heating	Water Heater (> 55 Gal)	7.6%	2,318.85	176.44	0.95
Interior Lighting	General Service Lighting	100.0%	601.99	601.99	3.25
Interior Lighting	Linear Lighting	100.0%	43.06	43.06	0.23
Interior Lighting	Exempted Lighting	100.0%	34.62	34.62	0.19
Exterior Lighting	Screw-In	100.0%	0.01	0.01	0.00
Appliances	Refrigerator	100.0%	715.36	715.36	3.87
Appliances	Second Refrigerator	3.0%	833.25	25.29	0.14
Appliances	Freezer	23.4%	571.74	133.91	0.72
Appliances	Clothes Washer	61.0%	82.99	50.67	0.27
Appliances	Clothes Dryer	43.5%	599.33	260.52	1.41
Appliances	Dishwasher	74.6%	382.79	285.69	1.54
Appliances	Stove/Oven	70.1%	356.68	250.13	1.35
Appliances	Microwave	88.7%	127.95	113.50	0.61
Electronics	Personal Computers	46.8%	173.75	81.39	0.44
Electronics	Monitor	55.5%	73.26	40.66	0.22
Electronics	Laptops	88.9%	45.75	40.66	0.22
Electronics	Printer/Fax/Copier	52.5%	58.97	30.94	0.17
Electronics	TVs	143.3%	268.95	385.32	2.08
Electronics	Set-top Boxes/DVRs	75.1%	108.52	81.49	0.44
Electronics	Devices and Gadgets	100.0%	104.27	104.27	0.56
Miscellaneous	Electric Vehicles	0.0%	4,324.00	-	-
Miscellaneous	Pool Heater	0.0%	3,517.00	-	-
Miscellaneous	Pool Pump	0.0%	2,196.60	-	-
Miscellaneous	Furnace Fan	33.7%	74.65	25.19	0.14
Miscellaneous	Well Pump	0.0%	556.00	-	-
Miscellaneous	Miscellaneous	100.0%	167.05	167.05	0.90
<b>Total</b>				<b>7,248.6</b>	<b>39.2</b>

Table A-19 Residential Manufactured Home Electric Market Profile, Idaho

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	36.5%	500.40	182.86	0.91
Cooling	Room AC	20.2%	395.33	79.86	0.40
Cooling	Evaporative AC	0.0%	318.65	-	-
Cooling	Air-Source Heat Pump	5.1%	500.40	25.66	0.13
Heating	Air-Source Heat Pump	5.1%	5,486.00	281.33	1.40
Cooling	Geothermal Heat Pump	0.0%	440.55	-	-
Heating	Geothermal Heat Pump	0.0%	2,513.55	-	-
Heating	Electric Furnace	42.9%	6,667.83	2,857.64	14.18
Heating	Electric Room Heat	10.7%	5,856.50	627.48	3.11
Water Heating	Water Heater (<= 55 Gal)	66.4%	2,370.29	1,573.86	7.81
Water Heating	Water Heater (> 55 Gal)	8.8%	2,492.32	219.28	1.09
Interior Lighting	General Service Lighting	100.0%	696.96	696.96	3.46
Interior Lighting	Linear Lighting	100.0%	65.60	65.60	0.33
Interior Lighting	Exempted Lighting	100.0%	147.51	147.51	0.73
Exterior Lighting	Screw-In	100.0%	156.16	156.16	0.78
Appliances	Refrigerator	100.0%	679.45	679.45	3.37
Appliances	Second Refrigerator	20.7%	791.42	163.67	0.81
Appliances	Freezer	48.6%	545.58	265.28	1.32
Appliances	Clothes Washer	95.1%	80.02	76.08	0.38
Appliances	Clothes Dryer	82.2%	898.03	737.76	3.66
Appliances	Dishwasher	75.3%	365.62	275.41	1.37
Appliances	Stove/Oven	82.6%	510.08	421.53	2.09
Appliances	Microwave	94.6%	121.55	115.01	0.57
Electronics	Personal Computers	47.0%	165.06	77.54	0.38
Electronics	Monitor	55.7%	69.60	38.74	0.19
Electronics	Laptops	60.0%	43.46	26.07	0.13
Electronics	Printer/Fax/Copier	43.4%	56.02	24.29	0.12
Electronics	TVs	112.7%	272.78	307.44	1.53
Electronics	Set-top Boxes/DVRs	103.4%	103.10	106.64	0.53
Electronics	Devices and Gadgets	100.0%	99.06	99.06	0.49
Miscellaneous	Electric Vehicles	0.0%	4,324.00	2.09	0.01
Miscellaneous	Pool Heater	0.0%	3,341.15	-	-
Miscellaneous	Pool Pump	0.0%	2,086.77	-	-
Miscellaneous	Furnace Fan	72.0%	158.46	114.07	0.57
Miscellaneous	Well Pump	0.0%	428.45	-	-
Miscellaneous	Miscellaneous	100.0%	428.50	428.50	2.13
<b>Total</b>				<b>10,872.9</b>	<b>54.0</b>

Table A-20 Residential Low Income Electric Market Profile, Idaho

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)
Cooling	Central AC	25.4%	486.58	123.66	4.06
Cooling	Room AC	28.7%	350.20	100.60	3.31
Cooling	Evaporative AC	1.6%	366.90	5.91	0.19
Cooling	Air-Source Heat Pump	2.9%	490.00	14.19	0.47
Heating	Air-Source Heat Pump	2.9%	2,511.52	72.71	2.39
Cooling	Geothermal Heat Pump	0.0%	432.24	-	-
Heating	Geothermal Heat Pump	0.0%	1,122.71	-	-
Heating	Electric Furnace	19.4%	3,722.97	723.56	23.78
Heating	Electric Room Heat	50.0%	3,269.96	1,633.91	53.70
Water Heating	Water Heater (<= 55 Gal)	57.8%	2,154.62	1,245.94	40.95
Water Heating	Water Heater (> 55 Gal)	7.7%	2,265.55	173.59	5.71
Interior Lighting	General Service Lighting	100.0%	649.00	649.00	21.33
Interior Lighting	Linear Lighting	100.0%	53.58	53.58	1.76
Interior Lighting	Exempted Lighting	100.0%	67.23	67.23	2.21
Exterior Lighting	Screw-In	100.0%	47.17	47.17	1.55
Appliances	Refrigerator	100.0%	672.61	672.61	22.11
Appliances	Second Refrigerator	7.0%	783.46	54.87	1.80
Appliances	Freezer	29.4%	537.83	158.11	5.20
Appliances	Clothes Washer	67.7%	78.25	52.98	1.74
Appliances	Clothes Dryer	50.0%	616.09	308.23	10.13
Appliances	Dishwasher	75.1%	360.15	270.57	8.89
Appliances	Stove/Oven	71.1%	362.95	258.15	8.48
Appliances	Microwave	89.9%	120.27	108.13	3.55
Electronics	Personal Computers	47.9%	163.32	78.22	2.57
Electronics	Monitor	56.8%	68.86	39.08	1.28
Electronics	Laptops	85.8%	43.00	36.91	1.21
Electronics	Printer/Fax/Copier	52.8%	55.43	29.25	0.96
Electronics	TVs	142.7%	252.83	360.84	11.86
Electronics	Set-top Boxes/DVRs	81.8%	102.01	83.40	2.74
Electronics	Devices and Gadgets	100.0%	98.02	98.02	3.22
Miscellaneous	Electric Vehicles	0.0%	4,324.00	-	-
Miscellaneous	Pool Heater	0.0%	3,305.98	1.28	0.04
Miscellaneous	Pool Pump	0.2%	2,064.80	3.20	0.11
Miscellaneous	Furnace Fan	41.1%	94.04	38.65	1.27
Miscellaneous	Well Pump	1.2%	509.64	6.12	0.20
Miscellaneous	Miscellaneous	100.0%	256.48	256.48	8.43
<b>Total</b>				<b>7,826.1</b>	<b>257.2</b>

Table A-21 Commercial Small Office Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.5%	4.73	0.02	0.21
Cooling	Water-Cooled Chiller	0.0%	5.36	-	-
Cooling	RTU	74.3%	3.91	2.90	25.79
Cooling	Room AC	2.7%	4.02	0.11	0.96
Cooling	Air-Source Heat Pump	9.1%	3.91	0.36	3.16
Heating	Air-Source Heat Pump	9.1%	6.04	0.55	4.88
Cooling	Geothermal Heat Pump	3.6%	2.38	0.08	0.75
Heating	Geothermal Heat Pump	3.6%	4.59	0.16	1.45
Heating	Electric Furnace	1.6%	7.15	0.11	1.02
Heating	Electric Room Heat	31.0%	6.81	2.11	18.74
Ventilation	Ventilation	100.0%	1.37	1.37	12.17
Water Heating	Water Heater	46.4%	1.03	0.48	4.24
Interior Lighting	Screw-In	100.0%	0.35	0.35	3.13
Interior Lighting	Linear Lighting	100.0%	1.76	1.76	15.65
Interior Lighting	High-Bay Fixtures	100.0%	0.32	0.32	2.80
Exterior Lighting	Screw-In	100.0%	0.18	0.18	1.61
Exterior Lighting	Linear Lighting	100.0%	0.20	0.20	1.77
Exterior Lighting	Area Lighting	100.0%	0.59	0.59	5.22
Refrigeration	Walk-In Refrigerator/Freezer	0.0%	2.70	-	-
Refrigeration	Reach-In Refrigerator/Freezer	1.6%	0.61	0.01	0.09
Refrigeration	Glass Door Display	0.5%	0.62	0.00	0.03
Refrigeration	Open Display Case	0.5%	3.68	0.02	0.15
Refrigeration	Icemaker	0.5%	1.02	0.00	0.04
Refrigeration	Vending Machine	0.2%	0.48	0.00	0.01
Food Preparation	Oven	2.7%	1.69	0.05	0.41
Food Preparation	Fryer	0.0%	2.44	-	-
Food Preparation	Dishwasher	0.0%	3.36	-	-
Food Preparation	Hot Food Container	0.0%	0.46	-	-
Food Preparation	Steamer	0.0%	2.46	-	-
Office Equipment	Desktop Computer	100.0%	1.37	1.37	12.14
Office Equipment	Laptop	100.0%	0.21	0.21	1.87
Office Equipment	Monitor	100.0%	0.24	0.24	2.14
Office Equipment	Server	100.0%	0.40	0.40	3.57
Office Equipment	Printer/Copier/Fax	100.0%	0.19	0.19	1.66
Office Equipment	POS Terminal	17.2%	0.11	0.02	0.16
Miscellaneous	Non-HVAC Motors	22.0%	0.25	0.05	0.48
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	1.06	1.06	9.42
<b>Total</b>				<b>15.3</b>	<b>135.8</b>

Table A-22 Commercial Large Office Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	15.1%	2.42	0.37	0.36
Cooling	Water-Cooled Chiller	9.3%	2.68	0.25	0.25
Cooling	RTU	49.0%	2.95	1.45	1.43
Cooling	Room AC	2.6%	3.04	0.08	0.08
Cooling	Air-Source Heat Pump	8.3%	2.95	0.25	0.24
Heating	Air-Source Heat Pump	8.3%	4.35	0.36	0.36
Cooling	Geothermal Heat Pump	7.2%	1.80	0.13	0.13
Heating	Geothermal Heat Pump	7.2%	3.45	0.25	0.24
Heating	Electric Furnace	1.6%	4.75	0.08	0.07
Heating	Electric Room Heat	30.5%	4.53	1.38	1.36
Ventilation	Ventilation	100.0%	2.74	2.74	2.70
Water Heating	Water Heater	45.2%	0.91	0.41	0.41
Interior Lighting	Screw-In	100.0%	0.55	0.55	0.54
Interior Lighting	Linear Lighting	100.0%	2.59	2.59	2.55
Interior Lighting	High-Bay Fixtures	100.0%	0.25	0.25	0.25
Exterior Lighting	Screw-In	100.0%	0.17	0.17	0.16
Exterior Lighting	Linear Lighting	100.0%	0.30	0.30	0.30
Exterior Lighting	Area Lighting	100.0%	1.01	1.01	1.00
Refrigeration	Walk-In Refrigerator/Freezer	2.0%	1.51	0.03	0.03
Refrigeration	Reach-In Refrigerator/Freezer	14.0%	0.34	0.05	0.05
Refrigeration	Glass Door Display	4.0%	0.35	0.01	0.01
Refrigeration	Open Display Case	4.0%	2.06	0.08	0.08
Refrigeration	Icemaker	4.0%	0.57	0.02	0.02
Refrigeration	Vending Machine	2.1%	0.27	0.01	0.01
Food Preparation	Oven	10.0%	0.71	0.07	0.07
Food Preparation	Fryer	1.0%	1.02	0.01	0.01
Food Preparation	Dishwasher	12.0%	1.41	0.17	0.17
Food Preparation	Hot Food Container	1.0%	0.19	0.00	0.00
Food Preparation	Steamer	1.0%	1.03	0.01	0.01
Office Equipment	Desktop Computer	100.0%	1.56	1.56	1.54
Office Equipment	Laptop	100.0%	0.24	0.24	0.24
Office Equipment	Monitor	100.0%	0.28	0.28	0.27
Office Equipment	Server	100.0%	0.92	0.92	0.91
Office Equipment	Printer/Copier/Fax	100.0%	0.14	0.14	0.14
Office Equipment	POS Terminal	57.6%	0.02	0.01	0.01
Miscellaneous	Non-HVAC Motors	89.6%	0.23	0.21	0.21
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	0.93	0.93	0.91
<b>Total</b>				<b>17.4</b>	<b>17.1</b>

Table A-23 Commercial Restaurant Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.3%	3.75	0.01	0.00
Cooling	Water-Cooled Chiller	0.0%	4.14	-	-
Cooling	RTU	71.5%	4.71	3.36	1.00
Cooling	Room AC	5.9%	4.84	0.28	0.08
Cooling	Air-Source Heat Pump	7.4%	4.71	0.35	0.10
Heating	Air-Source Heat Pump	7.4%	5.60	0.41	0.12
Cooling	Geothermal Heat Pump	4.0%	2.87	0.11	0.03
Heating	Geothermal Heat Pump	4.0%	3.95	0.16	0.05
Heating	Electric Furnace	2.5%	7.94	0.20	0.06
Heating	Electric Room Heat	0.2%	7.56	0.02	0.01
Ventilation	Ventilation	100.0%	2.57	2.57	0.77
Water Heating	Water Heater	15.1%	9.16	1.39	0.41
Interior Lighting	Screw-In	100.0%	2.08	2.08	0.62
Interior Lighting	Linear Lighting	100.0%	2.24	2.24	0.67
Interior Lighting	High-Bay Fixtures	100.0%	1.37	1.37	0.41
Exterior Lighting	Screw-In	100.0%	0.63	0.63	0.19
Exterior Lighting	Linear Lighting	100.0%	0.48	0.48	0.14
Exterior Lighting	Area Lighting	100.0%	1.68	1.68	0.50
Refrigeration	Walk-In Refrigerator/Freezer	74.0%	6.82	5.05	1.51
Refrigeration	Reach-In Refrigerator/Freezer	7.0%	3.06	0.21	0.06
Refrigeration	Glass Door Display	77.6%	1.57	1.22	0.36
Refrigeration	Open Display Case	26.0%	9.31	2.42	0.72
Refrigeration	Icemaker	75.9%	2.57	1.95	0.58
Refrigeration	Vending Machine	0.0%	1.21	-	-
Food Preparation	Oven	21.0%	4.66	0.98	0.29
Food Preparation	Fryer	82.0%	6.75	5.53	1.65
Food Preparation	Dishwasher	52.5%	4.64	2.44	0.73
Food Preparation	Hot Food Container	84.0%	0.64	0.53	0.16
Food Preparation	Steamer	16.0%	3.40	0.54	0.16
Office Equipment	Desktop Computer	100.0%	0.36	0.36	0.11
Office Equipment	Laptop	100.0%	0.04	0.04	0.01
Office Equipment	Monitor	100.0%	0.06	0.06	0.02
Office Equipment	Server	50.0%	0.43	0.21	0.06
Office Equipment	Printer/Copier/Fax	100.0%	0.08	0.08	0.02
Office Equipment	POS Terminal	65.0%	0.11	0.07	0.02
Miscellaneous	Non-HVAC Motors	20.0%	0.62	0.12	0.04
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	2.78	2.78	0.83
<b>Total</b>				<b>42.0</b>	<b>12.5</b>

Table A-24 Commercial Retail Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.8%	3.39	0.03	0.35
Cooling	Water-Cooled Chiller	0.5%	3.84	0.02	0.24
Cooling	RTU	58.1%	2.80	1.63	20.16
Cooling	Room AC	5.5%	3.06	0.17	2.09
Cooling	Air-Source Heat Pump	2.1%	2.80	0.06	0.74
Heating	Air-Source Heat Pump	2.1%	4.75	0.10	1.25
Cooling	Geothermal Heat Pump	2.0%	1.71	0.03	0.42
Heating	Geothermal Heat Pump	2.0%	3.23	0.06	0.80
Heating	Electric Furnace	0.9%	5.93	0.06	0.70
Heating	Electric Room Heat	11.1%	5.65	0.63	7.75
Ventilation	Ventilation	100.0%	1.17	1.17	14.49
Water Heating	Water Heater	38.2%	0.95	0.36	4.49
Interior Lighting	Screw-In	100.0%	1.36	1.36	16.82
Interior Lighting	Linear Lighting	100.0%	1.74	1.74	21.57
Interior Lighting	High-Bay Fixtures	100.0%	1.89	1.89	23.47
Exterior Lighting	Screw-In	100.0%	0.45	0.45	5.52
Exterior Lighting	Linear Lighting	100.0%	0.30	0.30	3.74
Exterior Lighting	Area Lighting	100.0%	0.95	0.95	11.80
Refrigeration	Walk-In Refrigerator/Freezer	2.0%	2.42	0.05	0.60
Refrigeration	Reach-In Refrigerator/Freezer	1.6%	0.54	0.01	0.11
Refrigeration	Glass Door Display	16.3%	0.56	0.09	1.12
Refrigeration	Open Display Case	14.0%	3.30	0.46	5.72
Refrigeration	Icemaker	7.1%	0.91	0.06	0.81
Refrigeration	Vending Machine	22.8%	0.43	0.10	1.21
Food Preparation	Oven	4.0%	2.97	0.12	1.47
Food Preparation	Fryer	0.0%	4.30	-	-
Food Preparation	Dishwasher	2.0%	5.92	0.12	1.47
Food Preparation	Hot Food Container	1.0%	0.81	0.01	0.10
Food Preparation	Steamer	0.0%	4.34	-	-
Office Equipment	Desktop Computer	100.0%	0.26	0.26	3.26
Office Equipment	Laptop	100.0%	0.04	0.04	0.50
Office Equipment	Monitor	100.0%	0.05	0.05	0.58
Office Equipment	Server	82.0%	0.15	0.13	1.57
Office Equipment	Printer/Copier/Fax	100.0%	0.03	0.03	0.36
Office Equipment	POS Terminal	73.8%	0.08	0.06	0.76
Miscellaneous	Non-HVAC Motors	40.2%	0.26	0.10	1.29
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	0.96	0.96	11.94
<b>Total</b>				<b>13.7</b>	<b>169.3</b>

Table A-25 Commercial Grocery Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	0.5%	5.06	0.03	0.05
Cooling	Water-Cooled Chiller	0.3%	5.72	0.02	0.04
Cooling	RTU	75.2%	4.18	3.14	6.22
Cooling	Room AC	3.5%	4.29	0.15	0.30
Cooling	Air-Source Heat Pump	3.3%	3.69	0.12	0.24
Heating	Air-Source Heat Pump	3.3%	3.15	0.10	0.21
Cooling	Geothermal Heat Pump	0.5%	1.56	0.01	0.02
Heating	Geothermal Heat Pump	0.5%	2.02	0.01	0.02
Heating	Electric Furnace	9.8%	5.88	0.58	1.14
Heating	Electric Room Heat	1.8%	5.60	0.10	0.20
Ventilation	Ventilation	100.0%	2.03	2.03	4.01
Water Heating	Water Heater	17.5%	2.13	0.37	0.74
Interior Lighting	Screw-In	100.0%	1.13	1.13	2.24
Interior Lighting	Linear Lighting	100.0%	5.07	5.07	10.04
Interior Lighting	High-Bay Fixtures	100.0%	2.84	2.84	5.61
Exterior Lighting	Screw-In	100.0%	0.58	0.58	1.15
Exterior Lighting	Linear Lighting	100.0%	0.63	0.63	1.25
Exterior Lighting	Area Lighting	100.0%	1.42	1.42	2.82
Refrigeration	Walk-In Refrigerator/Freezer	16.0%	5.02	0.80	1.59
Refrigeration	Reach-In Refrigerator/Freezer	83.1%	0.32	0.27	0.53
Refrigeration	Glass Door Display	95.6%	3.30	3.16	6.25
Refrigeration	Open Display Case	95.6%	19.57	18.72	37.05
Refrigeration	Icemaker	66.6%	0.27	0.18	0.36
Refrigeration	Vending Machine	36.5%	0.25	0.09	0.18
Food Preparation	Oven	11.0%	0.59	0.07	0.13
Food Preparation	Fryer	87.0%	0.86	0.74	1.47
Food Preparation	Dishwasher	54.9%	1.18	0.65	1.28
Food Preparation	Hot Food Container	73.0%	0.16	0.12	0.23
Food Preparation	Steamer	20.0%	0.86	0.17	0.34
Office Equipment	Desktop Computer	100.0%	0.15	0.15	0.30
Office Equipment	Laptop	64.0%	0.02	0.01	0.03
Office Equipment	Monitor	100.0%	0.03	0.03	0.05
Office Equipment	Server	100.0%	0.09	0.09	0.17
Office Equipment	Printer/Copier/Fax	100.0%	0.02	0.02	0.03
Office Equipment	POS Terminal	95.9%	0.06	0.06	0.11
Miscellaneous	Non-HVAC Motors	34.6%	0.69	0.24	0.47
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	2.89	2.89	5.71
<b>Total</b>				<b>46.8</b>	<b>92.6</b>

Table A-26 Commercial College Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	27.1%	4.69	1.27	6.79
Cooling	Water-Cooled Chiller	5.0%	6.95	0.35	1.86
Cooling	RTU	39.5%	3.04	1.20	6.41
Cooling	Room AC	2.9%	3.12	0.09	0.48
Cooling	Air-Source Heat Pump	3.8%	3.03	0.12	0.62
Heating	Air-Source Heat Pump	3.8%	8.69	0.33	1.77
Cooling	Geothermal Heat Pump	0.9%	1.85	0.02	0.09
Heating	Geothermal Heat Pump	0.9%	6.73	0.06	0.34
Heating	Electric Furnace	0.0%	12.25	-	-
Heating	Electric Room Heat	19.1%	11.66	2.23	11.89
Ventilation	Ventilation	100.0%	1.97	1.97	10.51
Water Heating	Water Heater	15.1%	2.69	0.40	2.16
Interior Lighting	Screw-In	100.0%	0.17	0.17	0.89
Interior Lighting	Linear Lighting	100.0%	1.50	1.50	7.99
Interior Lighting	High-Bay Fixtures	100.0%	0.37	0.37	1.99
Exterior Lighting	Screw-In	100.0%	0.31	0.31	1.66
Exterior Lighting	Linear Lighting	100.0%	0.70	0.70	3.74
Exterior Lighting	Area Lighting	100.0%	0.21	0.21	1.10
Refrigeration	Walk-In Refrigerator/Freezer	7.7%	0.39	0.03	0.16
Refrigeration	Reach-In Refrigerator/Freezer	13.4%	0.17	0.02	0.12
Refrigeration	Glass Door Display	8.0%	0.09	0.01	0.04
Refrigeration	Open Display Case	4.8%	0.53	0.03	0.14
Refrigeration	Icemaker	28.2%	0.29	0.08	0.44
Refrigeration	Vending Machine	8.8%	0.14	0.01	0.06
Food Preparation	Oven	24.7%	0.50	0.12	0.66
Food Preparation	Fryer	1.1%	0.73	0.01	0.04
Food Preparation	Dishwasher	16.3%	1.00	0.16	0.87
Food Preparation	Hot Food Container	10.6%	0.14	0.01	0.08
Food Preparation	Steamer	11.9%	0.73	0.09	0.47
Office Equipment	Desktop Computer	100.0%	0.61	0.61	3.28
Office Equipment	Laptop	100.0%	0.03	0.03	0.15
Office Equipment	Monitor	100.0%	0.11	0.11	0.58
Office Equipment	Server	100.0%	0.07	0.07	0.39
Office Equipment	Printer/Copier/Fax	100.0%	0.08	0.08	0.45
Office Equipment	POS Terminal	95.6%	0.02	0.02	0.12
Miscellaneous	Non-HVAC Motors	88.8%	0.18	0.16	0.87
Miscellaneous	Pool Pump	58.8%	0.01	0.01	0.04
Miscellaneous	Pool Heater	58.8%	0.01	0.01	0.05
Miscellaneous	Miscellaneous	100.0%	0.82	0.82	4.38
<b>Total</b>				<b>13.8</b>	<b>73.7</b>

Table A-27 Commercial School Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	21.5%	2.55	0.55	6.21
Cooling	Water-Cooled Chiller	5.0%	3.78	0.19	2.14
Cooling	RTU	30.3%	1.65	0.50	5.67
Cooling	Room AC	2.3%	1.70	0.04	0.44
Cooling	Air-Source Heat Pump	9.3%	1.65	0.15	1.73
Heating	Air-Source Heat Pump	9.3%	6.57	0.61	6.91
Cooling	Geothermal Heat Pump	4.5%	1.00	0.05	0.52
Heating	Geothermal Heat Pump	4.5%	5.09	0.23	2.62
Heating	Electric Furnace	0.0%	9.26	-	-
Heating	Electric Room Heat	2.8%	8.82	0.25	2.84
Ventilation	Ventilation	100.0%	1.05	1.05	11.85
Water Heating	Water Heater	13.6%	1.46	0.20	2.25
Interior Lighting	Screw-In	100.0%	0.16	0.16	1.80
Interior Lighting	Linear Lighting	100.0%	0.88	0.88	10.00
Interior Lighting	High-Bay Fixtures	100.0%	0.90	0.90	10.24
Exterior Lighting	Screw-In	100.0%	0.27	0.27	3.10
Exterior Lighting	Linear Lighting	100.0%	0.68	0.68	7.73
Exterior Lighting	Area Lighting	100.0%	0.61	0.61	6.95
Refrigeration	Walk-In Refrigerator/Freezer	19.0%	0.45	0.09	0.98
Refrigeration	Reach-In Refrigerator/Freezer	33.0%	0.20	0.07	0.76
Refrigeration	Glass Door Display	19.7%	0.10	0.02	0.23
Refrigeration	Open Display Case	11.9%	0.62	0.07	0.83
Refrigeration	Icemaker	69.7%	0.34	0.24	2.70
Refrigeration	Vending Machine	21.8%	0.16	0.03	0.40
Food Preparation	Oven	61.4%	0.29	0.18	1.99
Food Preparation	Fryer	2.6%	0.41	0.01	0.12
Food Preparation	Dishwasher	40.4%	0.57	0.23	2.62
Food Preparation	Hot Food Container	26.3%	0.08	0.02	0.23
Food Preparation	Steamer	29.6%	0.42	0.12	1.41
Office Equipment	Desktop Computer	100.0%	0.43	0.43	4.86
Office Equipment	Laptop	100.0%	0.03	0.03	0.30
Office Equipment	Monitor	100.0%	0.08	0.08	0.86
Office Equipment	Server	100.0%	0.10	0.10	1.14
Office Equipment	Printer/Copier/Fax	100.0%	0.05	0.05	0.53
Office Equipment	POS Terminal	11.5%	0.01	0.00	0.02
Miscellaneous	Non-HVAC Motors	43.7%	0.12	0.05	0.58
Miscellaneous	Pool Pump	32.9%	0.01	0.00	0.03
Miscellaneous	Pool Heater	32.9%	0.01	0.00	0.04
Miscellaneous	Miscellaneous	100.0%	0.61	0.61	6.89
<b>Total</b>				<b>9.7</b>	<b>110.5</b>

Table A-28 Commercial Health Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	16.7%	6.05	1.01	3.75
Cooling	Water-Cooled Chiller	66.7%	7.93	5.29	19.66
Cooling	RTU	11.0%	5.80	0.64	2.36
Cooling	Room AC	0.4%	5.96	0.02	0.09
Cooling	Air-Source Heat Pump	1.1%	5.79	0.06	0.23
Heating	Air-Source Heat Pump	1.1%	9.62	0.10	0.38
Cooling	Geothermal Heat Pump	0.4%	3.53	0.01	0.05
Heating	Geothermal Heat Pump	0.4%	7.06	0.03	0.10
Heating	Electric Furnace	0.1%	14.08	0.02	0.06
Heating	Electric Room Heat	3.6%	13.41	0.49	1.82
Ventilation	Ventilation	100.0%	5.33	5.33	19.80
Water Heating	Water Heater	32.0%	4.99	1.59	5.92
Interior Lighting	Screw-In	100.0%	1.21	1.21	4.49
Interior Lighting	Linear Lighting	100.0%	2.63	2.63	9.78
Interior Lighting	High-Bay Fixtures	100.0%	0.78	0.78	2.89
Exterior Lighting	Screw-In	100.0%	0.12	0.12	0.44
Exterior Lighting	Linear Lighting	100.0%	0.22	0.22	0.82
Exterior Lighting	Area Lighting	100.0%	0.56	0.56	2.07
Refrigeration	Walk-In Refrigerator/Freezer	33.0%	1.34	0.44	1.64
Refrigeration	Reach-In Refrigerator/Freezer	50.0%	0.30	0.15	0.56
Refrigeration	Glass Door Display	8.6%	0.31	0.03	0.10
Refrigeration	Open Display Case	6.7%	1.83	0.12	0.45
Refrigeration	Icemaker	21.1%	0.50	0.11	0.39
Refrigeration	Vending Machine	27.9%	0.24	0.07	0.25
Food Preparation	Oven	62.2%	1.72	1.07	3.97
Food Preparation	Fryer	14.2%	2.48	0.35	1.31
Food Preparation	Dishwasher	30.9%	3.41	1.06	3.92
Food Preparation	Hot Food Container	12.3%	0.47	0.06	0.21
Food Preparation	Steamer	3.6%	2.50	0.09	0.34
Office Equipment	Desktop Computer	100.0%	0.68	0.68	2.54
Office Equipment	Laptop	100.0%	0.04	0.04	0.16
Office Equipment	Monitor	100.0%	0.12	0.12	0.45
Office Equipment	Server	100.0%	0.16	0.16	0.60
Office Equipment	Printer/Copier/Fax	100.0%	0.07	0.07	0.28
Office Equipment	POS Terminal	51.0%	0.05	0.03	0.10
Miscellaneous	Non-HVAC Motors	74.1%	0.36	0.27	0.99
Miscellaneous	Pool Pump	3.9%	0.01	0.00	0.00
Miscellaneous	Pool Heater	5.7%	0.01	0.00	0.00
Miscellaneous	Miscellaneous	100.0%	3.74	3.74	13.89
<b>Total</b>				<b>28.8</b>	<b>106.9</b>

Table A-29 Commercial Lodging Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.1%	1.44	0.03	0.09
Cooling	Water-Cooled Chiller	7.5%	1.88	0.14	0.44
Cooling	RTU	16.3%	3.20	0.52	1.61
Cooling	Room AC	40.6%	3.29	1.33	4.12
Cooling	Air-Source Heat Pump	18.0%	3.20	0.58	1.78
Heating	Air-Source Heat Pump	18.0%	5.36	0.96	2.98
Cooling	Geothermal Heat Pump	3.4%	2.76	0.09	0.29
Heating	Geothermal Heat Pump	3.4%	3.48	0.12	0.37
Heating	Electric Furnace	1.5%	5.85	0.09	0.27
Heating	Electric Room Heat	53.2%	5.57	2.97	9.18
Ventilation	Ventilation	100.0%	1.89	1.89	5.84
Water Heating	Water Heater	10.5%	6.41	0.67	2.08
Interior Lighting	Screw-In	100.0%	0.98	0.98	3.03
Interior Lighting	Linear Lighting	100.0%	0.57	0.57	1.76
Interior Lighting	High-Bay Fixtures	100.0%	0.20	0.20	0.63
Exterior Lighting	Screw-In	100.0%	0.24	0.24	0.74
Exterior Lighting	Linear Lighting	100.0%	0.04	0.04	0.12
Exterior Lighting	Area Lighting	100.0%	1.02	1.02	3.15
Refrigeration	Walk-In Refrigerator/Freezer	3.0%	1.09	0.03	0.10
Refrigeration	Reach-In Refrigerator/Freezer	19.0%	0.25	0.05	0.14
Refrigeration	Glass Door Display	40.0%	0.25	0.10	0.31
Refrigeration	Open Display Case	0.0%	1.49	-	-
Refrigeration	Icemaker	88.9%	0.82	0.73	2.27
Refrigeration	Vending Machine	57.8%	0.39	0.22	0.69
Food Preparation	Oven	24.0%	0.69	0.17	0.51
Food Preparation	Fryer	4.0%	1.00	0.04	0.12
Food Preparation	Dishwasher	39.0%	1.38	0.54	1.66
Food Preparation	Hot Food Container	10.0%	0.19	0.02	0.06
Food Preparation	Steamer	4.0%	1.01	0.04	0.13
Office Equipment	Desktop Computer	100.0%	0.17	0.17	0.52
Office Equipment	Laptop	100.0%	0.03	0.03	0.08
Office Equipment	Monitor	100.0%	0.03	0.03	0.09
Office Equipment	Server	100.0%	0.10	0.10	0.31
Office Equipment	Printer/Copier/Fax	100.0%	0.02	0.02	0.06
Office Equipment	POS Terminal	38.9%	0.03	0.01	0.03
Miscellaneous	Non-HVAC Motors	91.3%	0.19	0.17	0.54
Miscellaneous	Pool Pump	66.7%	0.03	0.02	0.06
Miscellaneous	Pool Heater	2.9%	0.04	0.00	0.00
Miscellaneous	Miscellaneous	100.0%	0.97	0.97	2.99
<b>Total</b>				<b>15.9</b>	<b>49.2</b>

Table A-30 Commercial Warehouse Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.5%	3.83	0.10	0.62
Cooling	Water-Cooled Chiller	2.5%	4.39	0.11	0.71
Cooling	RTU	11.3%	3.76	0.42	2.74
Cooling	Room AC	1.1%	3.87	0.04	0.27
Cooling	Air-Source Heat Pump	1.7%	3.76	0.06	0.42
Heating	Air-Source Heat Pump	1.7%	5.94	0.10	0.66
Cooling	Geothermal Heat Pump	0.0%	2.29	-	-
Heating	Geothermal Heat Pump	0.0%	4.52	-	-
Heating	Electric Furnace	2.1%	7.94	0.17	1.07
Heating	Electric Room Heat	11.3%	7.57	0.85	5.52
Ventilation	Ventilation	100.0%	0.56	0.56	3.60
Water Heating	Water Heater	38.3%	0.57	0.22	1.40
Interior Lighting	Screw-In	100.0%	0.13	0.13	0.81
Interior Lighting	Linear Lighting	100.0%	0.42	0.42	2.73
Interior Lighting	High-Bay Fixtures	100.0%	1.55	1.55	10.01
Exterior Lighting	Screw-In	100.0%	0.15	0.15	1.00
Exterior Lighting	Linear Lighting	100.0%	0.23	0.23	1.48
Exterior Lighting	Area Lighting	100.0%	0.77	0.77	4.99
Refrigeration	Walk-In Refrigerator/Freezer	1.1%	4.20	0.05	0.30
Refrigeration	Reach-In Refrigerator/Freezer	2.0%	0.94	0.02	0.12
Refrigeration	Glass Door Display	0.0%	0.97	-	-
Refrigeration	Open Display Case	0.0%	5.73	-	-
Refrigeration	Icemaker	8.3%	1.58	0.13	0.85
Refrigeration	Vending Machine	6.9%	0.74	0.05	0.33
Food Preparation	Oven	0.0%	0.26	-	-
Food Preparation	Fryer	0.0%	0.38	-	-
Food Preparation	Dishwasher	2.0%	0.53	0.01	0.07
Food Preparation	Hot Food Container	0.0%	0.07	-	-
Food Preparation	Steamer	0.0%	0.39	-	-
Office Equipment	Desktop Computer	100.0%	0.21	0.21	1.34
Office Equipment	Laptop	100.0%	0.03	0.03	0.17
Office Equipment	Monitor	100.0%	0.04	0.04	0.24
Office Equipment	Server	89.0%	0.24	0.22	1.40
Office Equipment	Printer/Copier/Fax	100.0%	0.02	0.02	0.15
Office Equipment	POS Terminal	6.1%	0.07	0.00	0.03
Miscellaneous	Non-HVAC Motors	49.9%	0.15	0.07	0.48
Miscellaneous	Pool Pump	0.0%	0.01	-	-
Miscellaneous	Pool Heater	0.0%	0.01	-	-
Miscellaneous	Miscellaneous	100.0%	0.69	0.69	4.46
<b>Total</b>				<b>7.4</b>	<b>47.9</b>

Table A-31 Commercial Miscellaneous Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Sqft.)	Usage (GWh)
Cooling	Air-Cooled Chiller	7.8%	4.84	0.38	4.71
Cooling	Water-Cooled Chiller	4.0%	5.48	0.22	2.76
Cooling	RTU	45.9%	4.00	1.84	22.90
Cooling	Room AC	4.1%	4.11	0.17	2.11
Cooling	Air-Source Heat Pump	7.2%	4.00	0.29	3.58
Heating	Air-Source Heat Pump	7.2%	9.11	0.65	8.17
Cooling	Geothermal Heat Pump	1.9%	2.44	0.05	0.58
Heating	Geothermal Heat Pump	1.9%	7.06	0.13	1.67
Heating	Electric Furnace	7.5%	10.98	0.82	10.27
Heating	Electric Room Heat	8.9%	10.46	0.93	11.62
Ventilation	Ventilation	100.0%	1.65	1.65	20.52
Water Heating	Water Heater	12.4%	3.13	0.39	4.85
Interior Lighting	Screw-In	100.0%	0.54	0.54	6.74
Interior Lighting	Linear Lighting	100.0%	1.44	1.44	18.02
Interior Lighting	High-Bay Fixtures	100.0%	0.55	0.55	6.88
Exterior Lighting	Screw-In	100.0%	0.30	0.30	3.80
Exterior Lighting	Linear Lighting	100.0%	0.27	0.27	3.38
Exterior Lighting	Area Lighting	100.0%	0.22	0.22	2.80
Refrigeration	Walk-In Refrigerator/Freezer	9.0%	1.16	0.10	1.30
Refrigeration	Reach-In Refrigerator/Freezer	0.0%	0.26	-	-
Refrigeration	Glass Door Display	15.0%	0.27	0.04	0.50
Refrigeration	Open Display Case	0.0%	1.59	-	-
Refrigeration	Icemaker	41.6%	0.44	0.18	2.27
Refrigeration	Vending Machine	28.6%	0.41	0.12	1.47
Food Preparation	Oven	46.1%	0.45	0.21	2.59
Food Preparation	Fryer	4.1%	0.65	0.03	0.33
Food Preparation	Dishwasher	4.1%	0.90	0.04	0.46
Food Preparation	Hot Food Container	10.0%	0.12	0.01	0.15
Food Preparation	Steamer	2.4%	0.66	0.02	0.20
Office Equipment	Desktop Computer	100.0%	0.45	0.45	5.57
Office Equipment	Laptop	100.0%	0.07	0.07	0.86
Office Equipment	Monitor	100.0%	0.08	0.08	0.98
Office Equipment	Server	66.0%	0.26	0.17	2.16
Office Equipment	Printer/Copier/Fax	100.0%	0.05	0.05	0.61
Office Equipment	POS Terminal	22.7%	0.07	0.02	0.20
Miscellaneous	Non-HVAC Motors	59.9%	0.20	0.12	1.50
Miscellaneous	Pool Pump	11.6%	0.03	0.00	0.04
Miscellaneous	Pool Heater	5.6%	0.04	0.00	0.03
Miscellaneous	Miscellaneous	100.0%	1.06	1.06	13.16
<b>Total</b>				<b>13.6</b>	<b>169.8</b>

Table A-32 Industrial Electric Market Profile, Idaho

End Use	Technology	Saturation	EUI (kWh)	Intensity (kWh/Empl.)	Usage (GWh)
Cooling	Air-Cooled Chiller	2.5%	6,171.21	154.28	1.37
Cooling	Water-Cooled Chiller	2.5%	7,074.38	176.86	1.57
Cooling	RTU	11.3%	6,661.64	750.24	6.67
Cooling	Air-Source Heat Pump	1.7%	6,067.70	104.22	0.93
Heating	Air-Source Heat Pump	1.7%	9,394.72	161.37	1.44
Cooling	Geothermal Heat Pump	0.0%	4,047.15	-	-
Heating	Geothermal Heat Pump	0.0%	6,266.28	-	-
Heating	Electric Furnace	2.1%	12,568.11	262.55	2.34
Heating	Electric Room Heat	11.3%	11,969.63	1,352.52	12.03
Ventilation	Ventilation	100.0%	890.77	890.77	7.93
Interior Lighting	Screw-In	100.0%	104.36	104.36	0.93
Interior Lighting	Linear Lighting	100.0%	350.40	350.40	3.12
Interior Lighting	High-Bay Fixtures	100.0%	1,284.54	1,284.54	11.43
Exterior Lighting	Screw-In	100.0%	127.82	127.82	1.14
Exterior Lighting	Linear Lighting	100.0%	189.51	189.51	1.69
Exterior Lighting	Area Lighting	100.0%	640.49	640.49	5.70
Motors	Pumps	100.0%	5,807.10	5,807.10	51.67
Motors	Fans & Blowers	100.0%	2,999.05	2,999.05	26.68
Motors	Compressed Air	100.0%	2,463.35	2,463.35	21.92
Motors	Material Handling	100.0%	10,438.26	10,438.26	92.87
Motors	Other Motors	100.0%	666.02	666.02	5.93
Process	Process Heating	100.0%	4,510.93	4,510.93	40.13
Process	Process Cooling	100.0%	1,479.31	1,479.31	13.16
Process	Process Refrigeration	100.0%	1,479.31	1,479.31	13.16
Process	Process Electrochemical	100.0%	2,930.65	2,930.65	26.07
Process	Process Other	100.0%	992.62	992.62	8.83
Miscellaneous	Miscellaneous	100.0%	1,620.59	1,620.59	14.42
<b>Total</b>				<b>41,937.1</b>	<b>373.1</b>



## MARKET ADOPTION (RAMP) RATES

This appendix presents the Power Council's 7<sup>th</sup> Plan ramp rates we applied to technical potential to estimate achievable technical potential. Retrofit ramp rates were implemented as the difference between percentage values in any given year.

Table B-1 Measure Ramp Rates Used in CPA

Ramp Rate Name	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
LO12Med	9%	19%	28%	37%	47%	55%	62%	67%	71%	75%	78%	80%	82%	83%	84%	85%	85%	85%	85%	85%
LO5Med	4%	8%	13%	20%	27%	35%	45%	54%	63%	71%	76%	81%	83%	84%	85%	85%	85%	85%	85%	85%
LO1Slow	0%	1%	1%	3%	5%	7%	11%	16%	22%	29%	37%	46%	54%	62%	69%	75%	79%	82%	84%	85%
LO50Fast	38%	56%	68%	76%	81%	83%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LO20Fast	19%	32%	42%	49%	55%	61%	65%	69%	72%	75%	78%	79%	81%	82%	83%	84%	84%	84%	85%	85%
LOEven20	4%	9%	13%	17%	21%	26%	30%	34%	38%	43%	47%	51%	55%	60%	64%	68%	72%	77%	81%	85%
LOMax60*	1%	3%	5%	8%	12%	16%	20%	24%	28%	31%	34%	37%	40%	42%	45%	47%	49%	51%	53%	55%
LO3Slow	0%	1%	3%	5%	9%	15%	22%	31%	40%	49%	57%	65%	71%	75%	79%	81%	83%	84%	85%	85%
Retro12Med	9%	19%	28%	37%	47%	55%	62%	67%	71%	75%	78%	80%	82%	83%	84%	85%	85%	85%	85%	85%
Retro5Med	4%	8%	13%	20%	27%	35%	45%	54%	63%	71%	76%	81%	83%	84%	85%	85%	85%	85%	85%	85%
Retro1Slow	0%	1%	1%	3%	5%	7%	11%	16%	22%	29%	37%	46%	54%	62%	69%	75%	79%	82%	84%	85%
Retro50Fast	38%	56%	68%	76%	81%	83%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Retro20Fast	19%	32%	42%	49%	55%	61%	65%	69%	72%	75%	78%	79%	81%	82%	83%	84%	84%	84%	85%	85%
RetroEven20	4%	9%	13%	17%	21%	26%	30%	34%	38%	43%	47%	51%	55%	60%	64%	68%	72%	77%	81%	85%
RetroMax60*	1%	3%	5%	8%	12%	16%	20%	24%	28%	31%	34%	37%	40%	42%	45%	47%	49%	51%	53%	55%
Retro3Slow	0%	1%	3%	5%	9%	15%	22%	31%	40%	49%	57%	65%	71%	75%	79%	81%	83%	84%	85%	85%
LightingPPA	28%	51%	68%	79%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%

\* Assumption of 55% maximum achievability from Council's 7<sup>th</sup> Power Plan



## APPENDIX | C

**MEASURE DATA**

Please see measure-level assumptions and details in the file "*Avista 2016 CPA Measure Assumptions.xlsx*"



## **NON-EQUIPMENT MEASURE DATA**

Please see measure-level assumptions and details in the file “*Avista Appendix- Non-Equipment Measure Data.xlsx*”



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# 2017 Electric Integrated Resource Plan

## Appendix D – Conservation Potential Assessment Measure Assumptions



Measure				Assumptions in First Year (2015)														Sources							
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Average Annual Savings (kWh/Unit/Year)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
WA	Residential	Single Family - Existing	Cooling	Central AC	SEER 13.0	SEER 14.0 (ENERGY STAR 2016)	SEER 14.0	15	\$394.85	\$ -	\$ -	115	0.0005	-	-	48.3%	at Turnover	Lost Opportunity	LO5Med	\$	396.26	DEER	DEER	AEQ-BEST	
WA	Residential	Single Family - Existing	Cooling	Room AC	IEER 11.0	IEER 12.1 (ENERGY STAR 2016)	IEER 12.1	12	\$281.59	\$ -	\$ -	53	-	-	-	15.2%	at Turnover	Lost Opportunity	LO15Low	\$	74.72	AEO 2015	AEO 2015	AEQ-BEST	
WA	Residential	Single Family - Existing	Cooling	Evaporative AC	Direct	Indirect/Direct	Indirect/Direct	15	\$203.29	\$ -	\$ -	392	0.0005	-	-	1.3%	at Turnover	Lost Opportunity	LO15Low	\$	60.00	DEER	DEER	New Buildings Institute Study, 2006	
WA	Residential	Single Family - Existing	Heating	Air-Source Heat Pump	SEER 14.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0	14	\$461.98	\$ -	\$ -	114	0.0005	-	-	8.1%	at Turnover	Lost Opportunity	LO5Med	\$	62.69	RTF	RTF	AEQ-BEST	
WA	Residential	Single Family - Existing	Heating	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0	15	\$461.98	\$ -	\$ -	738	-	-	-	0.0003	-	8.1%	at Turnover	Lost Opportunity	LO5Med	\$	62.69	RTF	AEO 2015
WA	Residential	Single Family - Existing	Cooling	Geothermal Heat Pump	EER 13.4 / COP 3.1	EER 16.1 / COP 3.5	EER 16.1	20	\$3,849.85	\$ -	\$ -	237	0.0005	-	-	0.3%	at Turnover	Lost Opportunity	LO15Low	\$	451.90	7th Plan	AEO 2015	AEQ-BEST	
WA	Residential	Single Family - Existing	Heating	Geothermal Heat Pump	EER 13.4 / COP 3.1	EER 16.1 / COP 3.5	EER 16.1	20	\$3,849.85	\$ -	\$ -	584	-	-	-	0.0003	-	0.3%	at Turnover	Lost Opportunity	LO15Low	\$	451.90	7th Plan	AEO 2015
WA	Residential	Single Family - Existing	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	-	7.3%	at Turnover	Lost Opportunity	LO5Med	\$	-	AEO 2015	AEQ-BEST		
WA	Residential	Single Family - Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	-	0.0003	-	6.3%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2014	AEQ-BEST
WA	Residential	Single Family - Existing	Water Heating	Water Heater (<= 55 Gal)	IEF 9.1	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$803.83	\$ -	\$ 2.53	1,842	0.0002	0.0002	43.0%	at Turnover	Lost Opportunity	LO35Low	\$	53.74	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Water Heating	Water Heater (> 55 Gal)	IEF 8.85	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$151.46	\$ -	\$ 0.65	792	0.0002	0.0002	5.7%	at Turnover	Lost Opportunity	LO35Low	\$	28.75	RTF	RTF			
WA	Residential	Single Family - Existing	Interior Lighting	General Service Lighting	EISA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	12	\$267.32	\$ 10.04	\$ -	344	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	84.29	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Interior Lighting	Linear Lighting	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	20	\$111.67	\$ -	\$ -	18	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	60.07	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Interior Lighting	Exempted Lighting	Incandescence (9.7 lm/W)	LED 2017 (77.7 lm/W)	LED 2017 (77.7 lm/W)	20	\$165.94	\$ 27.95	\$ -	298	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(7.22)	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Exterior Lighting	Screw-In	EISA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	10	\$38.26	\$ 1.73	\$ -	123	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	37.79	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	15	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	LO15Low	\$	242.26	RTF	RTF			
WA	Residential	Single Family - Existing	Appliances	Second Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	18	0.0003	0.0001	29.6%	at Turnover	Lost Opportunity	LO15Low	\$	207.98	RTF	RTF			
WA	Residential	Single Family - Existing	Appliances	Freezer	Standard 2014	ENERGY STAR	ENERGY STAR	22	\$447.57	\$ -	\$ -	66	0.0003	0.0001	59.2%	at Turnover	Lost Opportunity	LO15Low	\$	61.32	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Clothes Washer	Standard 2015 (IMEF 1.84 / WF 4.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	14	\$145.04	\$ 23.52	\$ -	53	0.0003	0.0001	96.4%	at Turnover	Lost Opportunity	LO12Med	\$	113.03	RTF	RTF			
WA	Residential	Single Family - Existing	Appliances	Clothes Dryer	Standard 2015 (IEF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	16	\$313.00	\$ -	\$ -	178	0.0002	0.0002	38.8%	at Turnover	Lost Opportunity	LO12Med	\$	195.22	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Dishwasher	Standard 2013 (180-307 kWh)	Standard 2013 (180-307 kWh)	Standard 2013 (180-307 kWh)	15	\$6.51	\$ 0.54	\$ -	8	0.0003	0.0002	82.1%	at Turnover	Lost Opportunity	LO12Med	\$	27.74	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Stove/Oven	Standard 2013 (180-307 kWh)	High Efficiency	High Efficiency	20	\$312.07	\$ -	\$ -	89	0.0004	0.0003	67.3%	at Turnover	Lost Opportunity	LO20Fast	\$	155.09	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Clothes Dryer	Standard 2015 (IEF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	11	\$4.70	\$ -	\$ -	9	0.0004	0.0003	98.0%	at Turnover	Lost Opportunity	LO12Med	\$	73.27	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Dishwasher	Standard 2013 (180-307 kWh)	Standard 2013 (180-307 kWh)	Standard 2013 (180-307 kWh)	15	\$6.51	\$ 0.54	\$ -	8	0.0003	0.0002	82.1%	at Turnover	Lost Opportunity	LO12Med	\$	27.74	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Stove/Oven	Standard 2013 (180-307 kWh)	High Efficiency	High Efficiency	20	\$312.07	\$ -	\$ -	89	0.0004	0.0003	67.3%	at Turnover	Lost Opportunity	LO20Fast	\$	155.09	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Appliances	Clothes Dryer	Standard 2015 (IEF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	11	\$4.70	\$ -	\$ -	9	0.0004	0.0003	98.0%	at Turnover	Lost Opportunity	LO12Med	\$	73.27	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Electronics	Personal Computers	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	5	\$14.40	\$ -	\$ -	62	0.0002	0.0001	81.4%	at Turnover	Lost Opportunity	LO50Fast	\$	64.15	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Electronics	Monitor	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	5	\$8.35	\$ -	\$ -	61	0.0002	0.0001	96.5%	at Turnover	Lost Opportunity	LO50Fast	\$	38.04	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Electronics	Laptops	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	5	\$58.11	\$ -	\$ -	15	0.0002	0.0001	113.1%	at Turnover	Lost Opportunity	LO50Fast	\$	133.17	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Electronics	Printer/Fax/Copier	Standard	ENERGY STAR	ENERGY STAR	5	\$0.01	\$ -	\$ -	22	0.0002	0.0001	86.5%	at Turnover	Lost Opportunity	LO20Fast	\$	0.12	ENERGY STAR	ENERGY STAR			
WA	Residential	Single Family - Existing	Electronics	TVs	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	6	\$0.01	\$ -	\$ -	26	0.0002	0.0001	209.5%	at Turnover	Lost Opportunity	LO20Fast	\$	0.09	ENERGY STAR	ENERGY STAR			
WA	Residential	Single Family - Existing	Electronics	2017 Agreement	Standard	2017 Agreement	2017 Agreement	72	\$0.00	\$ -	\$ -	72	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.00	Voluntary STB Agreement	Voluntary STB Agreement			
WA	Residential	Single Family - Existing	Electronics	Devices and Gadgets	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	-	-	-	0.0002	-	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	N/A	N/A
WA	Residential	Single Family - Existing	Miscellaneous	Electric Vehicles	Level 2	Level 2	Level 2	10	\$782.51	\$ -	\$ -	117	0.0002	0.0001	0.3%	at Turnover	Lost Opportunity	LO12Med	\$	1,041.61	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Miscellaneous	Pool Heater	Electric Resistance	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	15	\$3,581.66	\$ -	\$ -	3,386	0.0002	0.0001	0.8%	at Turnover	Lost Opportunity	LO12Med	\$	131.96	AEQ Research	AEQ Research			
WA	Residential	Single Family - Existing	Miscellaneous	Pool Heater	Electric Resistance	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	15	\$3,581.66	\$ -	\$ -	3,386	0.0002	0.0001	0.8%	at Turnover	Lost Opportunity	LO12Med	\$	131.96	AEQ Research	AEQ Research			
WA	Residential	Single Family - Existing	Miscellaneous	Furnace Fan	Standard	ECM	ECM	20	\$97.97	\$ -	\$ -	81	0.0002	0.0001	76.1%	at Turnover	Lost Opportunity	LO12Med	\$	116.90	Illinois TRM	Illinois TRM			
WA	Residential	Single Family - Existing	Miscellaneous	Well Pump	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	-	-	-	0.0002	-	14.9%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A
WA	Residential	Single Family - Existing	Miscellaneous	Well Pump	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	-	-	-	0.0002	-	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A
WA	Residential	Single Family - New	Cooling	Central AC	SEER 13.0	SEER 14.0 (ENERGY STAR 2016)	SEER 14.0	15	\$394.85	\$ -	\$ -	115	0.0005	-	-	48.3%	at Turnover	Lost Opportunity	LO5Med	\$	396.26	DEER	DEER		
WA	Residential	Single Family - New	Cooling	Room AC	IEER 11.0	IEER 12.1 (ENERGY STAR 2016)	IEER 12.1	12	\$281.59	\$ -	\$ -	43	-	-	-	15.2%	at Turnover	Lost Opportunity	LO15Low	\$	890.61	AEO 2015	AEO 2015		
WA	Residential	Single Family - New	Cooling	Evaporative AC	Direct	Indirect/Direct	Indirect/Direct	15	\$203.29	\$ -	\$ -	392	0.0005	-	-	1.3%	at Turnover	Lost Opportunity	LO15Low	\$	60.00	DEER	DEER		
WA	Residential	Single Family - New	Heating	Air-Source Heat Pump	SEER 14.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0	14	\$461.98	\$ -	\$ -	114	1.199	0.0003	-	-	1.7%	at Turnover	Lost Opportunity	LO5Med	\$	32.38	RTF	RTF	
WA	Residential	Single Family - New	Heating	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0	15	\$461.98	\$ -	\$ -	450	-	-	-	0.0003	-	9.4%	at Turnover	Lost Opportunity	LO5Med	\$	32.38	RTF	AEO 2015
WA	Residential	Single Family - New	Cooling	Geothermal Heat Pump	EER 13.4 / COP 3.1	EER 16.1 / COP 3.5	EER 16.1	20	\$3,849.85	\$ -	\$ -	2,587	-	-	-	0.0003	-	0.3%	at Turnover	Lost Opportunity	LO15Low	\$	133.88	7th Plan	AEO 2015
WA	Residential	Single Family - New	Heating	Geothermal Heat Pump	EER 13.4 / COP 3.1	EER 16.1 / COP 3.5	EER 16.1	20	\$3,849.85	\$ -	\$ -	584	-	-	-	0.0005	-	0.3%	at Turnover	Lost Opportunity	LO15Low	\$	133.88	7th Plan	AEO 2015
WA	Residential	Single Family - New	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	-	7.3%	at Turnover	Lost Opportunity	LO5Med	\$	-	AEO 2015	AEQ-BEST		
WA	Residential	Single Family - New	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	-	0.0003	-	4.8%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2014	AEQ-BEST
WA	Residential	Single Family - New	Water Heating	Water Heater (<= 55 Gal)	IEF 9.1	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$803.83	\$ -	\$ 2.53	1,836	0.0002	0.0002	26.0%	at Turnover	Lost Opportunity	LO35Low	\$	53.92	7th Plan	7th Plan			
WA	Residential	Single Family - New	Water Heating	Water Heater (> 55 Gal)	IEF 8.85	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$151.46	\$ -	\$ 0.65	793	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO35Low	\$	28.75	7th Plan	7th Plan			
WA	Residential	Single Family - New	Interior Lighting	General Service Lighting	EISA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	12	\$303.70	\$ 11.41	\$ -	390	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	84.28	7th Plan	7th Plan			
WA	Residential	Single Family - New	Interior Lighting	Linear Lighting	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm																		

Measure					Assumptions in First Year (2015)															Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy Benefits Annual \$/Unit	Measure Life (Years)	Average Incremental \$/Unit	Incremental O&M Costs (\$/Unit)	Annual Average Savings (\$/Unit)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
WA	Residential	Multifamily - W New	Water Heating	> SS Gal	Water Heater	EF 0.885	NEA Tier 2 Heat Pump (EF 2.0)	NEA Tier 2 Heat Pump (EF 2.0)	0.65	13	\$161.46	\$ -	424	0.0002	0.0002	8.7%	at Turnover	Lost Opportunity	L035Low	\$	52.31	RTF	RTF	RTF	
WA	Residential	Multifamily - W New	Interior Lighting	General Service Lighting	Linear Lighting	EF 1.0	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	-	20	\$189.56	\$ 7.12	-	232	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	88.35	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Interior Lighting	General Service Lighting	Linear Lighting	EF 1.0	T8 - F32 (69.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)	-	20	\$53.19	\$ -	-	6	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	824.23	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Interior Lighting	General Service Lighting	Linear Lighting	EF 1.0	LED 2017 (77.7 lm/W)	LED 2017 (77.7 lm/W)	3.05	22	\$189.56	\$ -	-	28	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	(8.50)	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Exterior Lighting	General Service Lighting	Linear Lighting	EF 1.0	LED 2017 (86.9 lm/W)	LED 2017 (86.9 lm/W)	-	5	\$0.00	\$ -	-	0	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	-	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Appliances	Refrigerator	Refrigerator	Standard 2014	CEI Tier 3 (20% above standard)	CEI Tier 3 (20% above standard)	-	15	\$31.62	\$ -	-	13	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	L015Low	\$	279.94	RTF	RTF	
WA	Residential	Multifamily - W New	Appliances	Second Refrigerator	Refrigerator	Standard 2014	CEI Tier 3 (20% above standard)	CEI Tier 3 (20% above standard)	-	15	\$31.62	\$ -	-	15	0.0003	0.0001	91.1%	at Turnover	Lost Opportunity	L015Low	\$	240.33	RTF	RTF	
WA	Residential	Multifamily - W New	Appliances	Washer	Washer	Standard 2014	ENERGY STAR	ENERGY STAR	-	22	\$44.57	\$ -	-	57	0.0003	0.0001	6.1%	at Turnover	Lost Opportunity	L015Low	\$	71.17	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Appliances	Clothes Washer	Clothes Washer	Standard 2014	CEI Tier 1 (IMEF 2.38 / WF 3.7)	CEI Tier 1 (IMEF 2.38 / WF 3.7)	-	14	\$145.04	\$ 23.52	-	45	0.0003	0.0001	84.7%	at Turnover	Lost Opportunity	L012Med	\$	(132.16)	RTF	RTF	
WA	Residential	Multifamily - W New	Appliances	Clothes Dryer	Clothes Dryer	Standard 2014	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	-	16	\$313.00	\$ -	-	122	0.0002	0.0002	113.9%	at Turnover	Lost Opportunity	L0M6A60	\$	283.95	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Appliances	Stove/Oven	Stove/Oven	Standard 2015 (EF 3.70)	ENERGY STAR (180-295 kWh)	ENERGY STAR (180-295 kWh)	0.54	15	\$61.51	\$ -	-	7	0.0003	0.0002	86.9%	at Turnover	Lost Opportunity	L012Med	\$	31.99	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Appliances	Stove/Oven	Stove/Oven	Standard 2015 (EF 3.70)	High Efficiency	High Efficiency	-	20	\$312.07	\$ -	-	136	0.0004	0.0003	66.1%	at Turnover	Lost Opportunity	L020Fast	\$	221.44	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Appliances	Microwave	Microwave	2016 Code	2016 Efficient (LEVEL 4)	2016 Efficient (LEVEL 4)	-	11	\$4.70	\$ -	-	8	0.0004	0.0003	96.0%	at Turnover	Lost Opportunity	L012Med	\$	84.26	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Electronics	Personal Computers	Personal Computers	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	-	5	\$14.00	\$ -	-	54	0.0003	0.0001	47.4%	at Turnover	Lost Opportunity	L050Fast	\$	73.78	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Electronics	Monitors	Monitors	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	-	5	\$8.35	\$ -	-	53	0.0003	0.0001	60.8%	at Turnover	Lost Opportunity	L050Fast	\$	43.75	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Electronics	Laptops	Laptops	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	-	4	\$88.11	\$ -	-	13	0.0003	0.0001	72.8%	at Turnover	Lost Opportunity	L050Fast	\$	1,510.83	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Electronics	Printer/Fax/Copier	Printer/Fax/Copier	Standard	ENERGY STAR	ENERGY STAR	-	5	\$0.01	\$ -	-	19	0.0003	0.0001	66.0%	at Turnover	Lost Opportunity	L020Fast	\$	0.14	ENERGY STAR	ENERGY STAR	
WA	Residential	Multifamily - W New	Electronics	TVs	TVs	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	-	6	\$0.01	\$ -	-	28	0.0003	0.0001	158.7%	at Turnover	Lost Opportunity	L020Fast	\$	0.08	ENERGY STAR	ENERGY STAR	
WA	Residential	Multifamily - W New	Electronics	Set-top Boxes/DVRs	Set-top Boxes/DVRs	Standard	2017 Agreement	2017 Agreement	-	5	\$0.00	\$ -	-	62	0.0003	0.0001	132.4%	at Turnover	Lost Opportunity	L020Fast	\$	-	Voluntary STB Agreement	Voluntary STB Agreement	
WA	Residential	Multifamily - W New	Electronics	Devices and Gadgets	Devices and Gadgets	Standard	Standard	Standard	-	5	\$0.00	\$ -	-	-	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	-	N/A	N/A	
WA	Residential	Multifamily - W New	Miscellaneous	Electric Vehicles	Electric Vehicles	Standard	Level 2	Level 2	-	10	\$782.51	\$ -	-	-	0.0003	0.0001	0.0%	at Turnover	Lost Opportunity	L0M6A60	\$	-	7th Plan	7th Plan	
WA	Residential	Multifamily - W New	Miscellaneous	Pool Heater	Pool Heater	Standard	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	-	10	\$588.28	\$ -	-	-	0.0003	0.0001	0.0%	at Turnover	Lost Opportunity	L012Med	\$	-	ACE Research	ACE Research	
WA	Residential	Multifamily - W New	Miscellaneous	Pool Pump	Pool Pump	Standard	ECM	ECM	-	20	\$97.97	\$ -	-	29	0.0003	0.0001	19.1%	at Turnover	Lost Opportunity	L012Med	\$	328.44	Illinois TRM	Illinois TRM	
WA	Residential	Multifamily - W New	Miscellaneous	Furnace Fan	Furnace Fan	Standard	Standard	Standard	-	5	\$0.00	\$ -	-	-	0.0003	0.0001	0.0%	at Turnover	Lost Opportunity	L012Med	\$	-	N/A	N/A	
WA	Residential	Multifamily - W New	Miscellaneous	Well Pump	Well Pump	Standard	Standard	Standard	-	5	\$0.00	\$ -	-	-	0.0003	0.0001	0.0%	at Turnover	Lost Opportunity	L012Med	\$	-	N/A	N/A	
WA	Residential	Manufactured   Existing	Miscellaneous	Furnace Fan	Furnace Fan	Standard	Standard	Standard	-	5	\$0.00	\$ -	-	-	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	L012Med	\$	-	N/A	N/A	
WA	Residential	Manufactured   Existing	Cooling	Central AC	Central AC	SEER 13.0	SEER 14.0	SEER 14.0	-	15	\$394.85	\$ -	-	42	0.0005	-	31.3%	at Turnover	Lost Opportunity	L050Med	\$	1,087.00	DEER	DEER	
WA	Residential	Manufactured   Existing	Cooling	Room AC	Room AC	SEER 11.0	SEER 12.1 (ENERGY STAR 2016)	SEER 12.1 (ENERGY STAR 2016)	-	12	\$289.59	\$ -	-	50	0.0005	-	28.6%	at Turnover	Lost Opportunity	L015Low	\$	764.83	AE0 2015	AE0 2015	
WA	Residential	Manufactured   Existing	Cooling	Indirect/Direct	Indirect/Direct	SEER 11.0	SEER 12.1 (ENERGY STAR 2016)	SEER 12.1 (ENERGY STAR 2016)	-	15	\$157.00	\$ 9.11	-	7	0.0005	-	1.7%	at Turnover	Lost Opportunity	L015Low	\$	144.45	ACE Research	ACE Research	
WA	Residential	Manufactured   Existing	Cooling	Air-Source Heat Pump	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	-	15	\$192.49	\$ -	-	40	0.0005	-	5.1%	at Turnover	Lost Opportunity	L05Med	\$	95.32	RTF	AE0 2015	
WA	Residential	Manufactured   Existing	Heating	Air-Source Heat Pump	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	-	15	\$192.49	\$ -	-	193	-	0.0002	-	5.1%	at Turnover	Lost Opportunity	L05Med	\$	95.32	RTF	AE0 2015
WA	Residential	Manufactured   Existing	Cooling	Geothermal Heat Pump	Geothermal Heat Pump	EEER 13.4 / COP 3.1	EEER 16.1 / COP 3.5	EEER 16.1 / COP 3.5	-	20	\$3,849.85	\$ -	-	-	0.0005	0.0002	0.0%	at Turnover	Lost Opportunity	L015Low	\$	-	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Heating	Geothermal Heat Pump	Geothermal Heat Pump	EEER 13.4 / COP 3.1	EEER 16.1 / COP 3.5	EEER 16.1 / COP 3.5	-	20	\$3,849.85	\$ -	-	-	0.0005	0.0002	0.0%	at Turnover	Lost Opportunity	L015Low	\$	-	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Heating	Electric Furnace	Electric Furnace	Standard	Standard	Standard	-	18	\$0.00	\$ -	-	-	-	0.0002	0.0002	51.5%	at Turnover	Lost Opportunity	L05Med	\$	-	AE0 2015	AE0 2015
WA	Residential	Manufactured   Existing	Heating	Electric Room Heat	Electric Room Heat	Standard	Standard	Standard	-	18	\$0.00	\$ -	-	-	-	0.0002	0.0002	4.1%	at Turnover	Lost Opportunity	L05Med	\$	-	EIA 2014	EIA 2014
WA	Residential	Manufactured   Existing	Water Heating	Water Heating (< 55 Gal)	Water Heating	EF 0.885	NEA Tier 2 Heat Pump (EF 2.0)	NEA Tier 2 Heat Pump (EF 2.0)	1.68	13	\$803.81	\$ 0.65	-	737	0.0002	0.0002	68.4%	at Turnover	Lost Opportunity	L035Low	\$	150.28	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Water Heating	Water Heating (> 55 Gal)	Water Heating	EF 0.885	NEA Tier 2 Heat Pump (EF 2.0)	NEA Tier 2 Heat Pump (EF 2.0)	0.65	13	\$161.46	\$ -	-	486	0.0002	0.0002	8.4%	at Turnover	Lost Opportunity	L035Low	\$	46.89	RTF	RTF	
WA	Residential	Manufactured   Existing	Interior Lighting	General Service Lighting	Linear Lighting	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	6.58	-	12	\$175.29	\$ -	-	193	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	96.69	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Interior Lighting	General Service Lighting	Linear Lighting	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	-	-	20	\$65.87	\$ -	-	11	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	600.82	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Interior Lighting	General Service Lighting	Linear Lighting	LED 2017 (77.7 lm/W)	LED 2017 (77.7 lm/W)	-	-	22	\$189.56	\$ -	-	28	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	60.73	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Exterior Lighting	General Service Lighting	Linear Lighting	LED 2017 (86.9 lm/W)	LED 2017 (86.9 lm/W)	-	-	5	\$0.00	\$ 0.66	-	46	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	L020Fast	\$	38.30	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Appliances	Refrigerator	Refrigerator	Standard 2014	CEI Tier 3 (20% above standard)	CEI Tier 3 (20% above standard)	-	15	\$31.62	\$ -	-	12	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	L015Low	\$	294.74	RTF	RTF	
WA	Residential	Manufactured   Existing	Appliances	Second Refrigerator	Refrigerator	Standard 2014	CEI Tier 3 (20% above standard)	CEI Tier 3 (20% above standard)	-	15	\$31.62	\$ -	-	14	0.0003	0.0001	20.7%	at Turnover	Lost Opportunity	L015Low	\$	254.04	RTF	RTF	
WA	Residential	Manufactured   Existing	Appliances	Washer	Washer	Standard 2014	ENERGY STAR	ENERGY STAR	-	22	\$44.57	\$ -	-	54	0.0003	0.0001	61.3%	at Turnover	Lost Opportunity	L015Low	\$	74.00	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Appliances	Clothes Washer	Clothes Washer	Standard 2015 (IMEF 1.84 / WF 4.7)	CEI Tier 1 (IMEF 2.38 / WF 3.7)	CEI Tier 1 (IMEF 2.38 / WF 3.7)	-	14	\$145.04	\$ 23.52	-	43	0.0003	0.0001	91.4%	at Turnover	Lost Opportunity	L012Med	\$	(137.08)	RTF	RTF	
WA	Residential	Manufactured   Existing	Appliances	Clothes Dryer	Clothes Dryer	Standard 2015 (EF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	-	16	\$313.00	\$ -	-	183	0.0002	0.0002	66.7%	at Turnover	Lost Opportunity	L0M6A60	\$	189.50	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Appliances	Stove/Oven	Stove/Oven	Standard 2015 (EF 3.70)	ENERGY STAR (180-295 kWh)	ENERGY STAR (180-295 kWh)	0.54	15	\$61.51	\$ -	-	7	0.0003	0.0002	71.1%	at Turnover	Lost Opportunity	L012Med	\$	31.50	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Appliances	Stove/Oven	Stove/Oven	Standard 2015 (EF 3.70)	High Efficiency	High Efficiency	-	20	\$312.07	\$ -	-	194	0.0004	0.0003	63.0%	at Turnover	Lost Opportunity	L020Fast	\$	154.85	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Appliances	Microwave	Microwave	2016 Code	2016 Efficient (LEVEL 4)	2016 Efficient (LEVEL 4)	-	11	\$4.70	\$ -	-	8	0.0004	0.0003	95.3%	at Turnover	Lost Opportunity	L012Med	\$	88.70	7th Plan	7th Plan	
WA	Residential	Manufactured   Existing	Electronics	Personal Computers	Personal Computers	Standard	ENERGY STAR (6.1)	ENERGY STAR																	

Measure										Assumptions in First Year (2015)										Sources									
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/Unit	Incremental O&M Costs (\$)	Average Annual Savings (\$/Unit/Year)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source						
WA	Residential	Low Income - V Existing	Appliances	Dishwasher	Standard	ENERGY STAR (180-295 kWh)	High Efficiency	ENERGY STAR (180-295 kWh)	5	\$6.51	\$ 0.54	\$ -	6	0.0003	0.0002	72.8%	at Turnover	Lost Opportunity	LO12Med	\$	33.66	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V Existing	Appliances	Stove/Oven	Standard	High Efficiency	High Efficiency	High Efficiency	20	\$312.07	\$ -	\$ -	137	0.0004	0.0003	75.6%	at Turnover	Lost Opportunity	LO20Fast	\$	219.38	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V Existing	Appliances	Microwave	Standard	2016 Code	2016 Efficient (LEVEL 4)	2016 Efficient (LEVEL 4)	11	\$4.70	\$ -	\$ -	8	0.0004	0.0003	96.0%	at Turnover	Lost Opportunity	LO12Med	\$	88.70	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V Existing	Electronics	Computers	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	ENERGY STAR (6.1)	5	\$4.24	\$ -	\$ -	51	0.0002	0.0001	39.5%	at Turnover	Lost Opportunity	LO20Fast	\$	71.66	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V Existing	Electronics	Monitor	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	ENERGY STAR (6.0)	5	\$8.35	\$ -	\$ -	50	0.0002	0.0001	46.8%	at Turnover	Lost Opportunity	LO50Fast	\$	46.05	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V Existing	Electronics	Laptops	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	ENERGY STAR (6.1)	4	\$58.11	\$ -	\$ -	12	0.0002	0.0001	56.8%	at Turnover	Lost Opportunity	LO50Fast	\$	1,590.35	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V Existing	Electronics	Printer/Fax/Copier	Standard	ENERGY STAR	ENERGY STAR	ENERGY STAR	5	\$0.01	\$ -	\$ -	18	0.0002	0.0001	53.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.15	ENERGY STAR	ENERGY STAR	ENERGY STAR					
WA	Residential	Low Income - V Existing	Electronics	TVs	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	ENERGY STAR (6.0)	5	\$0.01	\$ -	\$ -	27	0.0002	0.0001	34.8%	at Turnover	Lost Opportunity	LO20Fast	\$	0.09	ENERGY STAR	ENERGY STAR	ENERGY STAR					
WA	Residential	Low Income - V Existing	Electronics	Set-top Boxes/DVRs	Standard	2017 Agreement	2017 Agreement	2017 Agreement	5	\$0.00	\$ -	\$ -	59	0.0002	0.0001	111.4%	at Turnover	Lost Opportunity	LO20Fast	\$	-	Voluntary STB Agreement	Voluntary STB Agreement	Voluntary STB Agreement					
WA	Residential	Low Income - V Existing	Electronics	Devices and Gadgets	Standard	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	N/A	N/A	N/A					
WA	Residential	Low Income - V Existing	Miscellaneous	Electric Vehicles	Level 2	Standard	Level 2	Level 2	10	\$782.50	\$ -	\$ -	-	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	Electric Resistance	Electric Resistance	15	\$3,581.66	\$ -	\$ -	2,592	0.0002	0.0001	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	159.74	AEG Research	AEG Research	AEG Research					
WA	Residential	Low Income - V Existing	Miscellaneous	Pool Pump	Standard	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	10	\$588.28	\$ -	\$ -	743	0.0002	0.0001	0.2%	at Turnover	Lost Opportunity	LO12Med	\$	123.05	SCE Workpaper	SCE Workpaper	SCE Workpaper					
WA	Residential	Low Income - V Existing	Miscellaneous	Furnace Fan	Standard	ECM	ECM	ECM	20	\$97.97	\$ -	\$ -	35	0.0002	0.0001	28.7%	at Turnover	Lost Opportunity	LO12Med	\$	271.19	Illinois TRM	Illinois TRM	DOE TSD					
WA	Residential	Low Income - V Existing	Miscellaneous	Well Pump	Standard	Standard	Standard	Standard	5	\$60.00	\$ -	\$ -	-	0.0002	0.0001	0.8%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A					
WA	Residential	Low Income - V Existing	Miscellaneous	Miscellaneous	Standard	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0001	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A					
WA	Residential	Low Income - V New	Cooling	Central AC	SEER 13.0	SEER 14.0	SEER 14.0	SEER 14.0	5	\$394.85	\$ -	\$ -	-	0.0005	-	27.4%	at Turnover	Lost Opportunity	LO5Med	\$	1,348.77	DEER	DEER	AEG-BEST					
WA	Residential	Low Income - V New	Cooling	Room AC	SEER 11.0	SEER 12.1 (ENERGY STAR 2016)	SEER 12.1 (ENERGY STAR 2016)	SEER 12.1 (ENERGY STAR 2016)	12	\$282.59	\$ -	\$ -	-	0.0002	-	10.1%	at Turnover	Lost Opportunity	LO15low	\$	1,194.32	AEO 2015	DEER	AEO 2015					
WA	Residential	Low Income - V New	Cooling	Indirect/Direct	Direct	Indirect/Direct	Indirect/Direct	Indirect/Direct	15	\$203.29	\$ -	\$ -	-	0.0005	-	0.0%	at Turnover	Lost Opportunity	LO15low	\$	-	DEER	DEER	New Buildings Institute Study, 2006					
WA	Residential	Low Income - V New	Cooling	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	15	\$121.49	\$ -	\$ -	180	-	0.0003	1.0%	at Turnover	Lost Opportunity	LO5Med	\$	102.48	RTF	RTF	AEG-BEST					
WA	Residential	Low Income - V New	Heating	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	15	\$121.49	\$ -	\$ -	180	-	0.0003	5.3%	at Turnover	Lost Opportunity	LO5Med	\$	102.48	RTF	RTF	AEG-BEST					
WA	Residential	Low Income - V New	Heating	Geothermal Heat Pump	SEER 16.1 / COP 3.1	SEER 16.1 / COP 3.5	SEER 16.1 / COP 3.5	SEER 16.1 / COP 3.5	20	\$3,849.85	\$ -	\$ -	-	0.0003	0.0003	0.0%	at Turnover	Lost Opportunity	LO15low	\$	552.22	7th Plan	7th Plan	AEO 2015					
WA	Residential	Low Income - V New	Heating	Geothermal Heat Pump	SEER 16.1 / COP 3.1	SEER 16.1 / COP 3.5	SEER 16.1 / COP 3.5	SEER 16.1 / COP 3.5	20	\$3,849.85	\$ -	\$ -	-	0.0003	0.0003	0.0%	at Turnover	Lost Opportunity	LO15low	\$	552.22	7th Plan	7th Plan	AEO 2015					
WA	Residential	Low Income - V New	Heating	Electric Furnace	Standard	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0005	-	27.8%	at Turnover	Lost Opportunity	LO5Med	\$	-	-	-	AEO 2015					
WA	Residential	Low Income - V New	Heating	Electric Room Heat	Standard	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0005	-	40.6%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2014	EIA 2014	AEG-BEST					
WA	Residential	Low Income - V New	Water Heating	Water Heater (cc SS Gal)	EF 0.91	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$803.83	\$ 1.68	\$ 0.65	412	0.0002	0.0002	38.9%	at Turnover	Lost Opportunity	LO35low	\$	150.23	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Water Heating	Water Heater (>55 Gal)	EF 0.85	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$161.46	\$ -	\$ 0.65	412	0.0002	0.0002	7.5%	at Turnover	Lost Opportunity	LO35low	\$	53.84	RTF	RTF	RTF					
WA	Residential	Low Income - V New	Interior Lighting	General Service Lighting	LED 13.0	LED 17.0 (89.2 lm/W)	LED 17.0 (89.2 lm/W)	LED 17.0 (89.2 lm/W)	12	\$179.16	\$ 6.73	\$ -	232	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	83.77	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Interior Lighting	Interior Lighting	LED 13.0	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	10	\$134.18	\$ -	\$ -	616	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	75.23	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Interior Lighting	Exempted Lighting	Incandescent	LED 2017 (17.7 lm/W)	LED 2017 (17.7 lm/W)	LED 2017 (17.7 lm/W)	10	\$30.24	\$ 5.09	\$ -	54	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(7.17)	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Interior Lighting	Exterior Lighting	Incandescent	LED 2017 (86.9 lm/W)	LED 2017 (86.9 lm/W)	LED 2017 (86.9 lm/W)	10	\$4.06	\$ 0.18	\$ -	13	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	38.03	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Appliances	Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	12	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	LO15low	\$	294.60	RTF	RTF	RTF					
WA	Residential	Low Income - V New	Appliances	Second Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	12	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	LO15low	\$	294.60	RTF	RTF	RTF					
WA	Residential	Low Income - V New	Appliances	Freezer	Standard 2014	ENERGY STAR	ENERGY STAR	ENERGY STAR	22	\$44.57	\$ -	\$ -	54	0.0003	0.0001	38.1%	at Turnover	Lost Opportunity	LO15low	\$	75.09	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Appliances	Clothes Washer	Standard 2015 (IMEF 1.84 / WF 4.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	14	\$145.04	\$ 23.52	\$ -	43	0.0003	0.0001	87.0%	at Turnover	Lost Opportunity	LO12Med	\$	138.79	RTF	RTF	RTF					
WA	Residential	Low Income - V New	Appliances	Heat Pump Tier 2 (UECF 3.4)	Standard 2015 (IEF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	15	\$313.00	\$ -	\$ -	124	0.0002	0.0002	67.8%	at Turnover	Lost Opportunity	LO12Med	\$	279.13	RTF	RTF	RTF					
WA	Residential	Low Income - V New	Appliances	Dishwasher	Standard 2015 (180-295 kWh)	ENERGY STAR (180-295 kWh)	ENERGY STAR (180-295 kWh)	ENERGY STAR (180-295 kWh)	15	\$6.51	\$ 0.54	\$ -	7	0.0002	0.0001	87.4%	at Turnover	Lost Opportunity	LO12Med	\$	33.66	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Appliances	Stove/Oven	Standard	High Efficiency	High Efficiency	High Efficiency	20	\$312.07	\$ -	\$ -	137	0.0004	0.0003	63.0%	at Turnover	Lost Opportunity	LO20Fast	\$	219.38	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Appliances	Microwave	Standard	2016 Code	2016 Efficient (LEVEL 4)	2016 Efficient (LEVEL 4)	11	\$4.70	\$ -	\$ -	8	0.0004	0.0003	96.0%	at Turnover	Lost Opportunity	LO12Med	\$	88.70	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Electronics	Computers	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	ENERGY STAR (6.1)	5	\$4.24	\$ -	\$ -	51	0.0002	0.0001	39.5%	at Turnover	Lost Opportunity	LO20Fast	\$	71.66	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Electronics	Monitor	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	ENERGY STAR (6.0)	5	\$8.35	\$ -	\$ -	50	0.0002	0.0001	46.8%	at Turnover	Lost Opportunity	LO50Fast	\$	46.05	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Electronics	Laptops	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	ENERGY STAR (6.1)	4	\$58.11	\$ -	\$ -	12	0.0002	0.0001	56.8%	at Turnover	Lost Opportunity	LO50Fast	\$	1,590.35	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Electronics	Printer/Fax/Copier	Standard	ENERGY STAR	ENERGY STAR	ENERGY STAR	5	\$0.01	\$ -	\$ -	18	0.0002	0.0001	78.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.15	ENERGY STAR	ENERGY STAR	ENERGY STAR					
WA	Residential	Low Income - V New	Electronics	TVs	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	ENERGY STAR (6.0)	5	\$0.01	\$ -	\$ -	27	0.0002	0.0001	43.7%	at Turnover	Lost Opportunity	LO20Fast	\$	0.09	ENERGY STAR	ENERGY STAR	ENERGY STAR					
WA	Residential	Low Income - V New	Electronics	Set-top Boxes/DVRs	Standard	2017 Agreement	2017 Agreement	2017 Agreement	5	\$0.00	\$ -	\$ -	59	0.0002	0.0001	139.3%	at Turnover	Lost Opportunity	LO20Fast	\$	-	Voluntary STB Agreement	Voluntary STB Agreement	Voluntary STB Agreement					
WA	Residential	Low Income - V New	Electronics	Devices and Gadgets	Standard	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	N/A	N/A	N/A					
WA	Residential	Low Income - V New	Miscellaneous	Electric Vehicles	Level 2	Standard	Level 2	Level 2	10	\$782.50	\$ -	\$ -	-	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	7th Plan	7th Plan	7th Plan					
WA	Residential	Low Income - V New	Miscellaneous	Pool Heater	Standard	Electric Resistance	Electric Resistance	Electric Resistance	15	\$3,581.66	\$ -	\$ -	2,592	0.0002	0.0001	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	159.74	AEG Research	AEG Research	AEG Research					
WA	Residential	Low Income - V New	Miscellaneous	Pool Pump	Standard	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	10	\$588.28	\$ -	\$ -	743	0.0002	0.0001	0.2%	at Turnover	Lost Opportunity	LO12Med	\$	123.05	SCE Workpaper	SCE Workpaper	SCE Workpaper					
WA																													

Measure					Assumptions in First Year (2015)															Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Annual Benefits (\$/Unit)	Incremental O&M Costs (\$)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
ID	Residential	Single Family - I	New	Miscellaneous	Electric Vehicles	Standard	Level 2	10	\$782.51	\$ -	\$ -	-	117	0.0002	0.0001	0.03%	at Turnover	Lost Opportunity	LO16Med	\$	1,041.61	7th Plan	7th Plan	7th Plan	
ID	Residential	Single Family - I	New	Miscellaneous	Pool Heater	Electric Resistance	Heat Pump	Standard	15	\$3,811.66	\$ -	\$ -	-	2,865	0.0002	0.0001	0.06%	at Turnover	Lost Opportunity	LO12Med	\$	144.53	AEG Research	AEG Research	AEG Research
ID	Residential	Single Family - I	New	Miscellaneous	Pool Pump	Standard	ENERGY STAR Variable Speed	Standard	10	\$588.28	\$ -	\$ -	-	821	0.0002	0.0001	2.6%	at Turnover	Lost Opportunity	LO12Med	\$	111.33	SCE Workpaper	SCE Workpaper	SCE Workpaper
ID	Residential	Single Family - I	New	Miscellaneous	Furnace Fan	ECM	Standard	Standard	10	\$97.97	\$ -	\$ -	-	81	0.0002	0.0001	71%	at Turnover	Lost Opportunity	LO12Med	\$	116.90	Illinois TRM	Illinois TRM	DOE TSD
ID	Residential	Single Family - I	New	Miscellaneous	Well Pump	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	-	0.0002	0.0001	20.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A
ID	Residential	Single Family - I	New	Miscellaneous	Well Pump	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	-	0.0002	0.0001	159.4%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A
ID	Residential	Multifamily - ID	Existing	Cooling	Central AC	SEER 13.0	SEER 14.0	Standard	15	\$263.23	\$ -	\$ -	-	28	0.0004	-	22.6%	at Turnover	Lost Opportunity	LO5Med	\$	1,079.77	DEER	DEER	AEG-BEST
ID	Residential	Multifamily - ID	Existing	Cooling	Central AC	SEER 11.0	SEER 12.1 (ENERGY STAR 2016)	Standard	12	\$187.78	\$ -	\$ -	-	34	0.0004	-	31.4%	at Turnover	Lost Opportunity	LO5Med	\$	750.07	AEO 2015	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	Existing	Cooling	Evaporative AC	Direct	Indirect/Direct	Standard	15	\$100.87	\$ -	\$ -	-	109	0.0004	-	1.9%	at Turnover	Lost Opportunity	LO5Med	\$	106.52	DEER	DEER	New Buildings Institute Study, 2006
ID	Residential	Multifamily - ID	Existing	Cooling	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	Standard	15	\$128.33	\$ -	\$ -	-	28	0.0004	-	2.2%	at Turnover	Lost Opportunity	LO5Med	\$	186.76	RTF	RTF	AEO 2015
ID	Residential	Multifamily - ID	Existing	Heating	Air-Source Heat Pump	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	Standard	15	\$128.33	\$ -	\$ -	-	51	0.0004	0.0004	2.2%	at Turnover	Lost Opportunity	LO5Med	\$	186.76	RTF	RTF	AEO 2015
ID	Residential	Multifamily - ID	Existing	Cooling	Geothermal Heat Pump	SEER 13.4 / COP 3.1	SEER 16.1 / COP 3.5	Standard	20	\$2,566.56	\$ -	\$ -	-	-	-	0.0004	0.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	7th Plan	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	Existing	Heating	Geothermal Heat Pump	SEER 13.4 / COP 3.1	SEER 16.1 / COP 3.5	Standard	20	\$2,566.56	\$ -	\$ -	-	-	-	0.0004	0.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	7th Plan	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	Existing	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	0.0004	16.4%	at Turnover	Lost Opportunity	LO5Med	\$	-	AEO 2015	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	0.0004	59.5%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2014	EIA 2014	AEG-BEST
ID	Residential	Multifamily - ID	Existing	Water Heating	Water Heater (<= 55 Gal)	EF 0.91	NEA Tier 2 Heat Pump (EF 2.0)	Standard	13	\$803.83	\$ -	\$ 1.68	686	0.0002	0.0002	34.0%	at Turnover	Lost Opportunity	LO3Slow	\$	145.95	7th Plan	7th Plan	7th Plan	
ID	Residential	Multifamily - ID	Existing	Water Heating	Water Heater (> 55 Gal)	EF 0.885	NEA Tier 2 Heat Pump (EF 2.0)	Standard	13	\$161.46	\$ -	\$ 0.65	424	0.0002	0.0002	7.6%	at Turnover	Lost Opportunity	LO3Slow	\$	52.31	RTF	RTF	RTF	
ID	Residential	Multifamily - ID	Existing	Interior Lighting	General Service Lighting	EISA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	Standard	12	\$44.55	\$ 5.43	\$ -	-	178	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	87.30	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Interior Lighting	Linear Lighting	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	Standard	20	\$41.63	\$ -	\$ -	-	7	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	600.85	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Interior Lighting	Exempted Lighting	Incandescent (9.7 lm/W)	LED 2017 (9.7 lm/W)	Standard	10	\$13.79	\$ 2.32	\$ -	-	21	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(8.40)	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Exterior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.9 lm/W)	Standard	5	\$0.00	\$ -	\$ -	-	0	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Appliances	Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	Standard	15	\$31.62	\$ -	\$ -	-	13	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	LO15Slow	\$	279.94	RTF	RTF	RTF
ID	Residential	Multifamily - ID	Existing	Appliances	Second Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	Standard	15	\$31.62	\$ -	\$ -	-	15	0.0003	0.0001	3.0%	at Turnover	Lost Opportunity	LO15Slow	\$	240.33	RTF	RTF	RTF
ID	Residential	Multifamily - ID	Existing	Appliances	Freezer	Standard 2014	ENERGY STAR	Standard	22	\$44.57	\$ -	\$ -	-	57	0.0003	0.0001	23.4%	at Turnover	Lost Opportunity	LO15Slow	\$	71.37	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Appliances	Clothes Washer	Standard 2015 (IMEF 1.84 / WF 4.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	Standard	14	\$145.04	\$ 23.52	\$ -	-	45	0.0003	0.0001	61.0%	at Turnover	Lost Opportunity	LO12Med	\$	112.16	RTF	RTF	RTF
ID	Residential	Multifamily - ID	Existing	Appliances	Clothes Dryer	Standard 2015 (EF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Standard	10	\$313.00	\$ -	\$ -	-	122	0.0002	0.0002	3.0%	at Turnover	Lost Opportunity	LO16Med	\$	283.95	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Appliances	Dishwasher	Standard 2013 (180-307 kWh)	ENERGY STAR (180-325 kWh)	Standard	15	\$6.51	\$ 0.54	\$ -	-	7	0.0002	0.0002	74.6%	at Turnover	Lost Opportunity	LO12Med	\$	31.99	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Appliances	Stove/Oven	Standard	High Efficiency	Standard	20	\$312.07	\$ -	\$ -	-	136	0.0004	0.0003	70.1%	at Turnover	Lost Opportunity	LO20Fast	\$	231.44	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Appliances	Stove/Oven	Standard	2015 Efficient (LEVEL 4)	Standard	11	\$47.70	\$ -	\$ -	-	8	0.0004	0.0003	43.9%	at Turnover	Lost Opportunity	LO20Fast	\$	84.78	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Electronics	Personal Computers	Standard	ENERGY STAR (6.1)	Standard	5	\$14.40	\$ -	\$ -	-	54	0.0002	0.0001	46.8%	at Turnover	Lost Opportunity	LO50Fast	\$	73.78	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Electronics	Monitor	Standard	ENERGY STAR (6.0)	Standard	5	\$8.35	\$ -	\$ -	-	53	0.0002	0.0001	55.5%	at Turnover	Lost Opportunity	LO50Fast	\$	43.75	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Electronics	Laptops	Standard	ENERGY STAR (6.1)	Standard	4	\$58.11	\$ -	\$ -	-	13	0.0002	0.0001	89.6%	at Turnover	Lost Opportunity	LO50Fast	\$	1,510.83	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Electronics	Printer/Fax/Copier	Standard	ENERGY STAR	Standard	5	\$0.00	\$ -	\$ -	-	19	0.0002	0.0001	52.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	ENERGY STAR	ENERGY STAR	ENERGY STAR
ID	Residential	Multifamily - ID	Existing	Electronics	TVs	Standard	ENERGY STAR (6.0)	Standard	6	\$0.01	\$ -	\$ -	-	28	0.0002	0.0001	143.3%	at Turnover	Lost Opportunity	LO20Fast	\$	0.08	ENERGY STAR	ENERGY STAR	ENERGY STAR
ID	Residential	Multifamily - ID	Existing	Electronics	Set-top Boxes/DVRs	Standard	2017 Agreement	Standard	5	\$0.00	\$ -	\$ -	-	62	0.0002	0.0001	75.1%	at Turnover	Lost Opportunity	LO20Fast	\$	-	Voluntary STB Agreement	Voluntary STB Agreement	Voluntary STB Agreement
ID	Residential	Multifamily - ID	Existing	Electronics	Devices and Gadgets	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	40	0.0002	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	N/A	N/A	N/A
ID	Residential	Multifamily - ID	Existing	Miscellaneous	Electric Vehicles	Level 2	Level 2	Standard	10	\$782.51	\$ -	\$ -	-	-	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO16Med	\$	-	7th Plan	7th Plan	7th Plan
ID	Residential	Multifamily - ID	Existing	Miscellaneous	Pool Heater	Electric Resistance	Heat Pump	Standard	15	\$3,811.66	\$ -	\$ -	-	-	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEG Research	AEG Research	AEG Research
ID	Residential	Multifamily - ID	Existing	Miscellaneous	Pool Pump	Standard	ENERGY STAR Variable Speed	Standard	10	\$588.28	\$ -	\$ -	-	-	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	SCE Workpaper	SCE Workpaper	SCE Workpaper
ID	Residential	Multifamily - ID	Existing	Miscellaneous	Furnace Fan	ECM	Standard	Standard	10	\$97.97	\$ -	\$ -	-	29	0.0002	0.0001	23.7%	at Turnover	Lost Opportunity	LO12Med	\$	328.44	Illinois TRM	Illinois TRM	DOE TSD
ID	Residential	Multifamily - ID	Existing	Miscellaneous	Well Pump	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	-	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A
ID	Residential	Multifamily - ID	Existing	Miscellaneous	Well Pump	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	-	0.0002	0.0001	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A
ID	Residential	Multifamily - ID	New	Cooling	Central AC	SEER 13.0	SEER 14.0	Standard	15	\$263.23	\$ -	\$ -	-	31	0.0004	-	62.9%	at Turnover	Lost Opportunity	LO5Med	\$	885.97	DEER	DEER	AEG-BEST
ID	Residential	Multifamily - ID	New	Cooling	Central AC	SEER 11.0	SEER 12.1 (ENERGY STAR 2016)	Standard	12	\$187.78	\$ -	\$ -	-	34	0.0004	-	27.6%	at Turnover	Lost Opportunity	LO5Med	\$	929.15	AEO 2015	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	New	Cooling	Evaporative AC	Direct	Indirect/Direct	Standard	15	\$100.87	\$ -	\$ -	-	28	0.0004	-	1.9%	at Turnover	Lost Opportunity	LO5Med	\$	106.52	DEER	DEER	New Buildings Institute Study, 2006
ID	Residential	Multifamily - ID	New	Cooling	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9.0 (CEE)	Standard	15	\$128.33	\$ -	\$ -	-	125	-	0.0004	2.1%	at Turnover	Lost Opportunity	LO5Med	\$	98.43	RTF	RTF	AEO 2015
ID	Residential	Multifamily - ID	New	Heating	Air-Source Heat Pump	SEER 16.0 / HSPF 9.0 (CEE)	SEER 16.0 / HSPF 9.0 (CEE)	Standard	15	\$128.33	\$ -	\$ -	-	28	-	0.0004	2.2%	at Turnover	Lost Opportunity	LO5Med	\$	98.43	RTF	RTF	AEO 2015
ID	Residential	Multifamily - ID	New	Cooling	Geothermal Heat Pump	SEER 13.4 / COP 3.1	SEER 16.1 / COP 3.5	Standard	20	\$2,566.56	\$ -	\$ -	-	-	-	0.0004	0.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	7th Plan	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	New	Heating	Geothermal Heat Pump	SEER 13.4 / COP 3.1	SEER 16.1 / COP 3.5	Standard	20	\$2,566.56	\$ -	\$ -	-	-	-	0.0004	0.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	7th Plan	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	New	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	0.0004	16.4%	at Turnover	Lost Opportunity	LO5Med	\$	-	AEO 2015	AEO 2015	AEG-BEST
ID	Residential	Multifamily - ID	New	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	-	0.0004	59.5%	at Turnover							

Measure										Assumptions in First Year (2015)										Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Annual Average Savings (kWh/Unit/Year)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
ID	Residential	Manufactured	New	Heating	Air-Source Heat Pump	SEER 14	SEER 16.0 / HSPF 9 (CEE)	SEER 16.0 / HSPF 9 (CEE)	15	\$192.49	\$ -	\$ -	112	-	0.0002	5.2%	at Turnover	Lost Opportunity	LO5Med	\$	38.45	RTF	AEO 2015	AEQ-BEST	
ID	Residential	Manufactured	New	Cooling	Geothermal Heat Pump	EEER 13.4 / COP 3.1	EEER 16.1 / COP 3.5	EEER 16.1 / COP 3.5	20	\$3,849.85	\$ -	\$ -	-	-	0.0005	0.0%	at Turnover	Lost Opportunity	LO15Low	\$	-	7th Plan	AEO 2015	AEQ-BEST	
ID	Residential	Manufactured	New	Heating	Geothermal Heat Pump	EEER 13.4 / COP 3.1	EEER 16.1 / COP 3.5	EEER 16.1 / COP 3.5	20	\$3,849.85	\$ -	\$ -	-	-	0.0005	0.0%	at Turnover	Lost Opportunity	LO15Low	\$	-	7th Plan	AEO 2015	AEQ-BEST	
ID	Residential	Manufactured	New	Standard	Standard	Standard	Standard	Standard	12	\$187.99	\$ 7.06	\$ -	206	-	0.0002	10.7%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2014	EIA 2014	AEQ-BEST	
ID	Residential	Manufactured	New	Water Heating	Water Heater (<= 55 Gall)	EF 0.91	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$803.83	\$ -	\$ 1.68	737	0.0002	0.0002	71.5%	at Turnover	Lost Opportunity	LO35Low	\$	135.79	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Water Heating	Water Heater (> 55 Gall)	EF 0.885	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$161.46	\$ -	\$ 0.65	471	0.0002	0.0002	8.8%	at Turnover	Lost Opportunity	LO35Low	\$	46.89	RTF	RTF	AEQ-BEST	
ID	Residential	Manufactured	New	Interior Lighting	General Service Lighting	IESA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	12	\$177.17	\$ 6.65	\$ -	231	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	83.28	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Interior Lighting	Linear Lighting	R8 - F32 (69.0 lm/W In/W System)	LED 2017 (110.0 lm/W System)	LED 2017 (110.0 lm/W System)	20	\$71.70	\$ -	\$ -	8	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	824.32	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Interior Lighting	Exempted Lighting	Incandescence (9.7 lm/W)	LED 2017 (77.7 lm/W)	LED 2017 (77.7 lm/W)	10	\$66.13	\$ 11.14	\$ -	87	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(9.81)	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Exterior Lighting	Screw-In	IESA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	10	\$16.06	\$ 0.73	\$ -	58	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	33.69	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	12	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	294.74	RTF	RTF	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Second Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	14	0.0003	0.0001	32.0%	at Turnover	Lost Opportunity	LO15Low	\$	253.04	RTF	RTF	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Freezer	Standard 2014	ENERGY STAR	ENERGY STAR	22	\$44.57	\$ -	\$ -	54	0.0003	0.0001	76.2%	at Turnover	Lost Opportunity	LO15Low	\$	74.80	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Clothes Washer	Standard 2015 (IMEF 1.84 / WF 4.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	14	\$145.04	\$ 23.52	\$ -	42	0.0003	0.0001	68.5%	at Turnover	Lost Opportunity	LO12Med	\$	(140.18)	RTF	RTF	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Clothes Dryer	Standard 2015 (EF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	16	\$313.00	\$ -	\$ -	125	0.0002	0.0002	89.1%	at Turnover	Lost Opportunity	LO16Med	\$	189.50	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Dishwasher	Standard 2013 (180-307 kWh)	ENERGY STAR (180-295 kWh)	ENERGY STAR (180-295 kWh)	15	\$6.51	\$ 0.54	\$ -	6	0.0002	0.0002	90.4%	at Turnover	Lost Opportunity	LO12Med	\$	33.49	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Stove/Oven	Standard	High Efficiency	High Efficiency	20	\$132.07	\$ -	\$ -	194	0.0004	0.0003	84.4%	at Turnover	Lost Opportunity	LO20Fast	\$	154.85	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Appliances	Microwave	2016 Code	2016 Efficient (LEVEL 4)	2016 Efficient (LEVEL 4)	11	\$4.70	\$ -	\$ -	8	0.0004	0.0003	89.9%	at Turnover	Lost Opportunity	LO12Med	\$	89.64	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Electronics	Personal Computers	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	5	\$14.40	\$ -	\$ -	51	0.0003	0.0001	51.8%	at Turnover	Lost Opportunity	LO50Fast	\$	77.66	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Electronics	Monitor	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	5	\$8.35	\$ -	\$ -	50	0.0003	0.0001	60.2%	at Turnover	Lost Opportunity	LO50Fast	\$	46.05	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Electronics	Laptops	Standard	ENERGY STAR (6.1)	ENERGY STAR (6.1)	5	\$9.00	\$ -	\$ -	59	0.0003	0.0001	86.6%	at Turnover	Lost Opportunity	LO50Fast	\$	1,590.35	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Electronics	Printer/Fax/Copier	Standard	ENERGY STAR	ENERGY STAR	5	\$0.01	\$ -	\$ -	18	0.0003	0.0001	47.8%	at Turnover	Lost Opportunity	LO20Fast	\$	0.15	ENERGY STAR	ENERGY STAR	AEQ-BEST	
ID	Residential	Manufactured	New	Electronics	TVs	Standard	ENERGY STAR (6.0)	ENERGY STAR (6.0)	6	\$0.01	\$ -	\$ -	28	0.0003	0.0001	142.2%	at Turnover	Lost Opportunity	LO20Fast	\$	0.08	ENERGY STAR	ENERGY STAR	AEQ-BEST	
ID	Residential	Manufactured	New	Electronics	Set-top Boxes/DVRs	Standard	2017 Agreement	2017 Agreement	5	\$0.00	\$ -	\$ -	59	0.0003	0.0001	130.5%	at Turnover	Lost Opportunity	LO20Fast	\$	-	Voluntary STB Agreement	N/A	Voluntary STB Agreement	Voluntary STB Agreement
ID	Residential	Manufactured	New	Electronics	Devices and Gadgets	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	59	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	N/A	N/A	Voluntary STB Agreement	Voluntary STB Agreement
ID	Residential	Manufactured	New	Miscellaneous	Electric Vehicles	Standard	Level 2	Level 2	10	\$782.51	\$ -	\$ -	117	0.0003	0.0001	0.0%	at Turnover	Lost Opportunity	LO16Med	\$	1,041.61	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Manufactured	New	Miscellaneous	Pool Heater	Electric Resistance	Heat Pump	Heat Pump	15	\$3,581.66	\$ -	\$ -	2,565	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	161.44	AEQ Research	AEQ Research	AEQ Research	
ID	Residential	Manufactured	New	Miscellaneous	Pool Pump	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	ENERGY STAR Variable Speed	10	\$588.28	\$ -	\$ -	752	0.0002	0.0002	0.2%	at Turnover	Lost Opportunity	LO12Med	\$	124.12	SCS Workpaper	SCS Workpaper	AEQ-BEST	
ID	Residential	Manufactured	New	Miscellaneous	Furnace Fan	Standard	ECM	ECM	20	\$97.97	\$ -	\$ -	36	0.0002	0.0001	41.1%	at Turnover	Lost Opportunity	LO12Med	\$	154.72	Illinois TRM	Illinois TRM	DOE TSD	
ID	Residential	Manufactured	New	Miscellaneous	Well Pump	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	0	0.0002	0.0001	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	DOE TSD	
ID	Residential	Manufactured	New	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	0	0.0002	0.0001	147.4%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	DOE TSD	
ID	Residential	Low Income - E-Existing	Existing	Cooling	Room AC	SEER 11.0	SEER 12.1 (ENERGY STAR 2016)	SEER 12.1 (ENERGY STAR 2016)	12	\$281.59	\$ -	\$ -	40	-	0.0005	25.4%	at Turnover	Lost Opportunity	LO15Low	\$	1,242.09	DEER	DEER	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Cooling	Evaporative AC	Direct	Indirect/Direct	Indirect/Direct	15	\$203.29	\$ -	\$ -	131	0.0005	-	1.6%	at Turnover	Lost Opportunity	LO15Low	\$	179.92	DEER	DEER	New Buildings Institute Study, 2006	
ID	Residential	Low Income - E-Existing	Existing	Heating	Air-Source Heat Pump	SEER 14.0 / HSPF 9 (CEE)	SEER 16.0 / HSPF 9 (CEE)	SEER 16.0 / HSPF 9 (CEE)	15	\$192.49	\$ -	\$ -	187	-	0.0003	2.9%	at Turnover	Lost Opportunity	LO5Med	\$	98.41	RTF	RTF	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Heating	Air-Source Heat Pump	SEER 14.0 / HSPF 9 (CEE)	SEER 16.0 / HSPF 9 (CEE)	SEER 16.0 / HSPF 9 (CEE)	15	\$192.49	\$ -	\$ -	39	-	0.0003	3.4%	at Turnover	Lost Opportunity	LO5Med	\$	195.88	RTF	RTF	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Cooling	Geothermal Heat Pump	EEER 13.4 / COP 3.1	EEER 16.1 / COP 3.5	EEER 16.1 / COP 3.5	20	\$3,849.85	\$ -	\$ -	-	-	0.0005	0.0%	at Turnover	Lost Opportunity	LO15Low	\$	-	7th Plan	AEO 2015	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Cooling	Geothermal Heat Pump	EEER 13.4 / COP 3.1	EEER 16.1 / COP 3.5	EEER 16.1 / COP 3.5	20	\$3,849.85	\$ -	\$ -	-	-	0.0005	0.0%	at Turnover	Lost Opportunity	LO15Low	\$	-	7th Plan	AEO 2015	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Water Heating	Water Heater (<= 55 Gall)	EF 0.91	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$803.83	\$ -	\$ 1.68	670	0.0002	0.0002	57.8%	at Turnover	Lost Opportunity	LO35Low	\$	149.42	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Water Heating	Water Heater (> 55 Gall)	EF 0.885	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$161.46	\$ -	\$ 0.65	414	0.0002	0.0002	7.7%	at Turnover	Lost Opportunity	LO35Low	\$	63.54	RTF	RTF	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Interior Lighting	General Service Lighting	IESA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	12	\$177.17	\$ 6.65	\$ -	203	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	83.26	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Interior Lighting	Linear Lighting	R8 - F32 (69.0 lm/W In/W System)	LED 2017 (110.0 lm/W System)	LED 2017 (110.0 lm/W System)	20	\$51.80	\$ -	\$ -	8	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	600.85	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Interior Lighting	Exempted Lighting	Incandescence (9.7 lm/W)	LED 2017 (77.7 lm/W)	LED 2017 (77.7 lm/W)	10	\$26.88	\$ 4.53	\$ -	48	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(7.38)	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Interior Lighting	Exterior Lighting	IESA Compliant (17.4 lm/W)	LED 2017 (89.2 lm/W)	LED 2017 (89.2 lm/W)	10	\$49.19	\$ 0.19	\$ -	48	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	31.39	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Appliances	Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	12	0.0003	0.0001	100.0%	at Turnover	Lost Opportunity	LO15Low	\$	297.73	RTF	RTF	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Appliances	Second Refrigerator	Standard 2014	CEE Tier 3 (20% above standard)	CEE Tier 3 (20% above standard)	15	\$31.62	\$ -	\$ -	14	0.0003	0.0001	7.0%	at Turnover	Lost Opportunity	LO15Low	\$	255.61	RTF	RTF	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Appliances	Freezer	Standard 2014	ENERGY STAR	ENERGY STAR	22	\$44.57	\$ -	\$ -	54	0.0003	0.0001	29.4%	at Turnover	Lost Opportunity	LO15Low	\$	75.87	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Appliances	Clothes Washer	Standard 2015 (IMEF 1.84 / WF 4.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	CEE Tier 1 (IMEF 2.38 / WF 3.7)	14	\$145.04	\$ 23.52	\$ -	42	0.0003	0.0001	67.7%	at Turnover	Lost Opportunity	LO12Med	\$	149.18	RTF	RTF	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Appliances	Clothes Dryer	Standard 2015 (EF 3.73)	Heat Pump Tier 2 (UECF 3.4)	Heat Pump Tier 2 (UECF 3.4)	16	\$313.00	\$ -	\$ -	125	0.0002	0.0002	50.0%	at Turnover	Lost Opportunity	LO16Med	\$	276.22	7th Plan	7th Plan	AEQ-BEST	
ID	Residential	Low Income - E-Existing	Existing	Appliances	Dishwasher	Standard 2013 (180-307 kWh)	ENERGY STAR (180-295 kWh)	ENERGY STAR (180-295 kWh)	15	\$6.51	\$ 0.54	\$ -	6	0.0002	0.0										

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Annual Savings	Summer	Winter	Base Year	Applicability	Replacement	7th Plan Measure	TRC Levelized	Lifetime Source	Costs Source	Savings Source			
									Measure Life (Years)	Average Incremental \$/Unit	Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Annual Savings (kWh/Unit Greater)	Coincident Peak Factor (kW/kWh)	Peak Factor (kW/kWh)	Base Year Saturation	Replacement Type	7th Plan Measure Rate Ramp Name	Cost \$/MWh (20-Year)				
WA	Residential	Single Family - Existing	Cooling	Insulation - Foundation	R-0	R-10	20 \$957.61	\$ -	-	(14)	0.0004	-	15.0%	10.0%	Retrofit	Retro12Med	\$ 79.39	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Heating	Insulation - Foundation	R-0	R-10	20 \$957.61	\$ -	-	707	-	0.0003	15.0%	10.0%	Retrofit	Retro12Med	\$ 79.39	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Cooling	Insulation - Ducting	R-4	R-8	18 \$550.88	\$ -	-	38	0.0005	-	15.1%	50.0%	Retrofit	Retro12Med	\$ 97.88	DEER	Ameren Missouri Filing	AEG-BEST			
WA	Residential	Single Family - Existing	Heating	Insulation - Ducting	R-4	R-8	18 \$550.88	\$ -	-	463	0.0003	-	15.1%	50.0%	Retrofit	Retro12Med	\$ 97.88	DEER	Ameren Missouri Filing	AEG-BEST			
WA	Residential	Single Family - Existing	Cooling	Ducting - Repair and Seal	20% Leakage	Sealed	20 \$636.06	\$ -	-	43	0.0005	-	15.1%	50.0%	Retrofit	Retro12Med	\$ 47.54	RTF	RTF	7th Plan			
WA	Residential	Single Family - Existing	Heating	Ducting - Repair and Seal	20% Leakage	Sealed	20 \$636.06	\$ -	-	107	-	0.0003	15.1%	50.0%	Retrofit	Retro12Med	\$ 47.54	RTF	RTF	7th Plan			
WA	Residential	Single Family - Existing	Cooling	Building Shell - Infiltration	None	0.1 ACH Reduction	15 \$1,267.03	\$ 10.90	-	6	0.0004	-	15.1%	75.0%	Retrofit	Retro12Med	\$ 157.05	RTF	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Heating	Building Shell - Infiltration	None	0.1 ACH Reduction	15 \$1,267.03	\$ 10.90	-	705	0.0003	-	15.1%	75.0%	Retrofit	Retro12Med	\$ 157.05	RTF	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	45 \$3,249.66	\$ -	-	65	0.0004	-	24.2%	37.5%	Retrofit	Retro12Med	\$ 76.93	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Heating	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	45 \$3,249.66	\$ -	-	2,577	-	0.0003	24.2%	37.5%	Retrofit	Retro12Med	\$ 76.93	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Cooling	Windows - Install Reflective	No Film	Film Installed	45 \$3,827.96	\$ -	-	84	0.0004	-	15.0%	37.5%	Retrofit	Retro12Med	\$ 226.41	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Heating	Windows - Install Reflective	No Film	Film Installed	45 \$3,827.96	\$ -	-	919	-	0.0003	15.1%	37.5%	Retrofit	Retro12Med	\$ 226.41	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Cooling	Doors - Storm and Thermal	R-2.5 Door	R-5 Door	45 \$734.51	\$ -	-	6	0.0004	-	15.1%	75.0%	Retrofit	Retro12Med	\$ 6.07	RTF	RTF	AEG-BEST			
WA	Residential	Single Family - Existing	Heating	Doors - Storm and Thermal	R-2.5 Door	R-5 Door	45 \$734.51	\$ -	-	174	-	0.0003	15.1%	75.0%	Retrofit	Retro12Med	\$ 6.07	RTF	RTF	AEG-BEST			
WA	Residential	Single Family - Existing	Cooling	Ductless Mini Split Heat P	None	Installed	15 \$4,205.71	\$ -	-	63	0.0005	-	15.1%	75.0%	Retrofit	Retro15Low	\$ 185.52	RTF	RTF	7th Plan			
WA	Residential	Single Family - Existing	Heating	Ductless Mini Split Heat P	None	Installed	15 \$4,205.71	\$ -	-	2,053	-	0.0003	15.1%	75.0%	Retrofit	Retro15Med	\$ 185.52	RTF	RTF	7th Plan			
WA	Residential	Single Family - Existing	Cooling	Ductless Mini Split Heat P	None	Installed	15 \$3,791.06	\$ -	-	53	0.0005	-	60.0%	75.0%	Retrofit	Retro5Med	\$ 89.83	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Heating	Ductless Mini Split Heat P	None	Installed	15 \$3,791.06	\$ -	-	4,111	-	0.0003	60.0%	75.0%	Retrofit	Retro5Med	\$ 89.83	RTF	RTF	7th Plan			
WA	Residential	Single Family - Existing	Cooling	Space Heating - Heat Recirc	None	Installed	20 \$1,470.45	\$ -	-	100	0.0005	-	15.0%	75.0%	Retrofit	Retro15Low	\$ 180.60	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Heating	Space Heating - Heat Recirc	None	Installed	20 \$1,470.45	\$ -	-	660	-	0.0003	15.2%	75.0%	Retrofit	Retro15Low	\$ 180.60	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Cooling	Furnace - Conversion to Air	Central Forced Air Furnace	Central Air-Source Heat Pump	15 \$3,328.64	\$ -	-	6,554	-	-	5.0%	15.0%	Retrofit	Retro12Med	\$ 50.39	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Heating	Furnace - Conversion to Air	Central Forced Air Furnace	Central Air-Source Heat Pump	15 \$3,328.64	\$ -	-	6,554	-	-	5.0%	15.0%	Retrofit	Retro12Med	\$ 50.39	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Cooling	Room AC - Removal of Sec	Unit Removed	Unit Installed	3 \$18.18	\$ -	-	418	-	-	75.0%	75.0%	Retrofit	Retro5Med	\$ 17.76	DEER	NREL	DEER			
WA	Residential	Single Family - Existing	Cooling	Central AC - Maintenance	Standard Unit	Tuned Up Unit	6 \$281.16	\$ -	-	53	0.0005	-	15.1%	75.0%	Retrofit	RetroEven20	\$ 1,064.60	PG&E Workpaper	PG&E Workpaper	Illinois TRM			
WA	Residential	Single Family - Existing	Cooling	Central Heat Pump - Control	Standard Unit	Property Sized and Installed Unit	15 \$592.87	\$ 12.01	-	0	0.0005	-	15.1%	75.0%	Retrofit	Retro5Med	\$ 79.59	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Heating	Central Heat Pump - Control	Standard Unit	Property Sized and Installed Unit	15 \$592.87	\$ 12.01	-	4	0.0003	-	15.0%	75.0%	Retrofit	Retro5Med	\$ 79.59	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Cooling	Ceiling Fan - ENERGY STAR	Standard Unit	ENERGY STAR Unit	10 \$95.99	\$ -	-	16	0.0004	-	15.1%	75.0%	Retrofit	RetroEven20	\$ 815.23	ENERGY STAR	ENERGY STAR	ENERGY STAR			
WA	Residential	Single Family - Existing	Cooling	Whole-House Fan - Installa	None	Installed	20 \$726.04	\$ -	-	33	0.0005	-	15.0%	40.0%	Retrofit	Retro12Med	\$ 1,869.97	CPUC	CPUC	CPUC			
WA	Residential	Single Family - Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10 \$260.84	\$ -	-	505	0.0004	-	5.2%	75.0%	Retrofit	Retro5Med	\$ 63.74	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10 \$260.84	\$ -	-	505	0.0003	-	5.2%	75.0%	Retrofit	Retro5Med	\$ 63.74	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Drainwater	None	Installed	40 \$851.27	\$ -	-	196	0.0002	0.0002	15.0%	5.0%	Retrofit	Retro15Low	\$ 259.08	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Faucet Aeri	1.0 1.5 GPM Faucet	1.0 1.5 GPM Faucet	15 \$15.65	\$ 65.61	-	291	0.0002	0.0002	15.0%	40.0%	Retrofit	Retro15Low	\$ 192.74	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Drainwater	1.5 GPM Showerhead	2.2 GPM Showerhead	10 \$49.74	\$ -	-	267	0.0002	0.0002	15.0%	15.0%	Retrofit	Retro15Low	\$ 192.74	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Pipe Insula	R-3.5 Insulation Installed	R-3.5 Insulation Installed	15 \$16.59	\$ -	-	109	0.0002	0.0002	15.0%	40.0%	Retrofit	Retro12Med	\$ 14.97	Mid-Atlantic TRM	Mid-Atlantic TRM	Mid-Atlantic TRM			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Desuperhe	None	Installed	20 \$1,157.80	\$ -	-	1,332	0.0002	0.0002	0.1%	0.4%	Retrofit	RetroEven20	\$ 70.86	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Temperature	Water Set at 120°F	Water Set at 120°F	10 \$50.05	\$ -	-	407	0.0002	-	15.0%	40.0%	Retrofit	Retro12Med	\$ 40.02	60	Illinois TRM	Illinois TRM			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Thermostat	None	Installed	10 \$29.91	\$ -	-	79	0.0002	0.0002	15.0%	40.0%	Retrofit	Retro12Med	\$ 49.49	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Water Heating	Water Heater - Solar Syst	Standard Electric Unit	SEF 2.5 Solar Unit	20 \$8,991.09	\$ -	-	987	0.0002	0.0002	5.0%	25.0%	Retrofit	RetroMax60	\$ 735.51	7th Plan	7th Plan	7th Plan			
WA	Residential	Single Family - Existing	Interior Lighting	Interior Lighting - Occupan	Manual Controls	Occupancy-Based Controls	8 \$201.89	\$ -	-	137	0.0002	0.0003	23.2%	75.0%	Retrofit	Retro12Med	\$ 222.02	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper			
WA	Residential	Single Family - Existing	Exterior Lighting	Exterior Lighting - Photo	Manual Controls	Light-Sensing Controls	3 \$51.82	\$ -	-	4	0.0002	0.0002	18.1%	60.0%	Retrofit	Retro12Med	\$ 87.77	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Michigan Energy Measures Datab			
WA	Residential	Single Family - Existing	Exterior Lighting	Exterior Lighting - Photo	Manual Controls	Solar-Powered Unit Installed	3 \$43.28	\$ -	-	25	0.0002	0.0003	20.7%	60.0%	Retrofit	Retro12Med	\$ 614.32	AEG Research	AEG Research	AEG Research			
WA	Residential	Single Family - Existing	Exterior Lighting	Exterior Lighting - Timeloc	Manual Controls	Motion-Sensing Controls	10 \$59.69	\$ -	-	25	0.0002	0.0003	18.1%	40.0%	Retrofit	Retro12Med	\$ 295.63	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM			
WA	Residential	Single Family - Existing	Appliances	Refrigerator - Decommissi	Unit Installed	Unit Removed	6 \$230.98	\$ -	-	265	0.0003	0.0001	15.0%	55.0%	Retrofit	Retro5Med	\$ 194.69	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Appliances	Refrigerator - Decommissi	Unit Installed	Unit Removed	6 \$230.98	\$ -	-	402	0.0003	0.0003	15.0%	55.0%	Retrofit	Retro5Med	\$ 194.69	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Electronics	Advanced Power Strips - T	Standard Unit	Low Sensing Strip	5 \$66.50	\$ -	-	80	0.0002	0.0001	7.5%	37.5%	Retrofit	Retro35Low	\$ 209.00	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Electronics	Advanced Power Strips - T	Standard Unit	Low Sensing Strip	5 \$66.50	\$ -	-	80	0.0002	0.0001	7.5%	37.5%	Retrofit	Retro35Low	\$ 209.00	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Electronics	Advanced Power Strips - T	Standard Unit	Low Sensing Strip	5 \$66.50	\$ -	-	322	0.0002	0.0001	7.5%	37.5%	Retrofit	Retro35Low	\$ 76.86	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Electronics	Scheduled Controls	Standard Unit	Passive Solar Control	10 \$96.76	\$ -	-	226	0.0002	0.0001	0.1%	0.0%	Retrofit	Retro12Med	\$ 242.21	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM			
WA	Residential	Single Family - Existing	Miscellaneous	Pool Heater - Solar Water	Standard Electric Unit	Passive Solar Control	20 \$384.06	\$ -	-	1,841	0.0002	0.0001	1.1%	30.0%	Retrofit	Retro5Med	\$ 189.58	AEG	AEG	AEG			
WA	Residential	Single Family - Existing	Cooling	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	45 \$3,062.09	\$ -	-	32	0.0004	-	0.0%	0.0%	Retrofit	RetroEven20	\$ 221.05	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Heating	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	45 \$3,062.09	\$ -	-	230	0.0002	0.0003	0.0%	0.0%	Retrofit	RetroEven20	\$ 221.05	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Water Heating	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	45 \$3,062.09	\$ -	-	426	0.0002	0.0003	0.0%	0.0%	Retrofit	RetroEven20	\$ 221.05	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Interior Lighting	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	45 \$3,062.09	\$ -	-	84	0.0002	0.0003	0.0%	0.0%	Retrofit	RetroEven20	\$ 221.05	RTF	RTF	RTF			
WA	Residential	Single Family - Existing	Cooling	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$ -	N/A	N/A	N/A			
WA	Residential	Single Family - Existing	Heating	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$ -	N/A	N/A	N/A			
WA	Residential	Single Family - Existing	Water Heating	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$ -	N/A	N/A	N/A			
WA	Residential	Single Family - Existing	Interior Lighting	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$ -	N/A	N/A	N/A			
WA	Residential	Single Family - Existing	Exterior Lighting	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$ -	N/A	N/A	N/A			
WA	Residential	Single Family - Existing	Single Family - Existing	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav							

Measure				Assumptions in First Year (2015)										Sources									
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Year)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Residential	Single Family - New	Appliances	Refrigerator - Decommissioning	Unit Installed	Unit Removed	6	\$230.98	\$ -	-	-	250	0.0003	0.0001	15.0%	55.0%	Retirof	RetirofMed	\$	203.03	RTF	RTF	RTF
WA	Residential	Single Family - New	Appliances	Freezer - Decommissioning	Unit Installed	Unit Removed	5	\$127.25	\$ -	-	-	388	0.0002	0.0001	15.0%	55.0%	Retirof	RetirofMed	\$	83.41	RTF	RTF	RTF
WA	Residential	Single Family - New	Electronics	Advanced Power Strips - TI	Standard Unit	Load Sensing Strip	5	\$66.50	\$ -	-	-	93	0.0003	0.0001	7.5%	37.5%	Retirof	Retirof35low	\$	186.30	RTF	RTF	RTF
WA	Residential	Single Family - New	Electronics	Advanced Power Strips - TI	Standard Unit	IR or Occupancy Sensing Strip	5	\$94.09	\$ -	-	-	367	0.0002	0.0001	7.5%	37.5%	Retirof	Retirof35low	\$	67.50	RTF	RTF	RTF
WA	Residential	Single Family - New	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	-	-	663	0.0002	0.0001	0.5%	75.0%	Retirof	RetirofMed	\$	19.58	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM
WA	Residential	Single Family - New	Miscellaneous	Pool Heater - Solar Water	Standard Electric Unit	Passive Solar Unit	20	\$3,842.06	\$ -	-	-	2,297	0.0002	0.0001	0.1%	30.0%	Retirof	RetirofMed2	\$	151.38	AEQ	AEQ	AEQ
WA	Residential	Single Family - New	Cooling	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	-	-	47	0.0004	0.0002	16.3%	60.0%	Retirof	Retirofve20	\$	271.01	RTF	RTF	RTF
WA	Residential	Single Family - New	Cooling	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	-	-	103	0.0003	0.0002	16.3%	60.0%	Retirof	Retirofve20	\$	271.01	RTF	RTF	RTF
WA	Residential	Single Family - New	Water Heating	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	-	-	394	0.0002	0.0002	16.3%	60.0%	Retirof	Retirofve20	\$	271.01	RTF	RTF	RTF
WA	Residential	Single Family - New	Interior Lighting	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	-	-	90	0.0002	0.0003	19.9%	60.0%	Retirof	Retirofve20	\$	271.01	RTF	RTF	RTF
WA	Residential	Single Family - New	Cooling	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	-	N/A	N/A	N/A
WA	Residential	Single Family - New	Heating	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	-	N/A	N/A	N/A
WA	Residential	Single Family - New	Water Heating	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	-	N/A	N/A	N/A
WA	Residential	Single Family - New	Interior Lighting	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	-	N/A	N/A	N/A
WA	Residential	Single Family - New	Electronics	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	-	N/A	N/A	N/A
WA	Residential	Single Family - New	Miscellaneous	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	-	N/A	N/A	N/A
WA	Residential	Single Family - New	Interior Lighting	General Incandescence (17.4 lm/W)	General Incandescence (9.7 lm/W)	CFI (64.3 lm/W)	6	\$54.79	\$ -	-	-	318	0.0002	0.0003	0.0%	3.0%	Retirof	CustomBehav	\$	1.35	RTF	RTF	RTF
WA	Residential	Single Family - New	Interior Lighting	Exempted	Incandescence (9.7 lm/W)	CFI (64.3 lm/W)	7	(\$42.03)	\$ -	-	-	176	0.0002	0.0003	85.9%	90.2%	Retirof	LightingPPA	\$	(25.67)	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Ceiling Install	R-0	R-30, R-38, or R-49	45	\$193.35	\$ -	-	-	42	0.0002	-	18.8%	25.0%	Retirof	Retirof2Med	\$	24.97	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Ceiling Install	R-11	R-30, R-38, or R-49	45	\$193.35	\$ -	-	-	454	0.0002	0.0004	18.8%	25.0%	Retirof	Retirof2Med	\$	24.97	RTF	RTF	7th Plan
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Ceiling Upgrade	R-11	R-30 or R-49	45	\$157.00	\$ -	-	-	7	0.0002	-	12.5%	25.0%	Retirof	Retirof2Med	\$	86.67	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Insulation - Ceiling Upgrade	R-11	R-30 or R-49	45	\$157.00	\$ -	-	-	109	-	0.0004	12.5%	25.0%	Retirof	Retirof2Med	\$	86.67	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Radiant Barrier	None	Installed	15	\$154.29	\$ -	-	-	33	0.0002	-	15.0%	25.0%	Retirof	Retirof2Med	\$	43.30	NREL	NREL	AEQ Research
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Radiant Barrier	None	Installed	15	\$154.29	\$ -	-	-	351	0.0002	-	15.0%	25.0%	Retirof	Retirof2Med	\$	43.30	NREL	NREL	AEQ Research
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Wall Cavity Ins	R-11	R-11	45	\$1,182.48	\$ -	-	-	10	0.0002	-	22.5%	30.0%	Retirof	Retirof2Med	\$	98.55	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Insulation - Wall Cavity Ins	R-11	R-11	45	\$1,182.48	\$ -	-	-	755	-	0.0004	22.5%	30.0%	Retirof	Retirof2Med	\$	98.55	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Insulation - Wall Sheathing	None	Install R-5 Rigid	20	\$1,036.56	\$ -	-	-	8	-	-	15.0%	25.0%	Retirof	Retirof2Med	\$	610.38	DEER	ORNL/DOE Workpaper	AEQ-BEST
WA	Residential	Multi-Family - Existing	Heating	Insulation - Wall Sheathing	None	Install R-5 Rigid	20	\$1,036.56	\$ -	-	-	135	-	0.0004	15.0%	25.0%	Retirof	Retirof2Med	\$	610.38	DEER	ORNL/DOE Workpaper	AEQ-BEST
WA	Residential	Multi-Family - Existing	Heating	Insulation - Floor Install	R-0	R-22 or R-30	45	\$466.25	\$ -	-	-	(3)	0.0002	-	7.5%	12.5%	Retirof	Retirof2Med	\$	304.66	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Insulation - Floor Install	R-0	R-22 or R-30	45	\$466.25	\$ -	-	-	(4)	0.0002	-	7.5%	12.5%	Retirof	Retirof2Med	\$	304.66	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Insulation - Floor Upgrade	R-11	R-11	25	\$903.95	\$ -	-	-	(2)	0.0002	-	7.5%	12.5%	Retirof	Retirof2Med	\$	465.00	RTF	RTF	AEQ Research
WA	Residential	Multi-Family - Existing	Heating	Insulation - Floor Upgrade	R-11	R-11	25	\$903.95	\$ -	-	-	149	-	0.0004	7.5%	12.5%	Retirof	Retirof2Med	\$	465.00	RTF	RTF	AEQ Research
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Foundation	R-0	R-10	70	\$475.16	\$ -	-	-	(4)	0.0002	-	15.0%	10.0%	Retirof	Retirof2Med	\$	211.36	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Insulation - Foundation	R-0	R-10	70	\$475.16	\$ -	-	-	132	0.0002	-	15.0%	10.0%	Retirof	Retirof2Med	\$	211.36	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Insulation - Ducting	R-4	R-8	18	\$550.88	\$ -	-	-	4	0.0002	-	15.1%	50.0%	Retirof	Retirof2Med	\$	1,113.93	DEER	Ameren Missouri Filing	AEQ-BEST
WA	Residential	Multi-Family - Existing	Heating	Insulation - Ducting	R-4	R-8	18	\$550.88	\$ -	-	-	5	0.0002	-	15.1%	50.0%	Retirof	Retirof2Med	\$	1,113.93	DEER	Ameren Missouri Filing	AEQ-BEST
WA	Residential	Multi-Family - Existing	Cooling	Ducting - Repair and Seal	20% Leakage	Sealed	20	\$636.06	\$ -	-	-	40	0.0004	-	15.1%	50.0%	Retirof	Retirof2Med	\$	264.96	RTF	RTF	7th Plan
WA	Residential	Multi-Family - Existing	Heating	Ducting - Repair and Seal	20% Leakage	Sealed	20	\$636.06	\$ -	-	-	197	0.0004	-	15.1%	50.0%	Retirof	Retirof2Med	\$	264.96	RTF	RTF	7th Plan
WA	Residential	Multi-Family - Existing	Cooling	Building Shell - Infiltration	None	O.1 ACH Reduction	15	\$628.69	\$ 5.41	-	-	2	0.0002	-	15.1%	75.0%	Retirof	Retirof2Med	\$	416.01	RTF	RTF	7th Plan
WA	Residential	Multi-Family - Existing	Heating	Building Shell - Infiltration	None	O.1 ACH Reduction	15	\$628.69	\$ 5.41	-	-	143	-	-	15.2%	75.0%	Retirof	Retirof2Med	\$	416.01	RTF	RTF	7th Plan
WA	Residential	Multi-Family - Existing	Cooling	Windows - High Effectiveness	Standard Efficiency	ENERGY STAR	45	\$1,359.97	\$ -	-	-	17	0.0002	-	24.2%	37.5%	Retirof	Retirof2Med	\$	168.72	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Windows - High Effectiveness	Standard Efficiency	ENERGY STAR	15	\$1,359.97	\$ -	-	-	483	0.0002	-	24.2%	37.5%	Retirof	Retirof2Med	\$	168.72	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Windows - Install Reflective Film	No Film	Film Installed	45	\$1,517.27	\$ -	-	-	22	0.0002	-	10.0%	37.5%	Retirof	Retirof2Med	\$	462.89	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Windows - Install Reflective Film	No Film	Film Installed	45	\$1,517.27	\$ -	-	-	179	-	-	10.1%	37.5%	Retirof	Retirof2Med	\$	462.89	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Doors - Storm and Thermal	R-5 Door	R-5 Door	45	\$738.51	\$ -	-	-	-	-	-	15.0%	25.0%	Retirof	Retirof2Med	\$	156.06	RTF	RTF	AEQ-BEST
WA	Residential	Multi-Family - Existing	Heating	Doors - Storm and Thermal	R-5 Door	R-5 Door	45	\$738.51	\$ -	-	-	-	-	-	15.0%	25.0%	Retirof	Retirof2Med	\$	156.06	RTF	RTF	AEQ-BEST
WA	Residential	Multi-Family - Existing	Cooling	Ductless Mini Split Heat P	None	Installed	15	\$4,205.71	\$ -	-	-	38	-	-	15.1%	75.0%	Retirof	RetirofMed	\$	969.70	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Ductless Mini Split Heat P	None	Installed	15	\$4,205.71	\$ -	-	-	390	-	-	15.1%	75.0%	Retirof	RetirofMed	\$	969.70	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Ductless Mini Split Heat P	None	Installed	15	\$3,791.06	\$ -	-	-	12	0.0004	-	15.0%	40.0%	Retirof	RetirofMed	\$	499.33	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Ductless Mini Split Heat P	None	Installed	15	\$3,791.06	\$ -	-	-	741	-	-	60.0%	75.0%	Retirof	RetirofMed	\$	499.33	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Space Heating - Heat Recov	None	Installed	20	\$1,470.45	\$ -	-	-	(2)	0.0004	-	15.0%	75.0%	Retirof	Retirof15low	\$	1,024.09	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-Family - Existing	Heating	Space Heating - Heat Recov	None	Installed	20	\$1,470.45	\$ -	-	-	121	-	-	15.0%	75.0%	Retirof	Retirof15low	\$	1,024.09	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-Family - Existing	Cooling	Furnace - Conversion to Air	Central Forced Air Furnace	Central Forced Air Furnace	15	\$3,328.64	\$ -	-	-	-	-	-	5.0%	15.0%	Retirof	Retirof2Med	\$	279.28	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Heating	Furnace - Conversion to Air	Central Forced Air Furnace	Central Forced Air Furnace	15	\$3,328.64	\$ -	-	-	1,242	-	-	5.0%	15.0%	Retirof	Retirof2Med	\$	279.28	RTF	RTF	RTF
WA	Residential	Multi-Family - Existing	Cooling	Room AC - Removal of Seal	Unit Installed	Unit Removed	3	\$18.18	\$ -	-	-	256	-	-	75.0%	75.0%	Retirof	RetirofMed	\$	28.72	DEER	NREL	DEER
WA	Residential	Multi-Family - Existing	Cooling	Room AC - Maintenance	Standard Unit	Tuned Up Unit	3	\$281.16	\$ -														

Measure				Assumptions in First Year (2015)														Sources						
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Year)	Average Annual Savings (\$/Year)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	Residential	Multi-family - W New	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	Standard Efficiency	ENERGY STAR	45	\$1,359.97	\$ -	\$ -	19	0.0002	0.0001	24.2%	37.5%	Retrofit	Retrol2Med	\$	206.81	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Heating	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	Standard Efficiency	ENERGY STAR	45	\$1,359.97	\$ -	\$ -	393	0.0000	0.0004	24.2%	37.5%	Retrofit	Retrol2Med	\$	206.81	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Cooling	Windows - Install Reflective Film	No Film	Film Installed	No Film	Film Installed	45	\$1,517.27	\$ -	\$ -	25	0.0002	0.0004	10.0%	37.5%	Retrofit	Retrol2Med	\$	558.94	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Heating	Windows - Install Reflective Film	No Film	Film Installed	No Film	Film Installed	45	\$1,517.27	\$ -	\$ -	144	0.0000	0.0004	10.1%	37.5%	Retrofit	Retrol2Med	\$	558.94	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Cooling	Doors - Storm and Thermal	R-2.5 Door	R-5 Door	R-2.5 Door	R-5 Door	45	\$815.09	\$ -	\$ -	-	-	-	15.0%	25.0%	Retrofit	Retrol2Med	\$	98.36	RTF	RTF	AEGBEST
WA	Residential	Multi-family - W New	Heating	Doors - Storm and Thermal	R-2.5 Door	R-5 Door	R-2.5 Door	R-5 Door	45	\$20.38	\$ -	\$ -	-	-	-	13.0%	25.0%	Retrofit	Retrol2Med	\$	98.36	RTF	RTF	AEGBEST
WA	Residential	Multi-family - W New	Cooling	Ductless Mini Split Heat Pumps	None	Installed	None	Installed	15	\$4,205.71	\$ -	\$ -	36	-	-	15.1%	75.0%	Retrofit	Retrol5Med	\$	1,076.97	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Heating	Ductless Mini Split Heat Pumps	None	Installed	None	Installed	15	\$4,205.71	\$ -	\$ -	369	-	-	15.1%	75.0%	Retrofit	Retrol5Med	\$	1,076.97	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Cooling	Ductless Mini Split Heat Pumps	None	Installed	None	Installed	15	\$3,791.06	\$ -	\$ -	14	0.0004	-	60.0%	75.0%	Retrofit	Retrol5Med	\$	4,160.89	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Heating	Ductless Mini Split Heat Pumps	None	Installed	None	Installed	15	\$3,791.06	\$ -	\$ -	76	0.0004	-	60.0%	75.0%	Retrofit	Retrol5Med	\$	4,160.89	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Cooling	Space Heating - Heat Recirc	None	Installed	None	Installed	20	\$1,470.45	\$ -	\$ -	19	0.0000	0.0001	15.2%	75.0%	Retrofit	Retrol5Low	\$	4,378.17	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-family - W New	Heating	Space Heating - Heat Recirc	None	Installed	None	Installed	20	\$1,470.45	\$ -	\$ -	17	0.0004	0.0000	15.2%	75.0%	Retrofit	Retrol5Low	\$	4,378.17	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-family - W New	Cooling	Furnace - Conversion to All Electric	Central Forced Air Furnace	Central Forced Air Furnace	Central Forced Air Furnace	Central Forced Air Furnace	15	\$3,328.64	\$ -	\$ -	-	-	-	5.0%	15.0%	Retrofit	Retrol2Med	\$	2,735.03	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Heating	Furnace - Conversion to All Electric	Central Forced Air Furnace	Central Forced Air Furnace	Central Forced Air Furnace	Central Forced Air Furnace	15	\$3,328.64	\$ -	\$ -	121	-	-	5.0%	15.0%	Retrofit	Retrol2Med	\$	2,735.03	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Cooling	Room AC - Removal of Section	Unit Installed	Unit Removed	Unit Installed	Unit Removed	3	\$18.18	\$ -	\$ -	240	-	-	75.0%	75.0%	Retrofit	Retrol5Med	\$	30.69	DEER	NREL	DEER
WA	Residential	Multi-family - W New	Heating	Room AC - Removal of Section	Unit Installed	Unit Removed	Unit Installed	Unit Removed	3	\$18.18	\$ -	\$ -	15	0.0004	-	15.1%	75.0%	Retrofit	Retrol5Med	\$	3,968.51	PG&E Workpaper	PG&E Workpaper	Illinois TRM
WA	Residential	Multi-family - W New	Cooling	Central Heat Pump - Control	Standard Unit	Property Sized and Installed Unit	Standard Unit	Property Sized and Installed Unit	15	\$592.87	\$ 12.01	\$ -	0	-	0.0004	15.1%	75.0%	Retrofit	Retrol5Med	\$	1,221.43	RTF	RTF	7th Plan
WA	Residential	Multi-family - W New	Heating	Central Heat Pump - Control	Standard Unit	Property Sized and Installed Unit	Standard Unit	Property Sized and Installed Unit	15	\$592.87	\$ 12.01	\$ -	99	-	-	15.2%	75.0%	Retrofit	Retrol5Med	\$	1,221.43	RTF	RTF	7th Plan
WA	Residential	Multi-family - W New	Cooling	Ceiling Fan - ENERGY STAR	Standard Unit	ENERGY STAR Unit	Standard Unit	ENERGY STAR Unit	10	\$95.99	\$ -	\$ -	23	0.0002	0.0001	15.0%	75.0%	Retrofit	Retrol2Med	\$	633.67	ENERGY STAR	ENERGY STAR	ENERGY STAR
WA	Residential	Multi-family - W New	Heating	Whole-House Fan - Install	None	Installed	None	Installed	20	\$726.04	\$ -	\$ -	10	0.0003	0.0001	20.0%	10.0%	Retrofit	Retrol2Med	\$	5,940.16	CPUC	CPUC	CPUC
WA	Residential	Multi-family - W New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Standard Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	\$ -	13	0.0002	0.0001	5.1%	50.0%	Retrofit	Retrol5Med	\$	395.76	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-family - W New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Standard Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	\$ -	13	0.0002	0.0001	5.1%	50.0%	Retrofit	Retrol5Med	\$	395.76	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Drainwater	None	Installed	None	Installed	40	\$851.27	\$ -	\$ -	109	0.0002	0.0002	1.0%	10.0%	Retrofit	Retrol5Low	\$	475.61	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Faucet Aeri	2.5 GPM Faucet	1.0 - 1.5 GPM Faucet	2.5 GPM Faucet	1.0 - 1.5 GPM Faucet	15	\$10.43	\$ 30.88	\$ -	13	0.0002	0.0002	15.0%	40.0%	Retrofit	Retrol35Low	\$	119.32	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Low-Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$36.12	\$ -	\$ -	238	0.0002	0.0002	30.4%	40.0%	Retrofit	Retrol2Med	\$	20.72	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Pipe Insulat	Uninsulated Pipe	R-3.5 Insulation Installed	Uninsulated Pipe	R-3.5 Insulation Installed	15	\$16.59	\$ -	\$ -	59	0.0000	0.0002	15.0%	40.0%	Retrofit	Retrol2Med	\$	20.72	RTF	RTF	Mid-Atlantic TRM
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Desuperhe	None	Installed	None	Installed	20	\$1,157.80	\$ -	\$ -	69	0.0002	0.0002	0.1%	0.0%	Retrofit	Retrol5Med	\$	141.30	RTF	RTF	Mid-Atlantic TRM
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Temperature	Water Set at 135°F	Water Set at 120°F	Water Set at 135°F	Water Set at 120°F	2	\$5.05	\$ -	\$ -	37	0.0002	0.0002	15.0%	40.0%	Retrofit	Retrol2Med	\$	76.51	Illinois TRM	Illinois TRM	
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Thermostat	None	Installed	None	Installed	10	\$21.72	\$ -	\$ -	15	0.0000	0.0002	15.0%	40.0%	Retrofit	Retrol2Med	\$	53.77	RTF	RTF	Illinois TRM
WA	Residential	Multi-family - W New	Water Heating	Water Heater - Solar Syste	Standard Electric Unit	SEF 2.5 Solar Unit	Standard Electric Unit	SEF 2.5 Solar Unit	20	\$8,991.09	\$ -	\$ -	59	0.0002	0.0002	5.0%	25.0%	Retrofit	Retrol5Med	\$	1,380.81	7th Plan	7th Plan	7th Plan
WA	Residential	Multi-family - W New	Interior Lighting	Interior Lighting - Occupan	Manual Controls	Occupancy-Based Controls	Manual Controls	Occupancy-Based Controls	8	\$100.95	\$ -	\$ -	59	0.0000	0.0003	23.2%	75.0%	Retrofit	Retrol2Med	\$	260.62	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
WA	Residential	Multi-family - W New	Exterior Lighting	Exterior Lighting - Timeclo	Manual Controls	Light-Sensing Controls	Manual Controls	Light-Sensing Controls	15	\$0.07	\$ -	\$ -	0	-	-	18.1%	40.0%	Retrofit	Retrol2Med	\$	294.21	Ontario Power TRM	Ontario Power TRM	
WA	Residential	Multi-family - W New	Exterior Lighting	Exterior Lighting - Photooc	Manual Controls	Light-Sensing Controls	Manual Controls	Light-Sensing Controls	15	\$0.09	\$ -	\$ -	0	0.0002	0.0003	18.1%	40.0%	Retrofit	Retrol2Med	\$	294.21	Ontario Power TRM	Ontario Power TRM	
WA	Residential	Multi-family - W New	Exterior Lighting	Exterior Lighting - Photooc	Manual Controls	Motion-Sensing Controls	Manual Controls	Motion-Sensing Controls	10	\$0.12	\$ -	\$ -	0	0.0002	0.0003	20.3%	60.0%	Retrofit	Retrol2Med	\$	292.02	Ontario Power TRM	Ontario Power TRM	
WA	Residential	Multi-family - W New	Appliances	Refrigerator - Decommis	Unit Installed	Unit Removed	Unit Installed	Unit Removed	6	\$230.98	\$ -	\$ -	252	0.0003	0.0001	15.0%	55.0%	Retrofit	Retrol5Med	\$	203.03	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Unit Removals	Refrigerator - Decommis	Unit Installed	Unit Removed	Unit Installed	Unit Removed	5	\$127.25	\$ -	\$ -	287	0.0000	0.0002	15.0%	55.0%	Retrofit	Retrol5Med	\$	184.63	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Electronics	Advanced Power Strips - T	Standard Unit	Load Sensing Strip	Standard Unit	Load Sensing Strip	5	\$66.50	\$ -	\$ -	101	0.0003	0.0001	7.5%	37.5%	Retrofit	Retrol35Low	\$	166.21	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Electronics	Advanced Power Strips - T	Standard Unit	IR or Occupancy Sensing Str	Standard Unit	IR or Occupancy Sensing Str	5	\$94.99	\$ -	\$ -	405	0.0003	0.0001	7.5%	37.5%	Retrofit	Retrol35Low	\$	61.05	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Miscellaneous	Pool Heater - Solar Water	Standard Electric Unit	Scheduled Controls	Standard Electric Unit	Scheduled Controls	10	\$86.76	\$ -	\$ -	-	0.0003	0.0001	0.5%	30.0%	Retrofit	Retrol5Med	\$	-	Ontario Power TRM	Ontario Power TRM	
WA	Residential	Multi-family - W New	Miscellaneous	Pool Heater - Solar Water	Standard Electric Unit	Scheduled Controls	Standard Electric Unit	Scheduled Controls	10	\$86.76	\$ -	\$ -	15	0.0000	0.0001	0.5%	30.0%	Retrofit	Retrol5Med	\$	-	Ontario Power TRM	Ontario Power TRM	
WA	Residential	Multi-family - W New	Cooling	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	\$ -	10	0.0002	0.0001	16.3%	60.0%	Retrofit	Retrol5Med	\$	557.04	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Heating	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	\$ -	38	-	-	16.3%	60.0%	Retrofit	Retrol5Med	\$	557.04	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Water Heating	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	\$ -	235	0.0002	0.0002	16.3%	60.0%	Retrofit	Retrol5Med	\$	557.04	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Exterior Lighting	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	\$ -	38	0.0002	0.0002	19.0%	60.0%	Retrofit	Retrol5Med	\$	557.04	RTF	RTF	RTF
WA	Residential	Multi-family - W New	Cooling	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Heating	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Water Heating	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Interior Lighting	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Exterior Lighting	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Appliances	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Electronics	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Miscellaneous	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Residential	Multi-family - W New	Interior Lighting	Behavioral Programs	No Program	Implemented	No Program	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$	N/A	N/A	N/A	
WA	Res																							

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$)	Annual Average Savings (kWh/Unit Greater)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Residential	Manufactured	I Existing	Water Heating	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	\$ -	268	0.0002	0.0002	0.0%	0.0%	Retrolven20	\$ 378.15	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I Existing	Interior Lighting	ENERGY STAR Home Design	Code-Compliant Home Design	ENERGY STAR Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	\$ -	44	0.0002	0.0003	0.0%	0.0%	Retrolven20	\$ 378.15	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I Existing	Cooling	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Heating	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Water Heating	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Interior Lighting	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Exterior Lighting	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Appliances	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Electronics	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Miscellaneous	Behavioral Programs	No Program	Implemented	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	CustomBehav	\$ -	N/A	N/A	N/A	N/A
WA	Residential	Manufactured	I Existing	Interior Lighting	Interior Lighting - General	IESA Compliant (17.0 lm/W)	IESA Compliant (17.0 lm/W)	IESA Compliant (17.0 lm/W)	6	\$2,760.50	\$ -	\$ -	203	0.0002	0.0003	80.4%	80.4%	LightingPPA	\$ (1.82)	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I Existing	Interior Lighting	Interior Lighting - Exempt	Incandescence (9.7 lm/W)	Incandescence (9.7 lm/W)	Incandescence (9.7 lm/W)	7	\$122.05	\$ -	\$ -	40	0.0002	0.0003	80.4%	84.3%	LightingPPA	\$ (34.81)	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Insulation - Ceiling Install	R-30, R-38, or R-49	R-30, R-38, or R-49	R-30, R-38, or R-49	45	\$723.40	\$ -	\$ -	113	0.0002	0.0001	18.8%	25.0%	Retrol2Med	\$ 145.20	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Insulation - Ceiling Install	R-30, R-38, or R-49	R-30, R-38, or R-49	R-30, R-38, or R-49	45	\$723.40	\$ -	\$ -	205	0.0002	0.0001	18.8%	25.0%	Retrol2Med	\$ 145.20	RTF	RTF	RTF	7th Plan
WA	Residential	Manufactured	I New	Heating	Insulation - Ceiling Upgrade	R-11	R-11	R-11	25	\$609.14	\$ -	\$ -	18	0.0002	0.0001	12.5%	25.0%	Retrol2Med	\$ 1,686.21	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Insulation - Ceiling Upgrade	R-11	R-11	R-11	25	\$609.14	\$ -	\$ -	9	0.0002	0.0001	12.5%	25.0%	Retrol2Med	\$ 1,686.21	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Insulation - Radiant Barrier	None	Installed	Installed	15	\$481.83	\$ -	\$ -	89	0.0002	0.0001	15.0%	25.0%	Retrol2Med	\$ 208.67	NREL	AEG Research	AEG Research	7th Plan
WA	Residential	Manufactured	I New	Heating	Insulation - Radiant Barrier	None	Installed	Installed	15	\$481.83	\$ -	\$ -	161	0.0002	0.0001	15.0%	25.0%	Retrol2Med	\$ 208.67	NREL	AEG Research	AEG Research	7th Plan
WA	Residential	Manufactured	I New	Heating	Insulation - Wall Cavity Ins	R-9	R-11	R-11	25	\$1,642.63	\$ -	\$ -	28	0.0002	0.0001	27.5%	40.0%	Retrol2Med	\$ 352.22	7th Plan	AEG Research	AEG Research	7th Plan
WA	Residential	Manufactured	I New	Heating	Insulation - Wall Cavity Ins	R-9	R-11	R-11	25	\$1,642.63	\$ -	\$ -	339	0.0002	0.0001	27.5%	40.0%	Retrol2Med	\$ 352.22	7th Plan	AEG Research	AEG Research	7th Plan
WA	Residential	Manufactured	I New	Cooling	Insulation - Wall Sheathing	None	Install R-5 Rigid	Install R-5 Rigid	20	\$1,361.39	\$ -	\$ -	17	0.0002	0.0001	15.0%	40.0%	Retrol2Med	\$ 1,379.17	DEER	ORNL/DOE Workpaper	AEG-BEST	7th Plan
WA	Residential	Manufactured	I New	Cooling	Insulation - Floor Install	R-22 or R-30	R-22 or R-30	R-22 or R-30	25	\$516.29	\$ -	\$ -	(9)	0.0002	0.0001	7.5%	12.5%	Retrol2Med	\$ 1,118.40	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Insulation - Floor Install	R-22 or R-30	R-22 or R-30	R-22 or R-30	25	\$516.29	\$ -	\$ -	44	0.0002	0.0001	7.5%	12.5%	Retrol2Med	\$ 1,118.40	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Insulation - Floor Upgrade	R-11	R-11	R-11	25	\$479.14	\$ -	\$ -	(4)	0.0002	0.0001	7.5%	12.5%	Retrol2Med	\$ 572.20	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Insulation - Floor Upgrade	R-11	R-11	R-11	25	\$479.14	\$ -	\$ -	70	0.0002	0.0001	12.5%	9.0%	Retrol2Med	\$ 572.20	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Insulation - Foundation	R-0	R-10	R-10	70	\$741.92	\$ -	\$ -	(10)	0.0002	0.0001	15.0%	25.0%	Retrol2Med	\$ 847.11	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Insulation - Foundation	R-0	R-10	R-10	70	\$741.92	\$ -	\$ -	61	0.0002	0.0001	15.0%	25.0%	Retrol2Med	\$ 847.11	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Insulation - Ducting	R-4	R-8	R-8	18	\$550.88	\$ -	\$ -	36	0.0002	0.0001	15.3%	50.0%	Retrol2Med	\$ 811.07	DEER	Ameren Missouri Filing	AEG-BEST	7th Plan
WA	Residential	Manufactured	I New	Heating	Insulation - Ducting	R-4	R-8	R-8	18	\$550.88	\$ -	\$ -	27	0.0003	0.0001	15.3%	50.0%	Retrol2Med	\$ 811.07	DEER	Ameren Missouri Filing	AEG-BEST	7th Plan
WA	Residential	Manufactured	I New	Heating	Ducting - Repair and Seal	20% Leakage	Sealed	Sealed	18	\$483.74	\$ -	\$ -	126	0.0002	0.0001	45.0%	50.0%	Retrol2Med	\$ 198.14	RTF	RTF	RTF	7th Plan
WA	Residential	Manufactured	I New	Heating	Ducting - Repair and Seal	20% Leakage	Sealed	Sealed	18	\$483.74	\$ -	\$ -	109	0.0003	0.0001	45.0%	50.0%	Retrol2Med	\$ 198.14	RTF	RTF	RTF	7th Plan
WA	Residential	Manufactured	I New	Heating	Building Shell - Infiltration	None	0.1 ACH Reduction	0.1 ACH Reduction	15	\$4,605.72	\$ 8.44	\$ -	4	0.0002	0.0001	15.1%	75.0%	Retrol2Med	\$ 9,127.27	RTF	7th Plan	7th Plan	
WA	Residential	Manufactured	I New	Heating	Building Shell - Infiltration	None	0.1 ACH Reduction	0.1 ACH Reduction	15	\$4,605.72	\$ 8.44	\$ -	4	0.0002	0.0001	15.2%	75.0%	Retrol2Med	\$ 9,127.27	RTF	7th Plan	7th Plan	
WA	Residential	Manufactured	I New	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	ENERGY STAR	25	\$2,183.00	\$ -	\$ -	77	0.0002	0.0001	24.2%	37.5%	Retrol2Med	\$ 643.57	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	ENERGY STAR	25	\$2,183.00	\$ -	\$ -	24	0.0002	0.0001	37.5%	37.5%	Retrol2Med	\$ 643.57	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Windows - Install Reflective Film	No Film	Film Installed	Film Installed	25	\$2,692.40	\$ -	\$ -	58	0.0002	0.0001	10.1%	37.5%	Retrol2Med	\$ 1,520.59	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Windows - Install Reflective Film	No Film	Film Installed	Film Installed	25	\$2,692.40	\$ -	\$ -	76	0.0002	0.0001	10.1%	37.5%	Retrol2Med	\$ 1,520.59	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Doors - Storm and Thermal	R-5 Door	R-5 Door	R-5 Door	45	\$815.09	\$ -	\$ -	5	0.0002	0.0001	15.1%	75.0%	Retrol2Med	\$ 45.41	RTF	RTF	RTF	AEG-BEST
WA	Residential	Manufactured	I New	Heating	Doors - Storm and Thermal	R-5 Door	R-5 Door	R-5 Door	45	\$815.09	\$ -	\$ -	23	0.0002	0.0001	15.1%	75.0%	Retrol2Med	\$ 45.41	RTF	RTF	RTF	AEG-BEST
WA	Residential	Manufactured	I New	Cooling	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$4,205.71	\$ -	\$ -	59	-	-	15.1%	75.0%	Retrol5Med	\$ 398.51	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$4,205.71	\$ -	\$ -	1,050	-	-	15.1%	75.0%	Retrol5Med	\$ 398.51	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$3,791.06	\$ -	\$ -	20	0.0005	-	60.0%	75.0%	Retrol5Med	\$ 1,000.05	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$3,791.06	\$ -	\$ -	30	0.0002	0.0001	60.0%	75.0%	Retrol5Med	\$ 1,000.05	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Space Heating - Heat Recirc	None	Installed	Installed	20	\$1,470.45	\$ -	\$ -	(8)	0.0002	0.0001	15.0%	75.0%	Retrol5Med	\$ 3,887.59	7th Plan	7th Plan	7th Plan	7th Plan
WA	Residential	Manufactured	I New	Heating	Space Heating - Heat Recirc	None	Installed	Installed	20	\$1,470.45	\$ -	\$ -	39	0.0003	0.0001	15.2%	75.0%	Retrol5Med	\$ 3,887.59	7th Plan	7th Plan	7th Plan	7th Plan
WA	Residential	Manufactured	I New	Heating	Central Air-Source Heat Pump	None	Central Air-Source Heat Pump	Central Air-Source Heat Pump	15	\$4,845.32	\$ -	\$ -	5	0.0002	0.0001	5.0%	75.0%	Retrol5Med	\$ 2,531.86	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Central Air-Source Heat Pump	None	Central Air-Source Heat Pump	Central Air-Source Heat Pump	15	\$4,845.32	\$ -	\$ -	190	-	-	5.0%	75.0%	Retrol5Med	\$ 2,531.86	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Room AC - Removal of Sec	Unit Installed	Unit Removed	Unit Removed	3	\$18.18	\$ -	\$ -	384	-	-	75.0%	75.0%	Retrol5Med	\$ 19.31	DEER	NREL	DEER	7th Plan
WA	Residential	Manufactured	I New	Cooling	Central AC - Installation	Standard Unit	Turned Up Unit	Turned Up Unit	6	\$281.16	\$ -	\$ -	20	0.0005	-	15.1%	75.0%	Retrol5Med	\$ 2,826.88	PG&E Workpaper	PG&E Workpaper	Illinois TRM	7th Plan
WA	Residential	Manufactured	I New	Heating	Central AC - Installation	Standard Unit	Property Sited and Installed Unit	Property Sited and Installed Unit	6	\$592.87	\$ 3.66	\$ -	5	0.0002	0.0002	15.1%	75.0%	Retrol5Med	\$ 179.72	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Heating	Central Heat Pump - Contr	Standard Unit	Property Sited and Installed Unit	Property Sited and Installed Unit	15	\$592.87	\$ 3.66	\$ -	336	-	-	15.2%	75.0%	Retrol5Med	\$ 179.72	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Calline Fan - ENERGY STAR	Standard Unit	ENERGY STAR Unit	ENERGY STAR Unit	10	\$99.99	\$ -	\$ -	32	0.0002	0.0001	15.1%	75.0%	Retrol5Med	\$ 433.25	ENERGY STAR	ENERGY STAR	ENERGY STAR	7th Plan
WA	Residential	Manufactured	I New	Cooling	Calline Fan - Install	Standard Unit	Installed	Installed	10	\$738.04	\$ -	\$ -	27	0.0002	0.0001	15.0%	75.0%	Retrol5Med	\$ 2,282.32	RTF	RTF	RTF	RTF
WA	Residential	Manufactured	I New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	\$ -	26	0.0002	0.0001	5.2%	75.0%	Retrol5Med	\$ 507.92	7th Plan	7th Plan	7th Plan	7th Plan
WA	Residential</																						

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (Annual O&M Costs \$)	Incremental \$/Unit	Annual Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Residential	Low Income - V Existing	Cooling		Ductless Mini Split Heat Pump	None	Installed	15	\$3,791.06	\$ -	-	16	0.0005	-	-	60.0%	75.0%	Retirof	RetrosMed	\$	380.52	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		Ductless Mini Split Heat Pump	None	Installed	15	\$3,791.06	\$ -	-	16	0.0005	-	-	60.0%	75.0%	Retirof	RetrosMed	\$	380.52	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		Space Heating - Heat Recove	None	Installed	20	\$1,470.45	\$ -	-	183	0.0005	-	-	15.0%	75.0%	Retirof	Retros15low	\$	675.67	7th Plan	7th Plan	7th Plan
WA	Residential	Low Income - V Existing	Heating		Space Heating - Heat Recove	None	Installed	20	\$1,470.45	\$ -	-	183	0.0005	-	-	15.0%	75.0%	Retirof	Retros15low	\$	675.67	7th Plan	7th Plan	7th Plan
WA	Residential	Low Income - V Existing	Cooling		Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	15	\$3,328.64	\$ -	-	168	0.0005	-	-	5.0%	15.0%	Retirof	Retros12Med	\$	214.59	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	15	\$3,328.64	\$ -	-	1,658	0.0003	-	-	5.1%	15.0%	Retirof	Retros12Med	\$	214.59	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Cooling		Room AC - Removal of Seal	Unit Installed	Unit Removed	3	\$18.18	\$ -	-	319	0.0005	-	-	75.0%	75.0%	Retirof	RetrosMed	\$	23.82	DEER	NREL	DEER
WA	Residential	Low Income - V Existing	Cooling		Central AC - Maintenance	Standard Unit	Tuned Up Unit	6	\$281.16	\$ -	-	2	0.0005	-	-	15.0%	15.0%	Retirof	RetrosMed	\$	379.15	RTF	PG&E Workpaper	PG&E Workpaper
WA	Residential	Low Income - V Existing	Cooling		Central Heat Pump - Contr	Standard Unit	Property Sized and Installed Unit	15	\$592.87	\$ 12.01	5	0.0005	-	-	-	15.0%	75.0%	Retirof	RetrosMed	\$	379.15	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		Central Heat Pump - Contr	Standard Unit	Property Sized and Installed Unit	15	\$592.87	\$ 12.01	5	0.0005	-	-	-	15.0%	75.0%	Retirof	RetrosMed	\$	379.15	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Cooling		Callus Fan - ENERGY STAR	Standard Unit	ENERGY STAR Unit	10	\$95.99	\$ -	-	114	0.0002	-	-	5.0%	25.0%	Retirof	RetrosMax60	\$	2,462.03	ENERGY STAR	ENERGY STAR	ENERGY STAR
WA	Residential	Low Income - V Existing	Cooling		Whole-House Fan - Installa	Standard Unit	Installed	10	\$726.04	\$ -	-	10	0.0002	-	-	15.0%	40.0%	Retirof	Retros12Med	\$	5,839.98	CPUC	CPUC	CPUC
WA	Residential	Low Income - V Existing	Cooling		Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	-	12	0.0002	-	-	5.0%	75.0%	Retirof	RetrosMed	\$	244.74	7th Plan	7th Plan	7th Plan
WA	Residential	Low Income - V Existing	Heating		Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	-	134	0.0003	-	-	5.0%	75.0%	Retirof	RetrosMed	\$	244.74	7th Plan	7th Plan	7th Plan
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Drainwater	None	Installed	40	\$851.27	\$ -	-	106	0.0002	-	-	1.0%	10.0%	Retirof	Retros15low	\$	493.99	7th Plan	7th Plan	7th Plan
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Faucet Aer	1.0 - 1.5 GPM Faucet	2.5 GPM Faucet	15	\$10.43	\$ 43.74	5	0.0002	-	-	-	15.0%	40.0%	Retirof	Retros35low	\$	(228.27)	7th Plan	7th Plan	7th Plan
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Low-Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$36.12	\$ -	-	196	0.0002	-	-	30.0%	40.0%	Retirof	Retros12Med	\$	25.45	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Pipe Insula	Uninsulated Pipe	R-3.5 Insulation Installed	10	\$16.59	\$ -	-	63	0.0002	-	-	15.0%	40.0%	Retirof	Retros12Med	\$	27.32	Mid-Atlantic TRM	Mid-Atlantic TRM	Mid-Atlantic TRM
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Desuperhe	None	Installed	20	\$1,157.80	\$ -	-	764	0.0002	-	-	0.1%	0.0%	Retirof	RetrosMed	\$	129.94	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Temperatu	Water Set at 135°F	Water Set at 120°F	2	\$5.05	\$ -	-	39	0.0002	-	-	15.0%	40.0%	Retirof	Retros12Med	\$	73.19	Illinois TRM	Illinois TRM	Illinois TRM
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Thermosta	None	Installed	10	\$21.72	\$ -	-	46	0.0002	-	-	15.0%	40.0%	Retirof	Retros12Med	\$	64.87	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Water Heating		Water Heater - Solar Syst	Standard Electric Unit	SEF 2.5 Solar Unit	20	\$8,991.09	\$ -	-	570	0.0002	-	-	5.0%	25.0%	Retirof	RetrosMax60	\$	1,323.82	7th Plan	7th Plan	7th Plan
WA	Residential	Low Income - V Existing	Interior Lighting		Occupancy-Based Controls	Manual Controls	Occupancy-Based Controls	8	\$100.95	\$ -	-	59	0.0002	-	-	15.2%	75.0%	Retirof	Retros12Med	\$	243.68	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
WA	Residential	Low Income - V Existing	Interior Lighting		Occupancy-Based Controls	Manual Controls	Light-Sensing Controls	15	\$2.98	\$ -	-	3	0.0002	-	-	15.1%	40.0%	Retirof	Retros12Med	\$	88.05	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Michigan Energy Measures Datab
WA	Residential	Low Income - V Existing	Interior Lighting		Exterior Lighting - Photo	None	Smart-Powered Unit Installed	10	\$4.05	\$ -	-	2	0.0002	-	-	15.1%	60.0%	Retirof	Retros12Med	\$	617.54	AEG Research	AEG Research	AEG Research
WA	Residential	Low Income - V Existing	Interior Lighting		Exterior Lighting - Timeclo	Manual Controls	Motion-Sensing Controls	10	\$6.35	\$ -	-	2	0.0002	-	-	15.1%	40.0%	Retirof	Retros12Med	\$	297.95	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM
WA	Residential	Low Income - V Existing	Appliances		Refrigerator - Decommissi	Unit Installed	Unit Removed	6	\$230.98	\$ -	-	214	0.0003	-	-	15.0%	55.0%	Retirof	RetrosMed	\$	236.86	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Appliances		Freezer - Decommissioning	Unit Installed	Unit Removed	5	\$127.25	\$ -	-	338	0.0003	-	-	15.0%	55.0%	Retirof	RetrosMed	\$	96.86	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Electronics		Advanced Power Strips - T	Standard Unit	Load Sensing Strip	5	\$66.50	\$ -	-	30	0.0003	-	-	7.5%	37.5%	Retirof	Retros35low	\$	310.29	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Electronics		Advanced Power Strips - T	Standard Unit	IR or Occupancy Sensing Strip	5	\$94.99	\$ -	-	189	0.0002	-	-	7.5%	37.5%	Retirof	Retros35low	\$	131.19	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Miscellaneous		Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	-	48	0.0002	-	-	0.5%	75.0%	Retirof	RetrosMed	\$	29.31	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM
WA	Residential	Low Income - V Existing	Miscellaneous		Pool Heater - Solar Water	Standard Electric Unit	Passive Solar Unit	20	\$3,842.06	\$ -	-	1,535	0.0002	-	-	0.1%	30.0%	Retirof	RetrosMed	\$	229.82	AEG	AEG	AEG
WA	Residential	Low Income - V Existing	Heating		ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	-	40	0.0002	-	-	15.0%	60.0%	Retirof	RetrosMed	\$	547.77	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	-	40	0.0002	-	-	15.0%	60.0%	Retirof	RetrosMed	\$	547.77	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Interior Lighting		ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	45	\$3,062.09	\$ -	-	231	0.0002	-	-	15.0%	60.0%	Retirof	RetrosMed	\$	547.77	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Cooling		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	36	0.0002	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Heating		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Water Heating		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Interior Lighting		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Exterior Lighting		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Appliances		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Electronics		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Miscellaneous		Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	-	-	-	-	-	0.0%	3.0%	Retirof	CustomBehav	\$	N/A	N/A	N/A	N/A
WA	Residential	Low Income - V Existing	Interior Lighting		General	ISA Compliant (17.4 lm/W)	Interior Lighting - General	6	\$(2.49)	\$ -	-	189	0.0002	-	-	0.0%	91.7%	Retirof	LightingPA	\$	(1.71)	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Interior Lighting		Interior Lighting - Exempt	Incandescent (9.7 lm/W)	Interior Lighting - Exempt	7	\$(5.93)	\$ -	-	25	0.0002	-	-	31.9%	91.7%	Retirof	LightingPA	\$	(6.27)	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		R-30, R-38, or R-49	R-30, R-38, or R-49	Insulation - Ceiling Installa	45	\$1,073.79	\$ -	-	63	0.0003	-	-	18.8%	25.0%	Retirof	Retros12Med	\$	156.95	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		R-30, R-38, or R-49	R-30, R-38, or R-49	Insulation - Ceiling Installa	45	\$1,073.79	\$ -	-	375	0.0003	-	-	18.8%	25.0%	Retirof	Retros12Med	\$	156.95	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Cooling		Insulation - Ceiling Upgrade	R-11	Insulation - Ceiling Upgrade	45	\$99.65	\$ -	-	10	0.0003	-	-	12.5%	25.0%	Retirof	Retros12Med	\$	573.93	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		Insulation - Ceiling Upgrade	R-11	Insulation - Ceiling Upgrade	45	\$99.65	\$ -	-	93	0.0003	-	-	12.5%	25.0%	Retirof	Retros12Med	\$	573.93	RTF	RTF	RTF
WA	Residential	Low Income - V Existing	Interior Lighting		Insulation - Radiant Barrier	None	Installed	15	\$621.91	\$ -	-	289	0.0003	-	-	15.0%	25.0%	Retirof	Retros12Med	\$	196.39	NREL	AEG Research	
WA	Residential	Low Income - V Existing	Interior Lighting		Insulation - Radiant Barrier	None	Installed	15	\$621.91	\$ -	-	289	0.0003	-	-	15.0%	25.0%	Retirof	Retros12Med	\$	196.39	NREL	AEG Research	
WA	Residential	Low Income - V Existing	Cooling		Insulation - Wall Cavity Ins	R-11	Insulation - Wall Cavity Ins	45	\$2,587.65	\$ -	-	16	0.0003	-	-	27.5%	40.0%	Retirof	Retros12Med	\$	256.44	7th Plan	RTF	RTF
WA	Residential	Low Income - V Existing	Heating		Insulation - Wall Cavity Ins	R-11	Insulation - Wall Cavity Ins	45	\$2,587.65	\$ -	-	16	0.0003	-	-	27.5%	40.0%	Retirof	Retros12Med	\$	256.44	7th Plan	RTF	RTF
WA	Residential	Low Income - V Existing	Cooling		Insulation - Wall Sheathing	None	Install R-5 Rigid	20	\$1,529.40	\$ -	-	12	0.0003	-	-	15.0%	40.0%	Retirof	Retros12Med	\$	1,039.03	DEER	ORNL/DOE Workpaper	
WA	Residential	Low Income - V Existing	Heating																					

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Residential	Low Income - V New	Electronics	Behavioral Programs	No Program	Implemented	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$ -	N/A	N/A	N/A
WA	Residential	Low Income - V New	Miscellaneous	Behavioral Programs	No Program	Implemented	Implemented	1	\$100.00	\$ -	\$ -	-	-	-	-	0.0%	3.0%	Retrofit	CustomBehav	\$ -	N/A	N/A	N/A
WA	Residential	Low Income - V New	Interior Lighting	Interior Lighting - General	EISA Compliant (17.4 lm/W)	Implemented	CFI (64.3 lm/W)	9	\$2.83	\$ -	\$ -	183	0.0002	0.0003	31.0%	91.7%	Retrofit	LightingPA	\$ (1.32)	RTF	RTF	RTF	
WA	Residential	Low Income - V New	Interior Lighting	Interior Lighting - Exempt	Incandescent (9.7 lm/W)	Implemented	CFI (61.5 lm/W)	7	\$6.74	\$ -	\$ -	27	0.0002	0.0003	31.0%	91.7%	Retrofit	LightingPA	\$ (1.32)	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Insulation - Ceiling Install	R-0	Installed	R-30, R-38, or R-49	45	\$1,191.58	\$ -	\$ -	155	0.0004	-	18.8%	25.0%	Retrofit	Retrol2Med	\$ 31.09	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Insulation - Ceiling Install	R-0	Installed	R-30, R-38, or R-49	45	\$1,191.58	\$ -	\$ -	2,314	-	0.0003	18.8%	25.0%	Retrofit	Retrol2Med	\$ 31.09	RTF	RTF	7th Plan	
ID	Residential	Single Family - Existing	Cooling	Insulation - Ceiling Upgrade	R-11	Installed	R-30 or R-49	45	\$939.65	\$ -	\$ -	24	0.0004	-	12.5%	25.0%	Retrofit	Retrol2Med	\$ 96.20	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Insulation - Ceiling Upgrade	R-11	Installed	R-30 or R-49	45	\$939.65	\$ -	\$ -	560	-	-	25.0%	25.0%	Retrofit	Retrol2Med	\$ 96.20	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Insulation - Radiant Barrier	None	Installed	Installed	15	\$621.91	\$ -	\$ -	121	0.0004	-	15.0%	25.0%	Retrofit	Retrol2Med	\$ 34.90	NREL	NREL	REG Research	
ID	Residential	Single Family - Existing	Heating	Insulation - Radiant Barrier	None	Installed	Installed	15	\$621.91	\$ -	\$ -	1,747	-	0.0003	15.0%	25.0%	Retrofit	Retrol2Med	\$ 34.90	NREL	NREL	REG Research	
ID	Residential	Single Family - Existing	Heating	Insulation - Wall Cavity Ins	R-0	Installed	R-11	45	\$2,587.06	\$ -	\$ -	30	0.0004	-	30.0%	30.0%	Retrofit	Retrol2Med	\$ 42.32	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Insulation - Wall Cavity Ins	R-0	Installed	R-11	45	\$2,587.06	\$ -	\$ -	3,866	0.0003	0.0003	22.5%	30.0%	Retrofit	Retrol2Med	\$ 42.32	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Insulation - Wall Sheathing	None	Installed	Install R-5 Rigid	20	\$1,529.40	\$ -	\$ -	28	0.0004	-	15.0%	25.0%	Retrofit	Retrol2Med	\$ 179.22	DEER	ORNL/DOE Workpaper	REG-BEST	
ID	Residential	Single Family - Existing	Heating	Insulation - Wall Sheathing	None	Installed	Install R-5 Rigid	20	\$1,529.40	\$ -	\$ -	669	0.0003	0.0003	15.0%	25.0%	Retrofit	Retrol2Med	\$ 179.22	DEER	ORNL/DOE Workpaper	REG-BEST	
ID	Residential	Single Family - Existing	Heating	Insulation - Floor Install	R-0	Installed	R-22 or R-30	45	\$702.25	\$ -	\$ -	121	0.0004	-	7.5%	12.5%	Retrofit	Retrol2Med	\$ 88.10	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Insulation - Floor Install	R-0	Installed	R-22 or R-30	45	\$702.25	\$ -	\$ -	498	-	0.0003	7.5%	12.5%	Retrofit	Retrol2Med	\$ 88.10	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Insulation - Floor Upgrade	R-11	Installed	R-22	25	\$671.18	\$ -	\$ -	(6)	0.0004	-	7.5%	12.5%	Retrofit	Retrol2Med	\$ 67.28	RTF	REG Research	RTF	
ID	Residential	Single Family - Existing	Heating	Insulation - Floor Upgrade	R-11	Installed	R-22	25	\$671.18	\$ -	\$ -	(6)	0.0004	0.0003	7.5%	12.5%	Retrofit	Retrol2Med	\$ 67.28	RTF	REG Research	RTF	
ID	Residential	Single Family - Existing	Heating	Insulation - Foundation	R-10	Installed	R-10	70	\$957.61	\$ -	\$ -	133	0.0004	-	15.0%	10.0%	Retrofit	Retrol2Med	\$ 82.73	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Insulation - Foundation	R-10	Installed	R-10	70	\$957.61	\$ -	\$ -	684	-	-	15.0%	10.0%	Retrofit	Retrol2Med	\$ 82.73	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Insulation - Ducting	R-4	Installed	R-8	18	\$550.88	\$ -	\$ -	37	0.0005	-	15.0%	50.0%	Retrofit	Retrol2Med	\$ 102.12	DEER	Ameren Missouri Filing	REG-BEST	
ID	Residential	Single Family - Existing	Heating	Insulation - Ducting	R-4	Installed	R-8	18	\$550.88	\$ -	\$ -	44	0.0004	0.0003	15.0%	50.0%	Retrofit	Retrol2Med	\$ 102.12	DEER	Ameren Missouri Filing	REG-BEST	
ID	Residential	Single Family - Existing	Cooling	Ducting - Repair and Seal	20% Leakage	Sealed	Sealed	20	\$636.06	\$ -	\$ -	41	0.0005	-	15.4%	50.0%	Retrofit	Retrol2Med	\$ 49.11	RTF	RTF	7th Plan	
ID	Residential	Single Family - Existing	Heating	Ducting - Repair and Seal	20% Leakage	Sealed	Sealed	20	\$636.06	\$ -	\$ -	1,073	-	0.0003	15.4%	50.0%	Retrofit	Retrol2Med	\$ 49.11	RTF	RTF	7th Plan	
ID	Residential	Single Family - Existing	Cooling	Building Shell - Infiltration	None	Installed	0.1 ACH Reduction	15	\$1,267.03	\$ 10.90	\$ -	6	0.0004	-	15.1%	75.0%	Retrofit	Retrol2Med	\$ 163.35	RTF	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Heating	Building Shell - Infiltration	None	Installed	0.1 ACH Reduction	15	\$1,267.03	\$ 10.90	\$ -	6	0.0004	-	15.1%	75.0%	Retrofit	Retrol2Med	\$ 163.35	RTF	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	ENERGY STAR	45	\$3,249.66	\$ -	\$ -	63	0.0004	-	24.1%	37.5%	Retrofit	Retrol2Med	\$ 80.11	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	ENERGY STAR	45	\$3,249.66	\$ -	\$ -	2,493	-	-	24.1%	37.5%	Retrofit	Retrol2Med	\$ 80.11	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Film Installed	No Film	Film Installed	Film Installed	45	\$3,827.96	\$ -	\$ -	83	0.0004	-	10.1%	37.5%	Retrofit	Retrol2Med	\$ 236.31	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Windows - Install Reflective	No Film	Film Installed	Film Installed	45	\$3,827.96	\$ -	\$ -	891	-	-	10.1%	37.5%	Retrofit	Retrol2Med	\$ 236.31	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Doors - Storm and Thermal	R-2.5 Door	R-5 Door	R-5 Door	45	\$734.51	\$ -	\$ -	6	0.0004	-	15.1%	75.0%	Retrofit	Retrol2Med	\$ 6.31	RTF	RTF	REG-BEST	
ID	Residential	Single Family - Existing	Heating	Doors - Storm and Thermal	R-2.5 Door	R-5 Door	R-5 Door	45	\$734.51	\$ -	\$ -	169	-	0.0003	15.1%	75.0%	Retrofit	Retrol2Med	\$ 6.31	RTF	RTF	REG-BEST	
ID	Residential	Single Family - Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$4,205.71	\$ -	\$ -	1,954	-	-	15.1%	75.0%	Retrofit	Retrol5Med	\$ 196.36	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$4,205.71	\$ -	\$ -	1,954	-	-	15.1%	75.0%	Retrofit	Retrol5Med	\$ 196.36	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$3,791.06	\$ -	\$ -	5	0.0005	-	60.0%	75.0%	Retrofit	Retrol5Med	\$ 95.10	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$3,791.06	\$ -	\$ -	30	0.0005	-	60.0%	75.0%	Retrofit	Retrol5Med	\$ 95.10	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Space Heating - Heat Recirc	None	Installed	Installed	20	\$1,470.45	\$ -	\$ -	(9)	0.0005	-	15.0%	75.0%	Retrofit	Retrol5Low	\$ 186.50	7th Plan	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Heating	Space Heating - Heat Recirc	None	Installed	Installed	20	\$1,470.45	\$ -	\$ -	(9)	0.0005	-	15.1%	75.0%	Retrofit	Retrol5Low	\$ 186.50	7th Plan	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Cooling	Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	Central Air-Source Heat Pump	15	\$3,328.64	\$ -	\$ -	6,569	-	0.0003	5.4%	15.0%	Retrofit	Retrol2Med	\$ 53.42	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Heating	Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	Central Air-Source Heat Pump	15	\$3,328.64	\$ -	\$ -	6,569	-	0.0003	5.4%	15.0%	Retrofit	Retrol2Med	\$ 53.42	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Room AC - Removal of Sec	Unit Installed	Unit Removed	Unit Removed	3	\$118.18	\$ -	\$ -	400	-	-	75.0%	75.0%	Retrofit	Retrol5Med	\$ 18.54	DEER	NREL	DEER	
ID	Residential	Single Family - Existing	Heating	Central AC - Maintenance	Standard Unit	Tuned Up Unit	Tuned Up Unit	6	\$281.16	\$ -	\$ -	51	0.0005	-	15.1%	75.0%	Retrofit	Retrol5Med	\$ 1,110.89	PG&E Workpaper	PG&E Workpaper	Illinois TRM	
ID	Residential	Single Family - Existing	Cooling	Central Heat Pump - Control	Standard Unit	Property Sited and Installed Unit	Property Sited and Installed Unit	15	\$592.87	\$ 12.01	\$ -	0	0.0005	-	15.1%	75.0%	Retrofit	Retrol5Med	\$ 82.77	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Central Heat Pump - Control	Standard Unit	Property Sited and Installed Unit	Property Sited and Installed Unit	15	\$592.87	\$ 12.01	\$ -	0	0.0005	-	15.1%	75.0%	Retrofit	Retrol5Med	\$ 82.77	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Cooling	Ceiling Fan - ENERGY STAR	Standard Unit	ENERGY STAR Unit	ENERGY STAR Unit	10	\$95.99	\$ -	\$ -	15	0.0004	-	15.1%	75.0%	Retrofit	Retrol5Med	\$ 85.01	ENERGY STAR	ENERGY STAR	ENERGY STAR	
ID	Residential	Single Family - Existing	Cooling	Whole-House Fan - Install	None	Installed	Installed	20	\$726.04	\$ -	\$ -	31	0.0005	-	15.0%	40.0%	Retrofit	Retrol2Med	\$ 1,906.06	CPUC	CPUC	CPUC	
ID	Residential	Single Family - Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	\$ -	24	0.0004	-	5.2%	75.0%	Retrofit	Retrol5Med	\$ 65.79	7th Plan	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	\$ -	496	-	0.0003	5.2%	75.0%	Retrofit	Retrol5Med	\$ 65.79	7th Plan	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Drainwater	None	Installed	Installed	40	\$851.27	\$ -	\$ -	179	0.0002	0.0002	1.0%	5.0%	Retrofit	Retrol5Low	\$ 283.75	7th Plan	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Faucet Aer	2.5 GPM Faucet	1.0 L5 GPM Faucet	1.0 L5 GPM Faucet	15	\$15.65	\$ 65.61	\$ -	266	0.0002	0.0002	15.0%	40.0%	Retrofit	Retrol35Low	\$ (0.61)	7th Plan	7th Plan	7th Plan	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Low Flow	1.2 GPM Showerhead	1.5 GPM Showerhead	1.5 GPM Showerhead	10	\$49.74	\$ -	\$ -	310	0.0002	0.0002	30.0%	30.0%	Retrofit	Retrol2Med	\$ 21.56	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Pipe Insulat	Uninsulated Pipe	R-3.5 Insulation Installed	R-3.5 Insulation Installed	15	\$156.59	\$ -	\$ -	100	0.0002	0.0002	15.0%	40.0%	Retrofit	Retrol2Med	\$ 16.40	Mid-Atlantic TRM	Mid-Atlantic TRM	Mid-Atlantic TRM	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Desuperhe	None	Installed	Installed	20	\$1,157.80	\$ -	\$ -	1,214	0.0002	0.0002	1.1%	0.4%	Retrofit	Retrol5Med	\$ 78.86	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Temperature	Water Set at 135°F	Water Set at 120°F	Water Set at 120°F	10	\$510.05	\$ -	\$ -	62	0.0002	0.0002	15.0%	40.0%	Retrofit	Retrol2Med	\$ 44.00	Illinois TRM	Illinois TRM	Illinois TRM	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Thermostat	None	Installed	Installed	10	\$291.91	\$ -	\$ -	72	0.0002	0.0002	15.0%	40.0%	Retrofit	Retrol2Med	\$ 55.08	RTF	RTF	RTF	
ID	Residential	Single Family - Existing	Water Heating	Water Heater - Solar Syst	Standard Electric Unit	SEF 2.5 Solar Unit	SEF 2.5 Solar Unit	20	\$8,991.09	\$ -	\$ -												



Measure										Assumptions in First Year (2015)										Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Annual Average Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	7th Plan Measure Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Radiant Barrier	None	Installed	15	\$154.29	\$ -	\$ -	38	0.0003	0.0000	15.0%	25.0%	Retrofit	Retro12Med	\$	60.15	NREL	NREL	AEQ Research	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Radiant Barrier	None	Installed	15	\$154.29	\$ -	\$ -	240	0.0000	0.0004	15.0%	25.0%	Retrofit	Retro12Med	\$	60.15	NREL	NREL	AEQ Research	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Wall Cavity Insul	R-11	Installed	45	\$1,182.48	\$ -	\$ -	12	0.0003	0.0000	27.5%	40.0%	Retrofit	Retro12Med	\$	143.99	7th Plan	RTF	RTF	AEQ Research
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Wall Cavity Insul	R-11	Installed	45	\$1,182.48	\$ -	\$ -	514	0.0000	0.0004	27.5%	40.0%	Retrofit	Retro12Med	\$	143.99	7th Plan	RTF	RTF	AEQ Research
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Wall Sheathing	None	Install R-5 Rigid	20	\$1,036.56	\$ -	\$ -	-	-	-	15.0%	40.0%	Retrofit	Retro12Med	\$	268.75	DEER	ORNL/DOE Workpaper	AEQ-BEST	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Wall Sheathing	None	Install R-5 Rigid	20	\$1,036.56	\$ -	\$ -	345	0.0000	0.0004	15.0%	40.0%	Retrofit	Retro12Med	\$	268.75	DEER	ORNL/DOE Workpaper	AEQ-BEST	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Floor Installatio	R-11	Installed	45	\$466.25	\$ -	\$ -	60	0.0003	0.0000	7.5%	12.5%	Retrofit	Retro12Med	\$	460.12	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Floor Installatio	R-11	Installed	45	\$466.25	\$ -	\$ -	60	0.0003	0.0004	7.5%	12.5%	Retrofit	Retro12Med	\$	460.12	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Floor Upgrade	R-11	Installed	25	\$903.95	\$ -	\$ -	(2)	0.0003	0.0000	7.5%	12.5%	Retrofit	Retro12Med	\$	686.10	RTF	RTF	AEQ Research	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Floor Upgrade	R-11	Installed	25	\$903.95	\$ -	\$ -	102	0.0000	0.0004	7.5%	12.5%	Retrofit	Retro12Med	\$	686.10	RTF	RTF	AEQ Research	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Foundation	R-10	Installed	20	\$475.16	\$ -	\$ -	140	0.0003	0.0000	15.0%	25.0%	Retrofit	Retro12Med	\$	315.62	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Foundation	R-10	Installed	20	\$475.16	\$ -	\$ -	93	0.0000	0.0004	15.0%	25.0%	Retrofit	Retro12Med	\$	315.62	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Ducting	R-8	Installed	18	\$550.88	\$ -	\$ -	5	0.0004	0.0000	15.0%	50.0%	Retrofit	Retro12Med	\$	2,609.18	DEER	Ameren Missouri Filing	AEQ-BEST	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - Ducting	R-8	Installed	18	\$550.88	\$ -	\$ -	14	0.0004	0.0000	15.0%	50.0%	Retrofit	Retro12Med	\$	2,609.18	DEER	Ameren Missouri Filing	AEQ-BEST	
ID	Residential	Manufactured	Existing	Existing	Heating	Ducting - Repair and Sealin	20% Leakage	Sealed	20	\$636.06	\$ -	\$ -	12	0.0004	0.0000	45.1%	50.0%	Retrofit	Retro12Med	\$	1,322.62	RTF	RTF	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Ducting - Repair and Sealin	20% Leakage	Sealed	20	\$636.06	\$ -	\$ -	29	0.0004	0.0000	45.1%	50.0%	Retrofit	Retro12Med	\$	1,322.62	RTF	RTF	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Building Shell - Infiltration	None	0.1 ACH Reduction	15	\$628.69	\$ 5.41	\$ -	2	0.0003	0.0000	15.1%	75.0%	Retrofit	Retro12Med	\$	601.06	RTF	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Building Shell - Infiltration	None	0.1 ACH Reduction	15	\$628.69	\$ 5.41	\$ -	98	0.0000	0.0004	15.1%	75.0%	Retrofit	Retro12Med	\$	601.06	RTF	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Insulation - High Efficiency	Standard Efficiency	ENERGY STAR	45	\$1,359.97	\$ -	\$ -	19	0.0003	0.0000	24.1%	37.5%	Retrofit	Retro12Med	\$	243.18	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	45	\$1,359.97	\$ -	\$ -	331	0.0000	0.0004	24.1%	37.5%	Retrofit	Retro12Med	\$	243.18	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Windows - Install Reflective	No Film	Film Installed	45	\$1,517.27	\$ -	\$ -	25	0.0003	0.0000	10.0%	37.5%	Retrofit	Retro12Med	\$	632.60	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Windows - Install Reflective	No Film	Film Installed	45	\$1,517.27	\$ -	\$ -	122	0.0000	0.0004	10.1%	37.5%	Retrofit	Retro12Med	\$	632.60	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Doors - Storm and Thermal	R-5 Door	R-5 Door	45	\$815.09	\$ -	\$ -	-	-	-	15.0%	25.0%	Retrofit	Retro12Med	\$	116.76	RTF	RTF	AEQ-BEST	
ID	Residential	Manufactured	Existing	Existing	Heating	Doors - Storm and Thermal	R-5 Door	R-5 Door	45	\$815.09	\$ -	\$ -	11	0.0000	0.0004	15.0%	25.0%	Retrofit	Retro12Med	\$	116.76	RTF	RTF	AEQ-BEST	
ID	Residential	Manufactured	Existing	Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$4,205.71	\$ -	\$ -	38	-	-	15.1%	75.0%	Retrofit	Retro5Med	\$	963.96	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$4,205.71	\$ -	\$ -	407	-	-	15.1%	75.0%	Retrofit	Retro5Med	\$	963.96	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$3,791.06	\$ -	\$ -	15	0.0004	-	60.0%	75.0%	Retrofit	Retro5Med	\$	3,962.76	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$3,791.06	\$ -	\$ -	80	0.0004	-	60.0%	75.0%	Retrofit	Retro5Med	\$	3,962.76	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Space Heating - Heat Recirc	None	Installed	15	\$1,470.45	\$ -	\$ -	(8)	0.0000	0.0000	15.0%	25.0%	Retrofit	Retro12Med	\$	7,885.30	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Space Heating - Heat Recirc	None	Installed	20	\$1,470.45	\$ -	\$ -	18	0.0004	0.0000	15.0%	75.0%	Retrofit	Retro15Low	\$	7,885.30	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	15	\$3,328.64	\$ -	\$ -	-	-	-	5.0%	15.0%	Retrofit	Retro12Med	\$	2,584.82	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	15	\$3,328.64	\$ -	\$ -	127	0.0004	-	5.4%	15.0%	Retrofit	Retro12Med	\$	2,584.82	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Heating	Room AC - Removal of Sec	Unit Removed	Unit Removed	3	\$18.18	\$ -	\$ -	1	0.0000	-	75.0%	0.0%	Retrofit	Retro5Med	\$	62.60	NREL	NREL	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Room AC - Maintenance	Standard Unit	Turned Up Unit	6	\$281.16	\$ -	\$ -	15	0.0004	-	15.1%	75.0%	Retrofit	Retro5Med	\$	3,750.55	PG&E Workpaper	PG&E Workpaper	Illinois TRM	
ID	Residential	Manufactured	Existing	Existing	Heating	Central Heat Pump - Contr	Standard Unit	Property Sized and Installed Unit	15	\$592.87	\$ 12.01	\$ -	0	-	0.0004	15.1%	75.0%	Retrofit	Retro5Med	\$	1,102.15	RTF	RTF	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Central Heat Pump - Contr	Standard Unit	Property Sized and Installed Unit	15	\$592.87	\$ 12.01	\$ -	17	0.0005	-	15.1%	75.0%	Retrofit	Retro5Med	\$	1,102.15	RTF	RTF	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Ceiling Fan - ENERGY STAR	Standard Unit	ENERGY STAR Unit	10	\$95.99	\$ -	\$ -	22	0.0003	0.0000	15.1%	75.0%	Retrofit	Retro5Med	\$	631.58	ENERGY STAR	ENERGY STAR	ENERGY STAR	
ID	Residential	Manufactured	Existing	Existing	Heating	Whole-House Fan - Installa	None	Installed	20	\$726.04	\$ -	\$ -	10	0.0004	0.0000	2.0%	10.0%	Retrofit	Retro12Med	\$	6,350.44	CPUC	CPUC	CPUC	
ID	Residential	Manufactured	Existing	Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	\$ -	11	0.0003	0.0000	5.1%	50.0%	Retrofit	Retro12Med	\$	457.81	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10	\$260.84	\$ -	\$ -	11	0.0003	0.0000	5.1%	50.0%	Retrofit	Retro12Med	\$	457.81	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Drainwater	None	Installed	40	\$851.27	\$ -	\$ -	109	0.0002	0.0002	1.0%	10.0%	Retrofit	Retro15Low	\$	483.88	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Faucet Aer	2.5 GPM Faucet	1.0-1.5 GPM Faucet	15	\$10.43	\$ 30.88	\$ -	132	0.0002	0.0002	15.0%	40.0%	Retrofit	Retro35Low	\$	119.02	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Low Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$36.12	\$ -	\$ -	238	0.0002	0.0002	30.1%	40.0%	Retrofit	Retro12Med	\$	20.96	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Insulated Pipe	R-3.5 Water Heating	R-3.5 Water Heating	10	\$166.99	\$ -	\$ -	68	0.0002	0.0002	15.0%	40.0%	Retrofit	Retro12Med	\$	134.24	RTF	RTF	Med-Atlantic TRM	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Desuperhe	None	Installed	20	\$1,187.80	\$ -	\$ -	688	0.0002	0.0002	0.1%	0.0%	Retrofit	Retro5Med	\$	1,432.24	RTF	RTF	Med-Atlantic TRM	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Temperature	Water Heater - Temperature	Water Heater - Temperature	2	\$5.05	\$ -	\$ -	37	0.0002	0.0002	15.0%	40.0%	Retrofit	Retro12Med	\$	75.74	Illinois TRM	Illinois TRM		
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Thermostat	None	Installed	10	\$21.72	\$ -	\$ -	56	0.0002	0.0002	15.0%	40.0%	Retrofit	Retro12Med	\$	53.64	RTF	RTF	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Solar Syst	Standard Unit	SEF 2.5 Solar Unit	20	\$8,991.09	\$ -	\$ -	540	0.0002	0.0002	5.0%	25.0%	Retrofit	Retro5Med	\$	1,365.56	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Water Heating	Water Heater - Solar Syst	Standard Unit	SEF 2.5 Solar Unit	20	\$8,991.09	\$ -	\$ -	540	0.0002	0.0002	5.0%	25.0%	Retrofit	Retro5Med	\$	1,365.56	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Existing	Interior Lighting	Interior Lighting - Occupan	Manual Controls	Occupancy-Based Controls	8	\$100.95	\$ -	\$ -	55	0.0002	0.0003	17.9%	75.0%	Retrofit	Retro12Med	\$	265.84	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper	
ID	Residential	Manufactured	Existing	Existing	Interior Lighting	Exterior Lighting - Photoc	Manual Controls	Light-Sensing Controls	15	\$50.07	\$ -	\$ -	15	0.0002	0.0003	15.9%	40.0%	Retrofit	Retro12Med	\$	120.96	RTF	RTF	Michigan Energy Measures Datab	
ID	Residential	Manufactured	Existing	Existing	Interior Lighting	Exterior Lighting - Photoc	Manual Controls	Light-Sensing Controls	15	\$50.07	\$ -	\$ -	15	0.0002	0.0003	15.9%	40.0%	Retrofit	Retro12Med	\$	120.96	RTF	RTF	Michigan Energy Measures Datab	
ID	Residential	Manufactured	Existing	Existing	Interior Lighting	Exterior																			

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Gwhr)	Average Annual Savings (kWh/Unit Gwhr)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Residential	Manufactured	Existing	Water Heating	Water Heater - Low-Flow	Water Heater - Low-Flow 5.2 GPM Showerhead	1.5 GPM Showerhead	Installed	10	\$36.12	\$ -	\$ -	353	0.0002	0.0002	30.1%	40.0%	Retiro12Med	\$	14.31	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Water Heating	Water Heater - Pipe Insulation	Uninsulated Pipe	R-3.5 Insulation Installed	Installed	15	\$16.59	\$ -	\$ -	68	0.0002	0.0002	15.0%	40.0%	Retiro12Med	\$	24.44	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Water Heating	Water Heater - Desuperhe	None	Installed	Installed	20	\$1,157.80	\$ -	\$ -	834	0.0002	0.0002	0.1%	0.0%	RetiroEven20	\$	117.54	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Water Heating	Water Heater - Temperature	Water Set at 120°F	None	Installed	2	\$5.05	\$ -	\$ -	42	0.0002	0.0002	15.0%	40.0%	Retiro12Med	\$	60.02	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Water Heating	Water Heater - Thermostat	None	Installed	10	\$21.72	\$ -	\$ -	82	0.0002	0.0002	15.0%	40.0%	Retiro12Med	\$	36.55	RTF	RTF	RTF		
ID	Residential	Manufactured	Existing	Water Heating	Water Heater - Solar Sizing	Standard Electric Unit	SEF 2.5 Solar Unit	Occupancy-Based Controls	20	\$8,991.09	\$ -	\$ -	623	0.0002	0.0002	5.0%	25.0%	RetiroMax60	\$	1,191.42	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Interior Lighting	Interior Lighting - Occupancy	Manual Controls	Occupancy-Based Controls	Implemented	8	\$100.95	\$ -	\$ -	68	0.0002	0.0003	17.6%	75.0%	Retiro12Med	\$	224.00	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Interior Lighting	Interior Lighting - Photo	Manual Controls	Light-Sensing Controls	Implemented	15	\$11.85	\$ -	\$ -	64	0.0002	0.0003	15.9%	40.0%	Retiro12Med	\$	75.46	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Exterior Lighting	Exterior Lighting - Photo	None	Solar-Powered Unit Installed	Implemented	10	\$6.12	\$ -	\$ -	10	0.0002	0.0003	16.6%	60.0%	Retiro12Med	\$	540.85	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Exterior Lighting	Exterior Lighting - TimeClock	Manual Controls	Motion-Sensing Controls	Implemented	10	\$22.23	\$ -	\$ -	10	0.0002	0.0003	15.9%	40.0%	Retiro12Med	\$	254.18	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Appliances	Refrigerator - Decommission	Unit Installed	Unit Removed	Implemented	6	\$230.98	\$ -	\$ -	260	0.0003	0.0003	15.0%	55.0%	Retiro5Med	\$	194.75	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Appliances	Freezer - Decommissioning	Unit Installed	Unit Removed	Implemented	5	\$127.25	\$ -	\$ -	409	0.0003	0.0003	15.0%	55.0%	Retiro5Med	\$	79.88	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Electronics	Advanced Power Strips - TI	Standard Unit	Load Sensing Strip	Implemented	5	\$66.50	\$ -	\$ -	67	0.0003	0.0001	7.5%	37.5%	Retiro35Low	\$	246.44	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Electronics	Advanced Power Strips - TI	Standard Unit	IR or Occupancy Sensing Strip	Implemented	5	\$94.99	\$ -	\$ -	278	0.0003	0.0001	7.5%	37.5%	Retiro35Low	\$	88.50	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	Implemented	10	\$86.76	\$ -	\$ -	10	0.0003	0.0001	0.5%	75.0%	Retiro5Med	\$	76.46	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Miscellaneous	Pool Heater - Solar Water	Standard Electric Unit	Passive Solar Unit	Implemented	20	\$3,842.06	\$ -	\$ -	-	0.0003	0.0001	0.1%	30.0%	Retiro5Med	\$	-	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM	
ID	Residential	Manufactured	Existing	Cooling	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Implemented	45	\$3,062.09	\$ -	\$ -	12	0.0004	0.0002	0.0%	0.0%	RetiroEven20	\$	398.73	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Implemented	45	\$3,062.09	\$ -	\$ -	109	0.0002	0.0002	0.0%	0.0%	RetiroEven20	\$	398.73	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Water Heating	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Implemented	45	\$3,062.09	\$ -	\$ -	267	0.0002	0.0003	0.0%	0.0%	RetiroEven20	\$	398.73	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Interior Lighting	ENERGY STAR Home Desig	Code-Compliant Home Design	ENERGY STAR Home Design	Implemented	45	\$3,062.09	\$ -	\$ -	42	0.0002	0.0003	0.0%	0.0%	RetiroEven20	\$	398.73	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Heating	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Water Heating	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Interior Lighting	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Exterior Lighting	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Appliances	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Electronics	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Miscellaneous	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	-	-	0.0%	3.0%	CustomBehav	\$	-	N/A	N/A	N/A
ID	Residential	Manufactured	Existing	Interior Lighting	Interior Lighting - General	IESA Compliant (17.4 lm/W)	CFL (64.3 lm/W)	Implemented	9	\$2.62	\$ -	\$ -	193	0.0002	0.0003	91.7%	97.0%	LightingPA	\$	(1.79)	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Interior Lighting	Interior Lighting - Exempt	Incandescence (9.3 lm/W)	CFL (61.5 lm/W)	Implemented	7	\$13.04	\$ -	\$ -	42	0.0002	0.0003	60.2%	91.7%	LightingPA	\$	(34.48)	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Insulation - Ceiling Installa	R-0	R-30, R-38, or R-49	Implemented	45	\$723.40	\$ -	\$ -	103	0.0002	0.0001	18.8%	25.0%	Retiro12Med	\$	116.62	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Ceiling Installa	R-0	R-30, R-38, or R-49	Implemented	45	\$723.40	\$ -	\$ -	299	0.0001	0.0002	18.8%	25.0%	Retiro12Med	\$	116.62	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Ceiling Upgrade	R-11	R-30 or R-49	Implemented	25	\$609.14	\$ -	\$ -	17	0.0002	0.0001	12.5%	25.0%	Retiro12Med	\$	1,577.16	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Ceiling Upgrade	R-11	R-30 or R-49	Implemented	25	\$609.14	\$ -	\$ -	12	0.0001	0.0002	12.5%	25.0%	Retiro12Med	\$	1,577.16	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Insulation - Radiant Barrier	None	Installed	15	\$481.83	\$ -	\$ -	81	0.0002	0.0001	15.0%	25.0%	Retiro12Med	\$	1,681.21	RTF	RTF	RTF		
ID	Residential	Manufactured	Existing	Heating	Insulation - Radiant Barrier	None	Installed	15	\$481.83	\$ -	\$ -	281	0.0002	0.0001	15.0%	25.0%	Retiro12Med	\$	1,681.21	RTF	RTF	RTF		
ID	Residential	Manufactured	Existing	Cooling	Insulation - Wall Cavity Ins	R-0	R-11	Implemented	25	\$1,642.63	\$ -	\$ -	26	0.0002	0.0001	25.0%	40.0%	Retiro12Med	\$	261.23	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Heating	Insulation - Wall Cavity Ins	R-0	R-11	Implemented	25	\$1,642.63	\$ -	\$ -	49	0.0001	0.0002	25.0%	40.0%	Retiro12Med	\$	261.23	7th Plan	7th Plan	7th Plan	
ID	Residential	Manufactured	Existing	Cooling	Insulation - Wall Sheathing	None	Install R-5 Rigid	Implemented	20	\$1,361.39	\$ -	\$ -	15	0.0002	0.0001	17.5%	40.0%	Retiro12Med	\$	1,043.70	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Insulation - Floor Installa	R-0	R-22 or R-30	Implemented	25	\$516.29	\$ -	\$ -	(8)	0.0002	0.0001	7.5%	12.5%	Retiro12Med	\$	742.72	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Floor Installa	R-0	R-22 or R-30	Implemented	25	\$516.29	\$ -	\$ -	62	0.0001	0.0002	7.5%	12.5%	Retiro12Med	\$	742.72	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Insulation - Floor Upgrade	R-11	R-22	Implemented	25	\$479.14	\$ -	\$ -	(4)	0.0002	0.0001	7.5%	12.5%	Retiro12Med	\$	390.33	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Floor Upgrade	R-11	R-22	Implemented	25	\$479.14	\$ -	\$ -	100	0.0002	0.0001	7.5%	12.5%	Retiro12Med	\$	390.33	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Insulation - Foundation	R-0	R-10	Implemented	70	\$741.92	\$ -	\$ -	(9)	0.0002	0.0001	15.0%	25.0%	Retiro12Med	\$	556.09	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Foundation	R-0	R-10	Implemented	70	\$741.92	\$ -	\$ -	88	0.0001	0.0002	15.0%	25.0%	Retiro12Med	\$	556.09	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Ducting	R-8	R-8	Implemented	18	\$550.88	\$ -	\$ -	25	0.0003	0.0002	15.0%	25.0%	Retiro12Med	\$	931.66	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Insulation - Ducting	R-8	R-8	Implemented	18	\$550.88	\$ -	\$ -	25	0.0003	0.0002	15.0%	50.0%	Retiro12Med	\$	931.66	DEER	AMerem Missouri Filng	AMerem Missouri Filng	
ID	Residential	Manufactured	Existing	Cooling	Ducting - Repair and Seal	20% Leakage	Sealed	Implemented	18	\$483.74	\$ -	\$ -	103	0.0002	0.0001	45.1%	50.0%	Retiro12Med	\$	226.17	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Ducting - Repair and Seal	20% Leakage	Sealed	Implemented	18	\$483.74	\$ -	\$ -	101	0.0003	0.0001	45.1%	50.0%	Retiro12Med	\$	226.17	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Building Shell - Infiltration	0.1 ACH Reduction	0.1 ACH Reduction	Implemented	15	\$4,605.72	\$ 8.44	\$ -	4	0.0002	0.0002	15.1%	75.0%	Retiro12Med	\$	6,645.38	RTF	RTF	7th Plan	
ID	Residential	Manufactured	Existing	Heating	Building Shell - Infiltration	None	0.1 ACH Reduction	Implemented	15	\$4,605.72	\$ 8.44	\$ -	64	0.0002	0.0002	15.1%	75.0%	Retiro12Med	\$	6,645.38	RTF	RTF	7th Plan	
ID	Residential	Manufactured	Existing	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	Implemented	25	\$2,183.00	\$ -	\$ -	71	0.0002	0.0001	24.1%	37.5%	Retiro12Med	\$	506.96	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	Implemented	25	\$2,183.00	\$ -	\$ -	64	0.0002	0.0001	24.1%	37.5%	Retiro12Med	\$	506.96	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Windows - Install Reflect	No Film	Film Installed	Implemented	25	\$2,692.40	\$ -	\$ -	53	0.0002	0.0001	10.0%	37.5%	Retiro12Med	\$	1,262.91	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Heating	Windows - Install Reflect	No Film	Film Installed	Implemented	25	\$2,692.40	\$ -	\$ -	109	0.0001	0.0002	10.1%	37.5%	Retiro12Med	\$	1,262.91	RTF	RTF	RTF	
ID	Residential	Manufactured	Existing	Cooling	Doors - Storm and Thermal	R-2 Door	R-5																	

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Ramp Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
ID	Residential	Low Income - E	Existing	Cooling	Insulation - Floor Upgrade	R-11	R-22	25 \$671.18	\$ -	-	-	(2)	0.0003	-	-	7.5%	12.5%	Retrol2Med	\$ 249.27	RTF	AEQ Research	RTF	
ID	Residential	Low Income - E	Existing	Heating	Insulation - Floor Upgrade	R-11	R-22	25 \$671.18	\$ -	-	-	(2)	0.0003	-	0.0003	-	7.5%	12.5%	Retrol2Med	\$ 249.27	RTF	AEQ Research	RTF
ID	Residential	Low Income - E	Existing	Heating	Insulation - Foundation	R-10	R-10	70 \$957.61	\$ -	-	-	(5)	0.0003	-	-	15.0%	10.0%	Retrol2Med	\$ 307.26	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	Insulation - Foundation	R-0	R-0	70 \$957.61	\$ -	-	-	(5)	0.0003	-	-	15.0%	10.0%	Retrol2Med	\$ 307.26	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Cooling	Insulation - Ducting	R-4	R-8	18 \$550.88	\$ -	-	-	12	0.0005	-	-	15.0%	50.0%	Retrol2Med	\$ 346.85	DEER	Ameren Missouri Filing	AEQ-BEST	
ID	Residential	Low Income - E	Existing	Heating	Insulation - Ducting	R-4	R-8	18 \$550.88	\$ -	-	-	12	0.0005	-	0.0003	-	15.0%	50.0%	Retrol2Med	\$ 346.85	DEER	Ameren Missouri Filing	AEQ-BEST
ID	Residential	Low Income - E	Existing	Cooling	Ducting - Repair and Seal	20% Leakage	Sealed	20 \$636.06	\$ -	-	-	14	0.0005	-	-	15.1%	50.0%	Retrol2Med	\$ 169.39	RTF	RTF	7th Plan	
ID	Residential	Low Income - E	Existing	Cooling	Ducting - Repair and Seal	20% Leakage	Sealed	20 \$636.06	\$ -	-	-	14	0.0005	0.0003	-	15.1%	50.0%	Retrol2Med	\$ 169.39	RTF	RTF	7th Plan	
ID	Residential	Low Income - E	Existing	Cooling	Building Shell - Infiltration	None	0.1 ACH Reduction	15 \$1,267.03	\$ 10.90	-	-	2	0.0003	-	-	15.0%	75.0%	Retrol2Med	\$ 602.13	RTF	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Heating	Building Shell - Infiltration	None	0.1 ACH Reduction	15 \$1,267.03	\$ 10.90	-	-	2	0.0003	-	-	15.0%	75.0%	Retrol2Med	\$ 602.13	RTF	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Cooling	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	45 \$3,249.66	\$ -	-	-	190	0.0003	-	-	23.8%	37.5%	Retrol2Med	\$ 293.40	RTF	RTF	7th Plan	
ID	Residential	Low Income - E	Existing	Heating	Windows - High Efficiency	Standard Efficiency	ENERGY STAR	45 \$3,249.66	\$ -	-	-	190	0.0003	-	-	23.8%	37.5%	Retrol2Med	\$ 293.40	RTF	RTF	7th Plan	
ID	Residential	Low Income - E	Existing	Cooling	Windows - Install Reflective	None	Film Installed	45 \$3,827.96	\$ -	-	-	29	0.0003	-	-	10.0%	37.5%	Retrol2Med	\$ 848.02	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	Windows - Install Reflective	None	Film Installed	45 \$3,827.96	\$ -	-	-	24	0.0003	-	-	10.0%	37.5%	Retrol2Med	\$ 848.02	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	Doors - Storm and Thermal	R-5 Door	R-5 Door	45 \$738.51	\$ -	-	-	2	0.0003	-	-	15.0%	25.0%	Retrol2Med	\$ 23.10	RTF	RTF	AEQ-BEST	
ID	Residential	Low Income - E	Existing	Heating	Doors - Storm and Thermal	R-5 Door	R-5 Door	45 \$738.51	\$ -	-	-	2	0.0003	-	0.0003	-	15.0%	25.0%	Retrol2Med	\$ 23.10	RTF	RTF	AEQ-BEST
ID	Residential	Low Income - E	Existing	Cooling	Ductless Mini Split Heat Pu	None	Installed	15 \$4,205.71	\$ -	-	-	48	-	-	-	15.0%	75.0%	Retrol5Med	\$ 730.17	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	15 \$4,205.71	\$ -	-	-	509	-	-	-	15.0%	75.0%	Retrol5Med	\$ 730.17	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Cooling	Ductless Mini Split Heat Pu	None	Installed	15 \$3,791.06	\$ -	-	-	17	0.0005	-	-	60.0%	75.0%	Retrol5Med	\$ 373.04	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	15 \$3,791.06	\$ -	-	-	999	-	-	-	60.0%	75.0%	Retrol5Med	\$ 373.04	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Cooling	Space Heating - Heat Recov	None	Installed	20 \$1,470.45	\$ -	-	-	(3)	0.0005	-	-	15.0%	75.0%	Retrol5Low	\$ 648.61	7th Plan	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Heating	Space Heating - Heat Recov	None	Installed	20 \$1,470.45	\$ -	-	-	190	-	-	-	15.0%	75.0%	Retrol5Low	\$ 648.61	7th Plan	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Cooling	Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	15 \$3,328.64	\$ -	-	-	-	-	-	-	5.0%	15.0%	Retrol2Med	\$ 210.39	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	Furnace - Conversion to All	Central Forced Air Furnace	Central Air-Source Heat Pump	15 \$3,328.64	\$ -	-	-	1,681	-	0.0003	-	5.1%	15.0%	Retrol2Med	\$ 210.39	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Cooling	Room AC - Removal of Seal	Unit Installed	Unit Removed	3 \$38.18	\$ -	-	-	324	-	-	-	75.0%	75.0%	Retrol5Med	\$ 23.12	DEER	NREL	DEER	
ID	Residential	Low Income - E	Existing	Cooling	Central AC - Maintenance	Standard Unit	Tuned Up Unit	6 \$281.16	\$ -	-	-	2	0.0005	-	-	15.0%	75.0%	Retrol5Med	\$ 169.98	PG&E Workpaper	PG&E Workpaper	Illinois TRM	
ID	Residential	Low Income - E	Existing	Cooling	Central Heat Pump - Contr	Standard Unit	Property Sized and Installed Unit	15 \$592.87	\$ 12.01	-	-	0	0.0005	-	-	15.0%	75.0%	Retrol5Med	\$ 363.67	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	Central Heat Pump - Contr	Standard Unit	Property Sized and Installed Unit	15 \$592.87	\$ 12.01	-	-	133	-	0.0003	-	15.0%	75.0%	Retrol5Med	\$ 363.67	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Cooling	ENERGY STAR Unit	Standard Unit	ENERGY STAR Unit	10 \$95.99	\$ -	-	-	5	0.0003	-	-	15.0%	75.0%	Retrol5Med	\$ 2,348.73	ENERGY STAR	ENERGY STAR	ENERGY STAR	
ID	Residential	Low Income - E	Existing	Cooling	Whole-House Fan - Installa	None	Installed	20 \$726.04	\$ -	-	-	10	0.0005	-	-	15.0%	40.0%	Retrol2Med	\$ 5,796.17	CPUC	CPUC	CPUC	
ID	Residential	Low Income - E	Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10 \$260.84	\$ -	-	-	12	0.0003	-	-	5.0%	75.0%	Retrol5Med	\$ 239.62	7th Plan	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	10 \$260.84	\$ -	-	-	136	-	0.0003	-	5.0%	75.0%	Retrol5Med	\$ 239.62	7th Plan	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Drainwater	None	Installed	40 \$851.27	\$ -	-	-	114	0.0002	-	-	1.0%	10.0%	Retrol5Low	\$ 454.69	7th Plan	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Faucet Aerat	1.0-1.5 GPM Faucet	1.0-1.5 GPM Faucet	15 \$10.43	\$ 43.74	-	-	169	0.0002	0.0002	-	15.0%	40.0%	Retrol35Low	\$ 126.65	7th Plan	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Low-Flow S	2.2 GPM Showerhead	1.5 GPM Showerhead	10 \$49.74	\$ -	-	-	197	0.0002	-	-	40.0%	40.0%	Retrol2Med	\$ 34.72	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Insulated Pipe	R-3.5 Insulation Installed	R-3.5 Insulation Installed	15 \$16.59	\$ -	-	-	15	0.0002	-	-	30.0%	40.0%	Retrol2Med	\$ 15.06	Mid-Atlantic TRM	Mid-Atlantic TRM	Mid-Atlantic TRM	
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Desuperhe	None	Installed	10 \$115.78	\$ -	-	-	772	0.0002	0.0002	0.1%	0.0%	Retrol5Even20	\$ 127.01	RTF	RTF	RTF		
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Temperatur	Water Set at 135°F	Water Set at 120°F	2 \$5.05	\$ -	-	-	39	0.0002	0.0002	-	15.0%	40.0%	Retrol2Med	\$ 73.26	Illinois TRM	Illinois TRM	Illinois TRM	
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Thermostat	None	Installed	10 \$29.91	\$ -	-	-	46	0.0002	0.0002	-	15.0%	40.0%	Retrol2Med	\$ 8.81	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Water Heating	Water Heater - Solar Syst	Standard Electric Unit	SEF 2.5 Solar Unit	20 \$8,991.09	\$ -	-	-	8	0.0002	-	-	5.0%	75.0%	Retrol5Med	\$ 360.05	7th Plan	7th Plan	7th Plan	
ID	Residential	Low Income - E	Existing	Interior Lighting	Interior Lighting - Occupan	Manual Controls	Occupancy-Based Controls	8 \$100.95	\$ -	-	-	61	0.0002	0.0003	-	15.0%	75.0%	Retrol2Med	\$ 238.58	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper	
ID	Residential	Low Income - E	Existing	Interior Lighting	Interior Lighting - Occupan	Light-Sensing Controls	Light-Sensing Controls	15 \$3.49	\$ -	-	-	4	0.0002	0.0003	-	15.0%	40.0%	Retrol2Med	\$ 77.99	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Michigan Energy Measures Datab	
ID	Residential	Low Income - E	Existing	Interior Lighting	Interior Lighting - Photovo	None	Solar-Powered Unit Installed	10 \$4.75	\$ -	-	-	3	0.0002	0.0003	-	15.0%	60.0%	Retrol2Med	\$ 545.89	AEQ Research	AEQ Research	AEQ Research	
ID	Residential	Low Income - E	Existing	Interior Lighting	Interior Lighting - Timecon	Manual Controls	Time-Sensing Controls	10 \$26.55	\$ -	-	-	3	0.0002	0.0003	-	15.0%	60.0%	Retrol2Med	\$ 262.70	PG&E Power TRM	PG&E Power TRM	PG&E Power TRM	
ID	Residential	Low Income - E	Existing	Appliances	Refrigerator - Decommissi	Unit Installed	Unit Removed	6 \$230.98	\$ -	-	-	214	0.0003	0.0001	-	55.0%	55.0%	Retrol5Med	\$ 235.31	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Appliances	Freezer - Decommissioning	Unit Installed	Unit Removed	5 \$127.25	\$ -	-	-	334	0.0003	0.0001	-	55.0%	55.0%	Retrol5Med	\$ 98.52	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Electronics	Load Sensing Strip - Trips	Standard Unit	Load Sensing Strip	10 \$66.50	\$ -	-	-	49	0.0002	0.0002	-	7.5%	37.5%	Retrol5Med	\$ 341.98	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Electronics	Advanced Power Strips - Tri	Standard Unit	IR or Occupancy Sensing Str	5 \$99.99	\$ -	-	-	197	0.0002	0.0001	-	7.5%	37.5%	Retrol35Low	\$ 125.76	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	10 \$86.76	\$ -	-	-	682	0.0002	0.0001	-	0.5%	75.0%	Retrol5Med	\$ 18.85	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM	
ID	Residential	Low Income - E	Existing	Miscellaneous	Pool Heater - Solar Water	Standard Electric Unit	Passive Solar Unit	20 \$3,842.06	\$ -	-	-	2,889	0.0002	0.0001	-	0.1%	30.0%	Retrol5Med	\$ 147.57	AEQ	AEQ	AEQ	
ID	Residential	Low Income - E	Existing	Cooling	ENERGY STAR Home Desig	ENERGY STAR Home Design	ENERGY STAR Home Design	15 \$3,062.09	\$ -	-	-	61	0.0003	-	-	0.0%	0.0%	Retrol5Even20	\$ 486.83	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Heating	ENERGY STAR Home Desig	ENERGY STAR Home Design	ENERGY STAR Home Design	15 \$3,062.09	\$ -	-	-	61	0.0003	-	-	0.0%	0.0%	Retrol5Even20	\$ 486.83	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Water Heating	ENERGY STAR Home Desig	ENERGY STAR Home Design	ENERGY STAR Home Design	45 \$3,062.09	\$ -	-	-	247	0.0002	0.0002	0.0%	0.0%	Retrol5Even20	\$ 486.83	RTF	RTF	RTF		
ID	Residential	Low Income - E	Existing	Water Heating	ENERGY STAR Home Desig	ENERGY STAR Home Design	ENERGY STAR Home Design	45 \$3,062.09	\$ -	-	-	37	0.0002	0.0003	-	0.0%	0.0%	Retrol5Even20	\$ 486.83	RTF	RTF	RTF	
ID	Residential	Low Income - E	Existing	Cooling	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	-	-	0.0%	3.0%	Retrol5Med	\$ N/A	N/A	N/A	N/A	
ID	Residential	Low Income - E	Existing	Heating	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-	-	-	-	-	0.0%	3.0%	Retrol5Med	\$ N/A	N/A	N/A	N/A	
ID	Residential	Low Income - E	Existing	Water Heating	Behavioral Programs	No Program	Implemented	1 \$100.00	\$ -	-	-</												

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Year)	Average Annual Savings (\$/Year)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
19	ID	Residential	Low Income - IE New	Exterior Lighting	Photovoltaic	Exterior Lighting - Photovoltaic	None	Solar Powered Unit Installed	3	\$5.40	\$ -	\$ -	3	0.0002	0.0003	15.0%	60.0%	Retrol2Med	\$	597.44	AEG Research	AEG Research	AEG Research	
19	ID	Residential	Low Income - IE New	Exterior Lighting	Timeclock	Exterior Lighting - Timeclock	Manual Controls	Motion-Sensing Controls	10	\$7.44	\$ -	\$ -	3	0.0002	0.0003	15.0%	40.0%	Retrol2Med	\$	292.20	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM	
19	ID	Residential	Low Income - IE New	Appliances	Refrigerator - Decommissioning	Refrigerator - Decommissioning	Unit Installed	Unit Removed	6	\$230.98	\$ -	\$ -	205	0.0002	0.0003	15.0%	55.0%	Retrol5Med	\$	245.28	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Appliances	Decommissioning	Refrigerator - Decommissioning	Unit Installed	Unit Removed	6	\$227.25	\$ -	\$ -	207	0.0002	0.0003	15.0%	55.0%	Retrol5Med	\$	245.28	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Electronics	Advanced Power Strips - TI	Advanced Power Strips - TI	Standard Unit	Load Sensing Strip	5	\$66.50	\$ -	\$ -	58	0.0002	0.0001	7.5%	37.5%	Retrol35Low	\$	295.89	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Electronics	Advanced Power Strips - TI	Advanced Power Strips - TI	Standard Unit	IR or Occupancy Sensing Strip	5	\$94.99	\$ -	\$ -	227	0.0002	0.0001	7.5%	37.5%	Retrol35Low	\$	108.81	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Miscellaneous	Pool Pump - Timer	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	674	0.0002	0.0001	0.5%	75.0%	Retrol5Med	\$	19.08	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM	
19	ID	Residential	Low Income - IE New	Miscellaneous	Pool Heater - Solar Water	Pool Heater - Solar Water	Standard Electric Unit	Standard Electric Unit	20	\$3,842.06	\$ -	\$ -	2,334	0.0002	0.0001	0.1%	90.0%	Retrol5Med	\$	151.10	N/A	N/A	N/A	
19	ID	Residential	Low Income - IE New	Heating	ENERGY STAR Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	Code-Compliant Home Design	45	\$3,062.09	\$ -	\$ -	13	0.0004	0.0002	15.0%	60.0%	Retrolven20	\$	541.31	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Heating	ENERGY STAR Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	Code-Compliant Home Design	45	\$3,062.09	\$ -	\$ -	41	0.0002	0.0002	15.0%	60.0%	Retrolven20	\$	541.31	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Water Heating	ENERGY STAR Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	Code-Compliant Home Design	25	\$3,062.09	\$ -	\$ -	36	0.0002	0.0002	15.0%	60.0%	Retrolven20	\$	541.31	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Water Heating	ENERGY STAR Home Design	ENERGY STAR Home Design	Code-Compliant Home Design	Code-Compliant Home Design	45	\$3,062.09	\$ -	\$ -	32	0.0002	0.0002	15.0%	60.0%	Retrolven20	\$	541.31	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Cooling	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Heating	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Water Heating	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Interior Lighting	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Exterior Lighting	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Appliances	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Electronics	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Miscellaneous	Behavioral Programs	Behavioral Programs	No Program	Implemented	1	\$10.00	\$ -	\$ -	-	-	-	0.0%	3.0%	Retrol	\$	N/A	N/A	N/A		
19	ID	Residential	Low Income - IE New	Interior Lighting	General	Interior Lighting - General	EISA Compliant (17.4 lm/W)	EISA Compliant (17.4 lm/W)	9	\$2.79	\$ -	\$ -	181	0.0002	0.0003	27.5%	94.5%	Retrol	\$	(1.31)	RTF	RTF	RTF	
19	ID	Residential	Low Income - IE New	Interior Lighting	General	Interior Lighting - General	EISA Compliant (17.4 lm/W)	EISA Compliant (17.4 lm/W)	17	\$6.81	\$ -	\$ -	27	0.0002	0.0003	27.5%	94.5%	Retrol	\$	(2.62)	RTF	RTF	RTF	
19	WA	Commercial	Small Office - V Existing	Cooling	Air-Cooled Chiller	Air-Cooled Chiller	COP 4.0 (EER 15.0)	COP 4.0 (EER 15.0)	20	\$320,820.59	\$ -	\$ -	442,560	0.0002	0.0002	0.5%	at Turnover	Low Opportunity	L020Fatt	\$	66.72	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Cooling	Water-Cooled Chiller	Water-Cooled Chiller	COP 5.78 (EER 19.7)	COP 5.78 (EER 19.7)	25	\$153,993.88	\$ -	\$ -	326,996	0.0008	0.0008	0.0%	at Turnover	Low Opportunity	L020Fatt	\$	184.38	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Cooling	RTU	RTU	EER 11.2	EER 11.2	15	\$54,753.38	\$ -	\$ -	32,696	0.0008	0.0008	74.3%	at Turnover	Low Opportunity	L020Fatt	\$	99.50	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Cooling	Room AC	Room AC	EER 11.0 (COP 3.3)	EER 11.0 (COP 3.3)	10	\$35,198.28	\$ -	\$ -	4,008	0.0008	0.0008	2.7%	at Turnover	Low Opportunity	L020Fatt	\$	49.50	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Heating	Air-Source Heat Pump	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 11.0 (COP 3.3)	15	\$263,500.65	\$ -	\$ -	103,182	0.0008	0.0008	9.1%	at Turnover	Low Opportunity	L020Fatt	\$	181.94	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Heating	Air-Source Heat Pump	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 11.0 (COP 3.3)	15	\$263,500.65	\$ -	\$ -	56,275	0.0006	0.0006	9.1%	at Turnover	Low Opportunity	L020Fatt	\$	181.94	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Heating	Geothermal Heat Pump	Geothermal Heat Pump	EER 20.6 (COP 4.0)	EER 20.6 (COP 4.0)	25	\$320,820.59	\$ -	\$ -	79,374	0.0008	0.0008	3.6%	at Turnover	Low Opportunity	L020Fatt	\$	134.10	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Heating	Geothermal Heat Pump	Geothermal Heat Pump	EER 20.6 (COP 4.0)	EER 20.6 (COP 4.0)	25	\$320,820.59	\$ -	\$ -	119,943	0.0006	0.0006	3.6%	at Turnover	Low Opportunity	L020Fatt	\$	134.10	AEO 2015	AEO 2015	AEO 2015
19	WA	Commercial	Small Office - V Existing	Heating	Electric Furnace	Electric Furnace	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0006	0.0006	1.6%	at Turnover	Low Opportunity	L021Med	\$	-	AEO 2015	AEO 2015	AEG-BEST
19	WA	Commercial	Small Office - V Existing	Heating	Electric Furnace	Electric Furnace	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0006	0.0006	31.0%	at Turnover	Low Opportunity	L021Med	\$	-	EIA 2014	EIA 2014	AEG-BEST
19	WA	Commercial	Small Office - V Existing	Water Heating	Water Heater	Water Heater	Variable Air Volume	Variable Air Volume	20	\$59,015.43	\$ -	\$ -	169,013	0.0001	0.0001	100.0%	at Turnover	Low Opportunity	L021Med	\$	32.14	AEO 2015	AEO 2015	AEG Research
19	WA	Commercial	Small Office - V Existing	Water Heating	Water Heater	Water Heater	Resistance Heater, Standard Sandby Wattage	Resistance Heater, Standard Sandby Wattage	13	\$6,961.47	\$ -	\$ -	20,558	0.0002	0.0002	46.4%	at Turnover	Low Opportunity	L021Med	\$	41.13	RTF	RTF	RTF
19	WA	Commercial	Small Office - V Existing	Interior Lighting	Screen-In	Screen-In	LED 2017 (16.6 lm/W)	LED 2017 (16.6 lm/W)	8	\$5,447.17	\$ 853.54	\$ -	6,1018	0.0002	0.0003	100.0%	at Turnover	Low Opportunity	L020Fatt	\$	2.80	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Interior Lighting	Area Lighting	Area Lighting	F18 - F32 Standard (89.0 lm/W in W system)	LED 2017 (110.0 lm/W system)	17	\$274,380.06	\$ 7,276.24	\$ -	322,536	0.0002	0.0003	100.0%	at Turnover	Low Opportunity	L020Fatt	\$	50.11	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Interior Lighting	High Bay Fixtures	High Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (86.4 lm/W)	15	\$15,066.05	\$ -	\$ -	44,454	0.0002	0.0003	100.0%	at Turnover	Low Opportunity	L020Fatt	\$	36.09	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Exterior Lighting	Screen-In	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)	8	\$1,474.34	\$ 231.02	\$ -	25,728	0.0001	0.0001	100.0%	at Turnover	Low Opportunity	L020Fatt	\$	1.77	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Exterior Lighting	Linear Lighting	Linear Lighting	F18 - F32 Standard (89.0 lm/W in W system)	LED 2017 (110.0 lm/W system)	17	\$15,778.01	\$ 496.59	\$ -	36,405	0.0001	0.0001	100.0%	at Turnover	Low Opportunity	L020Fatt	\$	30.30	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Exterior Lighting	Area Lighting	Area Lighting	Metal Halide (44.3 lm/W)	LED 2017 (86.4 lm/W)	15	\$9,251.90	\$ 3,482.89	\$ -	121,787	0.0001	0.0001	100.0%	at Turnover	Low Opportunity	L020Fatt	\$	(21.79)	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Refrigeration	Walk-In Refrigerator/Freezer	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	11	\$0.00	\$ -	\$ -	-	0.0002	0.0002	0.0%	at Turnover	Low Opportunity	L05Med	\$	-	EIA 2011	EIA 2011	
19	WA	Commercial	Small Office - V Existing	Refrigeration	Reach-In Refrigerator/Freezer	Reach-In Refrigerator/Freezer	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	73,507	0.0002	0.0002	1.6%	at Turnover	Low Opportunity	L05Med	\$	-	RTF	RTF	
19	WA	Commercial	Small Office - V Existing	Refrigeration	Glass Door Display	Glass Door Display	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	79,441	0.0002	0.0002	0.5%	at Turnover	Low Opportunity	L05Med	\$	-	RTF	EIA 2011	
19	WA	Commercial	Small Office - V Existing	Refrigeration	Refrigerator Case	Refrigerator Case	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	84,969	0.0002	0.0002	0.5%	at Turnover	Low Opportunity	L05Med	\$	-	EIA 2011	EIA 2011	
19	WA	Commercial	Small Office - V Existing	Refrigeration	Kemarker	Kemarker	Current Standard	ENERGY STAR	9	\$90,501.44	\$ -	\$ -	33,378	0.0002	0.0002	0.5%	at Turnover	Low Opportunity	L05Med	\$	426.66	EIA 2011	Illinois TRM	
19	WA	Commercial	Small Office - V Existing	Refrigeration	Walking Machine	Walking Machine	Standard	ENERGY STAR	10	\$3,640.42	\$ -	\$ -	6,355	0.0002	0.0002	0.2%	at Turnover	Low Opportunity	L05Med	\$	84.44	EIA 2011	EIA 2011	
19	WA	Commercial	Small Office - V Existing	Food Preparation	Dishwasher	Dishwasher	Standard	ENERGY STAR	10	\$28,527.88	\$ 6,701.89	\$ -	267,686	0.0001	0.0001	2.7%	at Turnover	Low Opportunity	L05Med	\$	(12.20)	RTF	RTF	
19	WA	Commercial	Small Office - V Existing	Food Preparation	Fryer	Fryer	Standard	ENERGY STAR	8	\$37,396.30	\$ -	\$ -	6,375	0.0001	0.0002	0.0%	at Turnover	Low Opportunity	L05Med	\$	-	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Food Preparation	Dishwasher	Dishwasher	Standard	ENERGY STAR	15	\$48,337.00	\$ 21,982.25	\$ -	-	0.0001	0.0002	0.0%	at Turnover	Low Opportunity	L05Med	\$	-	Illinois TRM	Illinois TRM	
19	WA	Commercial	Small Office - V Existing	Food Preparation	Hot Food Container	Hot Food Container	Standard	ENERGY STAR	20	\$303,039.84	\$ -	\$ -	-	0.0001	0.0002	0.0%	at Turnover	Low Opportunity	L05Med	\$	-	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Food Preparation	Stove	Stove	Standard	ENERGY STAR	9	\$32,652.28	\$ 107,436.73	\$ -	-	0.0001	0.0002	0.0%	at Turnover	Low Opportunity	L05Med	\$	-	7th Plan	7th Plan	
19	WA	Commercial	Small Office - V Existing	Office Equipment	Desktop Computer	Desktop Computer	Standard	ENERGY STAR	5	\$23.17	\$ -	\$ -	266,032	0.0001	0.0002	100.0%	at Turnover	Low Opportunity	L05Fatt	\$	0.02	7th Plan	7th Plan	

Measure					Assumptions in First Year (2015)															Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	Commercial	Large Office - V Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	11	50.00	\$	-	-	106,013	0.002	0.002	2.0%	At Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
WA	Commercial	Large Office - V Existing	Refrigeration	Reach-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	10	50.00	\$	-	-	41,009	0.002	0.002	4.0%	At Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011
WA	Commercial	Large Office - V Existing	Refrigeration	Glass Door Display Case	Current Standard	Standard 2017	Standard 2017	10	50.00	\$	-	-	42,288	0.002	0.002	14.0%	At Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011
WA	Commercial	Large Office - V Existing	Refrigeration	Refrigerator	Current Standard	Standard 2017	Standard 2017	10	50.00	\$	-	-	47,404	0.002	0.002	4.0%	At Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011
WA	Commercial	Large Office - V Existing	Refrigeration	Ice Maker	Current Standard	ENERGY STAR	ENERGY STAR	9	550,490.9	\$	-	-	18,623	0.002	0.002	4.0%	At Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR
WA	Commercial	Large Office - V Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	ENERGY STAR	10	52,030.96	\$	-	-	3,546	0.002	0.002	2.1%	At Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011	
WA	Commercial	Large Office - V Existing	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	58,922.24	\$	2,805.17	-	112,044	0.002	0.003	10.0%	At Turnover	Lost Opportunity	LO5Med	\$	(12.20)	RTF	RTF	
WA	Commercial	Large Office - V Existing	Food Preparation	Food Preparation Server	Standard	ENERGY STAR	ENERGY STAR	8	515,615.76	\$	-	-	45,195	0.002	0.003	1.0%	At Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Food Preparation	Bidhwasher	Standard	ENERGY STAR	ENERGY STAR	15	520,232.14	\$	9,200.99	-	44,563	0.002	0.003	12.0%	At Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM	
WA	Commercial	Large Office - V Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	ENERGY STAR	20	5126,841.67	\$	-	-	109,718	0.002	0.003	1.0%	At Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	995,667.08	\$	44,969.18	-	995,564	0.001	0.002	1.0%	At Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	ENERGY STAR	5	526.47	\$	-	-	303,923	0.001	0.002	100.0%	At Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Office Equipment	Laptop	Standard	ENERGY STAR	ENERGY STAR	4	512.92	\$	-	-	44,275	0.001	0.002	100.0%	At Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	5	516.68	\$	-	-	47,534	0.001	0.002	100.0%	At Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	9	512,808	\$	-	-	85,808	0.001	0.002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	514.6	\$	-	-	30,173	0.001	0.002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	
WA	Commercial	Large Office - V Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	50.29	\$	-	-	3,363	0.002	0.002	57.6%	At Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	
WA	Commercial	Large Office - V Existing	Miscellaneous	Non-HVAC Motors	Standard	Standard (NEMA Premium)	Standard (NEMA Premium)	15	50.00	\$	-	-	-	0.002	0.002	89.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	
WA	Commercial	Large Office - V Existing	Miscellaneous	Variable Speed	Standard	ENERGY STAR	ENERGY STAR	10	5303.22	\$	-	-	-	0.002	0.002	0.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	EEER	EEER	
WA	Commercial	Large Office - V Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	Electric Resistance	15	5643.81	\$	-	-	-	0.002	0.002	0.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	AEG Research	AEG Research	
WA	Commercial	Large Office - V Existing	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	50.00	\$	-	-	-	0.002	0.002	100.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	
WA	Commercial	Large Office - V Existing	Miscellaneous	Water Heating	Standard	NEA Tier 1 Heat Pump (EF 2.0)	NEA Tier 1 Heat Pump (EF 2.0)	20	53,158.15	\$	-	-	1,617	0.002	0.002	100.0%	At Turnover	Lost Opportunity	LO2Fast	\$	153.85	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Water-Cooled Chiller	Standard	COP 5.78 (EER 19.7)	COP 10.66 (EER 36.4)	25	515,993.88	\$	-	-	49,480	0.002	0.001	10.6%	At Turnover	Lost Opportunity	LO2Fast	\$	27.97	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	RTU	Standard	EER 11.2	EER 11.7	15	554,753.38	\$	-	-	31,694	0.002	0.001	25.6%	At Turnover	Lost Opportunity	LO2Fast	\$	190.21	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Room AC	Standard	EER 11.0	EER 11.0	10	535,198.60	\$	-	-	51,594	0.002	0.001	5.9%	At Turnover	Lost Opportunity	LO2Fast	\$	100.57	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Air-Source Heat Pump	Standard	EER 12 (COP 3.3)	EER 12 (COP 3.4)	10	526,500.65	\$	-	-	42,204	0.002	0.001	9.2%	At Turnover	Lost Opportunity	LO2Fast	\$	201.89	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	EER 12 (COP 3.3)	EER 12 (COP 3.4)	10	526,500.65	\$	-	-	42,204	0.002	0.004	9.2%	At Turnover	Lost Opportunity	LO2Fast	\$	201.89	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	EER 14.0 (COP 3.5)	EER 20.6 (COP 3.5)	25	530,820.59	\$	-	-	236,107	0.000	0.001	7.9%	At Turnover	Lost Opportunity	LO2Fast	\$	56.28	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	EER 20.6 (COP 3.5)	EER 20.6 (COP 3.5)	25	530,820.59	\$	-	-	215,675	0.000	0.001	7.4%	At Turnover	Lost Opportunity	LO2Fast	\$	56.28	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18	50.00	\$	-	-	-	0.000	0.004	1.6%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Commercial	Large Office - V Existing	Miscellaneous	Heating	Standard	Standard	Standard	18																

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Annual Savings (\$/kW/yr)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Reach-In Refrigerator/Freezer	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	3,185	0.0002	0.0002	7.2%	At Turnover	Lost Opportunity	LO5Med	\$ -	RTF	EIA 2011	EIA 2011	
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Glass Door Display Case	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	1,634	0.0002	0.0002	79.8%	At Turnover	Lost Opportunity	LO5Med	\$ -	RTF	EIA 2011	EIA 2011	
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Open Display Case	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	1,841	0.0002	0.0002	26.7%	At Turnover	Lost Opportunity	LO5Med	\$ -	EIA 2011	EIA 2011	EIA 2011	
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	10	\$1,900.00	\$ -	\$ -	723	0.0002	0.0002	78.1%	At Turnover	Lost Opportunity	LO5Med	\$ 426.66	Illinois TRM	Illinois TRM	Illinois TRM	
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	10	\$78.86	\$ -	\$ -	-	0.0002	0.0002	0.0%	At Turnover	Lost Opportunity	LO5Med	\$ -	EIA 2011	EIA 2011	EIA 2011	
WA	WA	Commercial	Restaurant - W/ New	Existing	Food Preparation	Oven	Standard	ENERGY STAR	10	\$486.42	\$ 158.80	\$ -	6,343	0.0002	0.0003	40.0%	At Turnover	Lost Opportunity	LO5Med	\$ (12.00)	RTF	RTF	RTF	
WA	WA	Commercial	Restaurant - W/ New	Existing	Food Preparation	Fryer	Standard	ENERGY STAR	8	\$886.13	\$ -	\$ -	2,559	0.0002	0.0003	156.2%	At Turnover	Lost Opportunity	LO5Med	\$ 60.89	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Restaurant - W/ New	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	15	\$1,261.52	\$ 260.44	\$ -	1,261	0.0002	0.0003	100.0%	At Turnover	Lost Opportunity	LO5Med	\$ 143.88	Illinois TRM	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	Restaurant - W/ New	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	20	\$3,950.35	\$ -	\$ -	3,106	0.0002	0.0003	160.0%	At Turnover	Lost Opportunity	LO5Med	\$ 106.39	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Restaurant - W/ New	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	9	\$386.86	\$ 1,272.89	\$ -	28,191	0.0001	0.0002	30.5%	At Turnover	Lost Opportunity	LO5Med	\$ (40.20)	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Restaurant - W/ New	Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	5	\$0.05	\$ -	\$ -	404	0.0001	0.0002	110.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.02	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Restaurant - W/ New	Existing	Office Equipment	Laptop	Standard	ENERGY STAR	4	\$0.02	\$ -	\$ -	70	0.0001	0.0002	110.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.09	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Restaurant - W/ New	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	5	\$0.03	\$ -	\$ -	94	0.0001	0.0002	110.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.08	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Restaurant - W/ New	Existing	Office Equipment	Server	Standard	ENERGY STAR	4	\$0.05	\$ -	\$ -	341	0.0001	0.0002	55.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.05	7th Plan	7th Plan	AEG Research	
WA	WA	Commercial	Restaurant - W/ New	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	5	\$0.01	\$ -	\$ -	144	0.0001	0.0002	110.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.02	ENERGY STAR	ENERGY STAR	ENERGY STAR	
WA	WA	Commercial	Restaurant - W/ New	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	5	\$0.01	\$ -	\$ -	160	0.0002	0.0002	78.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.02	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Restaurant - W/ New	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0002	0.0002	24.0%	At Turnover	Lost Opportunity	LO12Med	\$ -	N/A	N/A	N/A	
WA	WA	Commercial	Restaurant - W/ New	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	10	\$2.60	\$ -	\$ -	-	0.0002	0.0002	0.0%	At Turnover	Lost Opportunity	LO3Slow	\$ -	DEER	DEER	SCE Workpaper	
WA	WA	Commercial	Restaurant - W/ New	Existing	Miscellaneous	Electric Resistance	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO3Slow	\$ -	N/A	N/A	N/A	
WA	WA	Commercial	Retail - WA	Existing	Cooling	Air-Cooled Chiller	COP 3.06 (EER 10.4)	COP 4.40 (EER 15.0)	20	\$13,878.48	\$ -	\$ -	103,347	0.0008	-	0.8%	At Turnover	Lost Opportunity	LO20Fast	\$ 97.66	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Cooling	Water-Cooled Chiller	COP 5.76 (EER 19.7)	COP 10.46 (EER 36.4)	25	\$80,388.81	\$ -	\$ -	220,523	0.0008	-	0.5%	At Turnover	Lost Opportunity	LO20Fast	\$ 28.76	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Cooling	RTU	EER 11.7	EER 15.0	15	\$28,581.26	\$ -	\$ -	8,735	0.0008	-	58.1%	At Turnover	Lost Opportunity	LO20Fast	\$ 360.27	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Cooling	Room AC	EER 11.0	EER 13.0	10	\$18,373.67	\$ -	\$ -	14,823	0.0008	-	5.5%	At Turnover	Lost Opportunity	LO20Fast	\$ 182.73	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	15	\$13,547.34	\$ -	\$ -	27,562	0.0008	-	2.1%	At Turnover	Lost Opportunity	LO5Med	\$ 347.26	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Cooling	Water-Cooled Chiller	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	15	\$13,547.34	\$ -	\$ -	27,562	0.0008	0.0008	2.1%	At Turnover	Lost Opportunity	LO5Med	\$ 347.26	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Cooling	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	25	\$167,468.35	\$ -	\$ -	20,135	0.0008	-	2.0%	At Turnover	Lost Opportunity	LO5Med	\$ 264.91	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	25	\$167,468.35	\$ -	\$ -	20,135	0.0008	-	2.0%	At Turnover	Lost Opportunity	LO5Med	\$ 264.91	AEO 2015	AEO 2015	AEO 2015	
WA	WA	Commercial	Retail - WA	Existing	Heating	Electric Room Heat	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0008	-	11.1%	At Turnover	Lost Opportunity	LO12Med	\$ -	EIA 2014	EIA 2014	AEG-BEST	
WA	WA	Commercial	Retail - WA	Existing	Ventilation	Constant Volume	Variable Air Volume	Standard	NEA Tier 2 Heat Pump (EF 2.0)	20	\$56,233.27	\$ -	\$ -	66,030	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO12Med	\$ 78.38	AEO 2015	AEO 2015	AEG Research
WA	WA	Commercial	Retail - WA	Existing	Water Heating	Water Heater	Resistance Heater, Standard Standby Wattage	NEA Tier 2 Heat Pump (EF 2.0)	13	\$2,388.12	\$ -	\$ -	7,052	0.0001	0.0003	38.2%	At Turnover	Lost Opportunity	LO12Med	\$ 41.13	RTF	RTF	RTF	
WA	WA	Commercial	Retail - WA	Existing	Interior Lighting	Interior Lighting	LED Compliant (13.6 lm/W)	LED 2017 (16.6 lm/W)	8	\$2,997.23	\$ 469.65	\$ -	63,878	0.0002	0.0003	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$ 1.82	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Interior Lighting	Linear Lighting	TR - F32 Standard (69.0 lm/W in W system)	LED 2017 (110.0 lm/W system)	17	\$58,815.57	\$ 1,851.13	\$ -	120,337	0.0002	0.0003	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$ 34.16	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (67.3 lm/W)	15	\$22,371.45	\$ -	\$ -	91,655	0.0002	0.0003	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$ 25.94	AEO 2015	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Interior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (16.6 lm/W)	8	\$1,388.68	\$ 217.60	\$ -	27,337	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$ 1.63	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Interior Lighting	Linear Lighting	TR - F32 Standard (69.0 lm/W in W system)	LED 2017 (110.0 lm/W system)	17	\$9,077.70	\$ 283.82	\$ -	20,891	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$ 30.17	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Interior Lighting	Area Lighting	Metal Halide (44.3 lm/W)	LED 2017 (67.3 lm/W)	15	\$3,321.42	\$ 2,202.66	\$ -	73,153	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$ (22.94)	AEO 2015	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	11	\$0.00	\$ -	\$ -	63,453	0.0002	0.0002	2.0%	At Turnover	Lost Opportunity	LO5Med	\$ -	EIA 2011	EIA 2011	EIA 2011	
WA	WA	Commercial	Retail - WA	Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	11	\$0.00	\$ -	\$ -	24,546	0.0002	0.0002	1.5%	At Turnover	Lost Opportunity	LO5Med	\$ -	EIA 2011	EIA 2011	EIA 2011	
WA	WA	Commercial	Retail - WA	Existing	Refrigeration	Glass Door Display Case	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	25,192	0.0002	0.0002	16.3%	At Turnover	Lost Opportunity	LO5Med	\$ -	RTF	EIA 2011	EIA 2011	
WA	WA	Commercial	Retail - WA	Existing	Refrigeration	Open Display Case	Current Standard	Standard 2017	10	\$0.00	\$ -	\$ -	28,373	0.0002	0.0002	14.0%	At Turnover	Lost Opportunity	LO5Med	\$ -	EIA 2011	EIA 2011	EIA 2011	
WA	WA	Commercial	Retail - WA	Existing	Refrigeration	Ice Maker	Current Standard	ENERGY STAR	9	\$30,226.66	\$ -	\$ -	11,146	0.0002	0.0002	7.1%	At Turnover	Lost Opportunity	LO5Med	\$ 426.66	EIA 2011	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	Retail - WA	Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	10	\$1,215.63	\$ -	\$ -	2,922	0.0002	0.0002	22.8%	At Turnover	Lost Opportunity	LO5Med	\$ 84.12	RTF	RTF	RTF	
WA	WA	Commercial	Retail - WA	Existing	Food Preparation	Oven	Standard	ENERGY STAR	10	\$13,494.18	\$ 4,405.55	\$ -	175,966	0.0002	0.0003	4.0%	At Turnover	Lost Opportunity	LO5Med	\$ (12.00)	RTF	RTF	RTF	
WA	WA	Commercial	Retail - WA	Existing	Food Preparation	Fryer	Standard	ENERGY STAR	8	\$24,582.77	\$ -	\$ -	11,446	0.0002	0.0002	0.0%	At Turnover	Lost Opportunity	LO5Med	\$ -	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	15	\$31,774.74	\$ 14,450.22	\$ -	69,886	0.0002	0.0003	2.0%	At Turnover	Lost Opportunity	LO5Med	\$ (143.88)	Illinois TRM	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	Retail - WA	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	20	\$19,205.81	\$ -	\$ -	172,313	0.0002	0.0003	1.0%	At Turnover	Lost Opportunity	LO5Med	\$ 106.39	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Retail - WA	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	9	\$21,464.25	\$ 70,624.45	\$ -	-	0.0002	0.0002	0.0%	At Turnover	Lost Opportunity	LO5Med	\$ -	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Retail - WA	Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	5	\$1.66	\$ -	\$ -	19,104	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.02	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Office Equipment	Laptop	Standard	ENERGY STAR	4	\$0.81	\$ -	\$ -	2,783	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.09	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	5	\$1.05	\$ -	\$ -	2,988	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.09	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Retail - WA	Existing	Office Equipment	Server	Standard	ENERGY STAR	4	\$0.78	\$ -	\$ -	5,394	0.0002	0.0002	82.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.05	7th Plan	7th Plan	AEG Research	
WA	WA	Commercial	Retail - WA	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	5	\$0.278	\$ -	\$ -	2,276	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$ 0.01	ENERGY STAR	ENERGY STAR	ENERGY STAR	

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy Measure Life (Years)	Average Incremental \$/Unit	Annual Energy Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source			
WA	Commercial	Grocery - WA	Existing	Refrigeration	Glass Door Display	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$	\$	57,264	0.0002	0.0002	95.6%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	Existing	Refrigeration	Open Display Case	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$	\$	64,496	0.0002	0.0002	95.6%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	Existing	Refrigeration	Iceemaker	Current Standard	ENERGY STAR	ENERGY STAR	9	\$3,434.78	\$	\$	1,267	0.0002	0.0002	96.6%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR
WA	Commercial	Grocery - WA	Existing	Refrigeration	Vending Machine	Current Standard	ENERGY STAR	ENERGY STAR	10	\$276.33	\$	\$	482	0.0002	0.0002	96.7%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	Existing	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	\$1,029.08	\$35.97	\$	13,419	0.0001	0.0002	11.0%	at Turnover	Lost Opportunity	LO5Med	\$	(12.20)	RTF	RTF	RTF
WA	Commercial	Grocery - WA	Existing	Food Preparation	Fryer	Standard	ENERGY STAR	ENERGY STAR	8	\$1,874.71	\$	\$	5,413	0.0001	0.0002	87.0%	at Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan	RTF
WA	Commercial	Grocery - WA	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	ENERGY STAR	15	\$2,423.18	\$1,101.99	\$	5,337	0.0001	0.0002	54.0%	at Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM	ENERGY STAR
WA	Commercial	Grocery - WA	Existing	Food Preparation	Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$15,191.69	\$	\$	13,141	0.0001	0.0002	73.0%	at Turnover	Lost Opportunity	LO5Med	\$	106.19	7th Plan	7th Plan	RTF
WA	Commercial	Grocery - WA	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$1,636.89	\$5,385.91	\$	119,284	0.0002	0.0002	20.0%	at Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan	RTF
WA	Commercial	Grocery - WA	Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$0.36	\$	\$	4,164	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	4	\$0.18	\$	\$	607	0.0002	0.0002	64.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	5	\$0.23	\$	\$	651	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	4	\$0.17	\$	\$	1,176	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.02	\$	\$	496	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	7th Plan
WA	Commercial	Grocery - WA	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	\$0.12	\$	\$	1,382	0.0002	0.0002	95.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$	\$	-	0.0002	0.0002	34.6%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	N/A	N/A
WA	Commercial	Grocery - WA	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	Variable Speed	10	\$43.32	\$	\$	-	0.0002	0.0002	0.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	DEER	SCE Workpaper	AGC Research
WA	Commercial	Grocery - WA	Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	Heat Pump	15	\$91.97	\$	\$	-	0.0002	0.0002	0.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	AGC Research	AGC Research	AGC Research
WA	Commercial	Grocery - WA	Existing	Miscellaneous	Standard	Standard	Standard	Standard	5	\$0.00	\$	\$	-	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	AGC Research	AGC Research	AGC Research
WA	Commercial	Grocery - WA	New	Cooling	Air-Cooled Chiller	COP 4.40 (IEER 10.4)	COP 4.40 (IEER 10.4)	COP 4.40 (IEER 10.4)	20	\$53,470.10	\$	\$	72,326	0.0003	0.0001	0.6%	at Turnover	Lost Opportunity	LO20Fast	\$	68.04	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Cooling	Water-Cooled Chiller	COP 5.78 (IEER 19.7)	COP 5.78 (IEER 19.7)	COP 5.78 (IEER 19.7)	25	\$25,665.65	\$	\$	137,191	0.0003	0.0001	0.4%	at Turnover	Lost Opportunity	LO20Fast	\$	15.27	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Cooling	RTU	IEER 11.2	IEER 11.2	IEER 11.2	15	\$9,125.56	\$	\$	6,465	0.0003	0.0001	79.0%	at Turnover	Lost Opportunity	LO20Fast	\$	156.86	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Cooling	Room AC	IEER 11.0	IEER 11.0	IEER 11.0	10	\$5,866.43	\$	\$	10,427	0.0003	0.0001	3.5%	at Turnover	Lost Opportunity	LO20Fast	\$	82.94	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Cooling	Air-Source Heat Pump	IEER 11.0 (COP 3.3)	IEER 11.0 (COP 3.3)	IEER 11.0 (COP 3.3)	15	\$43,916.77	\$	\$	20,608	0.0003	0.0001	3.3%	at Turnover	Lost Opportunity	LOeVen20	\$	192.42	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Heating	Air-Source Heat Pump	IEER 11.0 (COP 3.3)	IEER 11.0 (COP 3.3)	IEER 11.0 (COP 3.3)	15	\$43,916.77	\$	\$	4,521	0.0003	0.0001	3.3%	at Turnover	Lost Opportunity	LOeVen20	\$	192.42	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Heating	Geothermal Heat Pump	IEER 14.0 (COP 4.0)	IEER 14.0 (COP 4.0)	IEER 14.0 (COP 4.0)	25	\$53,470.10	\$	\$	13,461	0.0003	0.0001	4.0%	at Turnover	Lost Opportunity	LOeVen20	\$	123.67	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Heating	Geothermal Heat Pump	IEER 14.0 (COP 3.5)	IEER 14.0 (COP 3.5)	IEER 14.0 (COP 3.5)	25	\$53,470.10	\$	\$	11,831	-	-	0.5%	at Turnover	Lost Opportunity	LOeVen20	\$	123.67	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$	\$	-	-	-	9.8%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	AEO-BEST
WA	Commercial	Grocery - WA	New	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$	\$	-	-	-	1.8%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	EIA 2014	AGC Research
WA	Commercial	Grocery - WA	New	Ventilation	Ventilation	Constant Volume	Variable Air Volume	Variable Air Volume	20	\$11,241.03	\$	\$	25,706	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	40.24	AEO 2015	AEO 2015	AGC Research
WA	Commercial	Grocery - WA	New	Water Heating	Water Heater	Resistance Heater, Standard Standby Wattage	NEEA Tier 2 Heat Pump (EF 2.0)	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$2,057.50	\$	\$	6,076	0.0002	0.0003	17.5%	at Turnover	Lost Opportunity	LO12Med	\$	41.13	RTF	RTF	RTF
WA	Commercial	Grocery - WA	New	Interior Lighting	Screen-In	EISA Compliant (13.6 lm/W)	LED 2017 (86.4 lm/W)	LED 2017 (86.4 lm/W)	8	\$590.78	\$92.57	\$	19,322	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.99	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	New	Interior Lighting	High-Bay Fixtures	TR - F32 Standard (89.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	17	\$21,214.75	\$67.70	\$	2,667	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	2.30	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	New	Interior Lighting	High-Bay Fixtures	MEAL Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$7,000.59	\$	\$	49,318	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	15.07	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Interior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)	LED 2017 (86.4 lm/W)	8	\$634.26	\$99.39	\$	12,932	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	1.59	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	New	Interior Lighting	Screen-In	TR - F32 Standard (89.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)	LED 2017 (110.2 lm/W system)	17	\$17,416.01	\$	\$	2,667	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	2.30	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	New	Interior Lighting	Area Lighting	MEAL Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$1,784.67	\$1,183.54	\$	37,257	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(24.15)	AEO 2015	AEO 2015	AEO 2015
WA	Commercial	Grocery - WA	New	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	11	\$0.00	\$	\$	50,483	0.0002	0.0002	16.2%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	New	Refrigeration	Reach-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$	\$	5,580	0.0002	0.0002	84.0%	at Turnover	Lost Opportunity	LO5Fast	\$	-	RTF	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	New	Refrigeration	Glass Door Display	Current Standard	ENERGY STAR	ENERGY STAR	10	\$0.00	\$	\$	57,264	0.0002	0.0002	96.7%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	New	Refrigeration	Open Display Case	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$	\$	64,496	0.0002	0.0002	96.7%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	New	Refrigeration	Iceemaker	Current Standard	ENERGY STAR	ENERGY STAR	9	\$3,434.78	\$	\$	1,267	0.0002	0.0002	96.7%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR
WA	Commercial	Grocery - WA	New	Refrigeration	Vending Machine	Standard	ENERGY STAR	ENERGY STAR	10	\$276.33	\$	\$	482	0.0002	0.0002	96.7%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011	EIA 2011
WA	Commercial	Grocery - WA	New	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	\$1,029.08	\$35.97	\$	13,419	0.0001	0.0002	15.4%	at Turnover	Lost Opportunity	LO5Med	\$	(12.20)	RTF	RTF	RTF
WA	Commercial	Grocery - WA	New	Food Preparation	Fryer	Standard	ENERGY STAR	ENERGY STAR	8	\$1,874.71	\$	\$	5,413	0.0001	0.0002	121.8%	at Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan	RTF
WA	Commercial	Grocery - WA	New	Food Preparation	Dishwasher	Standard	ENERGY STAR	ENERGY STAR	15	\$2,423.18	\$1,101.99	\$	5,337	0.0001	0.0002	76.8%	at Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM	ENERGY STAR
WA	Commercial	Grocery - WA	New	Food Preparation	Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$15,191.69	\$	\$	13,141	0.0001	0.0002	73.0%	at Turnover	Lost Opportunity	LO5Med	\$	106.19	7th Plan	7th Plan	RTF
WA	Commercial	Grocery - WA	New	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$1,636.89	\$5,385.91	\$	119,284	0.0002	0.0002	20.0%	at Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan	RTF
WA	Commercial	Grocery - WA	New	Office Equipment	Desktop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$0.36	\$	\$	4,164	0.0002	0.0002	110.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	New	Office Equipment	Laptop	Standard	ENERGY STAR	ENERGY STAR	4	\$0.18	\$	\$	607	0.0002	0.0002	70.4%	at Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	7th Plan
WA	Commercial	Grocery - WA	New	Office Equipment	Monitor	Standard																		

Measure					Assumptions in First Year (2015)															Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Annual Benefits (\$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak (kW/Unit)	Winter Coincident Peak (kW/Unit)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
WA	WA	Commercial	College	WA	New	Refrigeration	Open Display Case	Current Standard	10	\$0.00	\$ -	\$ -	1,739	0.0002	0.0002	6.7%	at Turnover	Lost Opportunity	LO5Med	\$ -	EIA 2011	EIA 2011	EIA 2011		
WA	WA	Commercial	College	WA	New	Refrigeration	Kemecar	Current Standard	9	\$3,703.76	\$ -	\$ -	1,366	0.0002	0.0002	39.5%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	College	WA	New	Refrigeration	Vending Machine	Standard	10	\$148.98	\$ -	\$ -	260	0.0002	0.0002	12.3%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011	ENERGY STAR	
WA	WA	Commercial	College	WA	New	Food Preparation	Food Processor	Standard	11	\$573.00	\$ 385.20	\$ -	1,391	0.0004	0.0004	34.6%	at Turnover	Lost Opportunity	LO5Med	\$	112.20	RTF	RTF	ENERGY STAR	
WA	WA	Commercial	College	WA	New	Food Preparation	Fryer	Standard	8	\$1,591.41	\$ -	\$ -	4,555	0.0003	0.0004	1.5%	at Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Food Preparation	Dishwasher	Standard	15	\$2,057.00	\$ 935.46	\$ -	4,531	0.0003	0.0004	22.8%	at Turnover	Lost Opportunity	LO5Med	\$	143.88	Illinois TRM	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	College	WA	New	Food Preparation	Hot Food Container	Standard	20	\$12,895.95	\$ -	\$ -	11,155	0.0003	0.0004	14.8%	at Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Food Preparation	Desktop Computer	Standard	9	\$1,389.53	\$ 4,572.00	\$ -	1,003	0.0001	0.0001	16.7%	at Turnover	Lost Opportunity	LO5Med	\$	40.20	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Office Equipment	Laptop	Standard	5	\$14.9	\$ -	\$ -	17,053	0.0001	0.0002	140.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Office Equipment	Laptop	Standard	4	\$0.22	\$ -	\$ -	745	0.0001	0.0002	140.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Office Equipment	Server	Standard	5	\$0.94	\$ -	\$ -	2,667	0.0001	0.0002	140.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Office Equipment	Server	Standard	4	\$0.14	\$ -	\$ -	963	0.0001	0.0002	140.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Office Equipment	Printer/Copier/Fax	Standard	6	\$0.12	\$ -	\$ -	2,539	0.0001	0.0002	140.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR		
WA	WA	Commercial	College	WA	New	Office Equipment	POS Terminal	Standard	5	\$0.05	\$ -	\$ -	566	0.0002	0.0003	105.2%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
WA	WA	Commercial	College	WA	New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	15	\$9.00	\$ -	\$ -	208	0.0002	0.0003	106.6%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	RTF		
WA	WA	Commercial	College	WA	New	Miscellaneous	Pool Pump	Standard	10	\$49.27	\$ -	\$ -	264	0.0002	0.0003	70.6%	at Turnover	Lost Opportunity	LO3Low	\$	27.48	DEER	DEER		
WA	WA	Commercial	College	WA	New	Miscellaneous	Pool Heater	Electric Resistance	15	\$135.60	\$ -	\$ -	543	0.0002	0.0003	70.6%	at Turnover	Lost Opportunity	LO3Low	\$	27.49	AEG Research	AEG Research		
WA	WA	Commercial	College	WA	New	Miscellaneous	Miscellaneous	Standard	5	\$0.00	\$ -	\$ -	18,223	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO3Low	\$	N/A	N/A	RTF		
WA	WA	Commercial	School	WA	Existing	Cooling	Room AC	COP 3.06 (EER 10.4)	20	\$43,631.60	\$ -	\$ -	19,621	0.0001	0.0002	21.5%	at Turnover	Lost Opportunity	LO20Fac	\$	215.15	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	25	\$30,798.78	\$ -	\$ -	83,169	-	-	5.0%	at Turnover	Lost Opportunity	LO20Fac	\$	30.23	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Cooling	RTU	EER 11.2	15	\$10,950.68	\$ -	\$ -	1,974	-	-	30.3%	at Turnover	Lost Opportunity	LO20Fac	\$	610.71	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Cooling	Room AC	EER 11.0 (COP 3.3)	15	\$7,039.72	\$ -	\$ -	3,149	-	-	2.3%	at Turnover	Lost Opportunity	LO20Fac	\$	323.58	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.4)	15	\$52,700.13	\$ -	\$ -	6,221	-	-	9.3%	at Turnover	Lost Opportunity	LOven20	\$	412.90	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Heating	Air-Source Heat Pump	EER 12.0 (COP 3.3)	15	\$52,700.13	\$ -	\$ -	7,831	-	-	9.3%	at Turnover	Lost Opportunity	LOven20	\$	412.90	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	25	\$64,164.12	\$ -	\$ -	-	-	-	4.5%	at Turnover	Lost Opportunity	LOven20	\$	-	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Heating	Geothermal Heat Pump	EER 20.0 (COP 3.5)	25	\$64,164.12	\$ -	\$ -	-	-	-	16.7%	at Turnover	Lost Opportunity	LO5Med	\$	-	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Heating	Electric Furnace	Standard	18	\$0.00	\$ -	\$ -	-	-	-	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Heating	Electric Room Heat	Standard	18	\$0.00	\$ -	\$ -	-	-	-	0.0004	0.0004	2.8%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	EIA 2014
WA	WA	Commercial	School	WA	Existing	Ventilation	Variable Air Volume	Constant Volume	20	\$44,027.38	\$ -	\$ -	23,893	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	169.58	AEO 2015	AEO 2015		
WA	WA	Commercial	School	WA	Existing	Water Heating	Water Heater	Resistance Heater, Standard Sandby Wattage	NEA Tier 2 Heat Pump (EF 2.0)	13	\$1,406.12	\$ -	\$ -	4,152	0.0000	0.0002	13.6%	at Turnover	Lost Opportunity	LO12Med	\$	41.13	RTF	RTF	
WA	WA	Commercial	School	WA	Existing	Interior Lighting	Screen-In	F32 Standard (13.6 lm/W)	8	\$176.33	\$ 27.63	\$ -	2,871	0.0000	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	2.10	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Interior Lighting	Area Lighting	F32 Standard (69.0 lm/W in W system)	17	\$1,184.75	\$ 45.27	\$ -	20,955	0.0000	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	22.31	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	15	\$5,855.74	\$ -	\$ -	16,465	0.0001	0.0002	4.5%	at Turnover	Lost Opportunity	LO20Fac	\$	37.73	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Interior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	8	\$358.14	\$ 56.12	\$ -	5,166	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	2.02	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Interior Lighting	Area Lighting	F32 Standard (69.0 lm/W in W system)	17	\$7,630.13	\$ 240.15	\$ -	17,430	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	30.60	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Interior Lighting	Area Lighting	F32 Standard (69.0 lm/W in W system)	22	\$1,096.21	\$ 726.97	\$ -	22,381	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	24.75	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	11	\$0.00	\$ -	\$ -	4,558	0.0002	0.0002	19.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011		
WA	WA	Commercial	School	WA	Existing	Refrigeration	Reach-In Refrigerator/Freezer	Current Standard	10	\$0.00	\$ -	\$ -	3,527	0.0001	0.0002	33.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	RTF		
WA	WA	Commercial	School	WA	Existing	Refrigeration	Glass Door Display Case	Current Standard	10	\$0.00	\$ -	\$ -	1,810	0.0001	0.0002	19.7%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011		
WA	WA	Commercial	School	WA	Existing	Refrigeration	Refrigerator	Standard 2017	10	\$0.00	\$ -	\$ -	2,038	0.0001	0.0002	11.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011		
WA	WA	Commercial	School	WA	Existing	Refrigeration	Kemecar	Current Standard	9	\$4,341.93	\$ -	\$ -	1,601	0.0001	0.0002	69.7%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM		
WA	WA	Commercial	School	WA	Existing	Refrigeration	Vending Machine	Standard	10	\$174.65	\$ -	\$ -	305	0.0001	0.0002	21.8%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011		
WA	WA	Commercial	School	WA	Existing	Food Preparation	Oven	Standard	10	\$498.42	\$ 167.72	\$ -	6,499	0.0000	0.0000	61.4%	at Turnover	Lost Opportunity	LO5Med	\$	120.20	RTF	RTF		
WA	WA	Commercial	School	WA	Existing	Food Preparation	Dishwasher	Standard	15	\$1,173.63	\$ 533.73	\$ -	2,585	0.0000	0.0000	40.4%	at Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Food Preparation	Hot Food Container	Standard	20	\$7,357.83	\$ -	\$ -	6,365	0.0000	0.0000	26.3%	at Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Food Preparation	Desktop Computer	Standard	9	\$792.80	\$ 2,608.57	\$ -	6,365	0.0000	0.0002	36.8%	at Turnover	Lost Opportunity	LO5Med	\$	40.20	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Office Equipment	Laptop	Standard	5	\$1.04	\$ -	\$ -	11,916	0.0000	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fac	\$	0.02	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Office Equipment	Monitor	Standard	4	\$0.20	\$ -	\$ -	694	0.0000	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Office Equipment	Monitor	Standard	5	\$0.65	\$ -	\$ -	1,864	0.0000	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fac	\$	0.09	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Office Equipment	Printer/Copier/Fax	Standard	6	\$0.07	\$ -	\$ -	1,420	0.0000	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR		
WA	WA	Commercial	School	WA	Existing	Office Equipment	POS Terminal	Standard	5	\$0.03	\$ -	\$ -	316	0.0000	0.0002	11.5%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan		
WA	WA	Commercial	School	WA	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	15	\$9.00	\$ -	\$ -	208	0.0000	0.0002	43.7%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	RTF		
WA	WA	Commercial	School	WA	Existing	Miscellaneous	Pool Pump	Standard	10	\$38.70	\$ -	\$ -	208	0.0000	0.0002	32.9%	at Turnover	Lost Opportunity	LO3Low	\$	27.48	DEER	DEER		
WA	WA	Commercial	School	WA	Existing	Miscellaneous	Pool Heater	Electric Resistance	15	\$106.51	\$ -	\$ -	427	0.0000	0.0002	32.9%	at Turnover	Lost Opportunity	LO3Low	\$	27.49	AEG Research	AEG Research		
WA	WA	Commercial	School	WA	Existing	Miscellaneous	Miscellaneous	Standard	5	\$0.00	\$ -	\$ -	19,621	0.0000	0.0002	100.0%	at Turnover	Lost Opportunity	LO3Low	\$	N/A	N/A	RTF		
WA																									

Measure					Assumptions in First Year (2015)													Sources							
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy Annual O&M Costs (\$)	Annual Energy Savings (kWh/Unit Greater)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20- Year)	Lifetime Source	Costs Source	Savings Source					
									Measure Life (Years)	Average Incremental \$/Unit	Benefits Annual \$/Unit	Incremental O&M Costs (\$)	Average Annual Savings (kWh/Unit Greater)												
WA	WA	Commercial	Health - WA	Existing	Refrigeration	Icemaker	Current Standard	ENERGY STAR	9	\$320,025.0	\$ -	\$ -	11,813	0.0002	0.0002	21.1%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	Health - WA	Existing	Refrigeration	Wending Machine	Standard	ENERGY STAR	10	\$1,288.37	\$ -	\$ -	2,249	0.0002	0.0002	27.9%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011	RTF	
WA	WA	Commercial	Health - WA	Existing	Food Preparation	Oven	Standard	ENERGY STAR	10	\$14,909.86	\$ 4,867.73	\$ -	194,246	0.0002	0.0003	62.2%	at Turnover	Lost Opportunity	LO5Med	\$	(12.20)	RTF	RTF	EIA 2011	
WA	WA	Commercial	Health - WA	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	8	\$27,161.77	\$ 15,866.20	\$ -	78,245	0.0002	0.0003	78.2%	at Turnover	Lost Opportunity	LO5Med	\$	60.89	Illinois TRM	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	Health - WA	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	15	\$35,108.24	\$ 15,866.20	\$ -	77,328	0.0002	0.0003	30.9%	at Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM	ENERGY STAR	
WA	WA	Commercial	Health - WA	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	20	\$220,104.61	\$ -	\$ -	190,390	0.0002	0.0002	12.3%	at Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Health - WA	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	9	\$23,716.08	\$ 78,033.70	\$ -	1,728,250	0.0001	0.0002	3.6%	at Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	9	\$8.28	\$ -	\$ -	90,097	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Printer	Standard	ENERGY STAR	4	\$1.62	\$ -	\$ -	5,541	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	5	\$5.22	\$ -	\$ -	14,873	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fac	\$	0.09	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Scanner	Standard	ENERGY STAR	4	\$1.56	\$ -	\$ -	10,740	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	AEG Research	
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	6	\$0.55	\$ -	\$ -	11,328	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	RTF	
WA	WA	Commercial	Health - WA	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	5	\$0.55	\$ -	\$ -	6,313	0.0001	0.0002	51.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
WA	WA	Commercial	Health - WA	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0001	0.0002	74.1%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	N/A	N/A	
WA	WA	Commercial	Health - WA	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	10	\$48,046.0	\$ -	\$ -	794	0.0001	0.0002	3.9%	at Turnover	Lost Opportunity	LO3Slow	\$	27.48	DEER	DEER	SCE Workpaper	
WA	WA	Commercial	Health - WA	Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	15	\$407.48	\$ -	\$ -	1,632	0.0001	0.0002	5.7%	at Turnover	Lost Opportunity	LO3Slow	\$	27.49	AEG Research	AEG Research	AEG Research	
WA	WA	Commercial	Health - WA	Existing	Miscellaneous	Pool Heater	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A	N/A
WA	WA	Commercial	Health - WA	New	Cooling	Air-Cooled Chiller	COP 3.06 (EER 10.4)	COP 4.40 (EER 15.0)	20	\$20,363.04	\$ -	\$ -	41,534	0.0003	0.0001	2.1%	at Turnover	Lost Opportunity	LO20Fac	\$	266.70	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Cooling	Water-Cooled Chiller	COP 5.76 (EER 19.7)	COP 7.00 (EER 24.4)	15	\$39,984.44	\$ -	\$ -	15,542	0.0003	0.0001	1.6%	at Turnover	Lost Opportunity	LO20Fac	\$	419.02	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Cooling	RTU	EER 11.2	EER 11.2	15	\$48,775.80	\$ -	\$ -	15,542	0.0003	0.0001	16.3%	at Turnover	Lost Opportunity	LO20Fac	\$	214.01	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Cooling	Room AC	EER 11.0	EER 13.0	10	\$19,419.92	\$ -	\$ -	24,389	0.0003	0.0001	48.0%	at Turnover	Lost Opportunity	LO20Fac	\$	117.38	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Heating	Air-Source Heat Pump	EER 12.0 (COP 3.3)	EER 12.0 (COP 3.3)	15	\$145,379.67	\$ -	\$ -	49,441	0.0003	0.0001	18.0%	at Turnover	Lost Opportunity	LO20Fac	\$	206.14	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Heating	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	15	\$145,379.67	\$ -	\$ -	49,441	0.0003	0.0006	18.0%	at Turnover	Lost Opportunity	LO20Fac	\$	206.14	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Cooling	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	25	\$177,004.46	\$ -	\$ -	207,232	0.0003	0.0001	3.4%	at Turnover	Lost Opportunity	LO20Fac	\$	42.39	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	25	\$177,004.46	\$ -	\$ -	207,232	0.0003	0.0006	3.4%	at Turnover	Lost Opportunity	LO20Fac	\$	42.39	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	New	Heating	Electric Room Heat	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0001	0.0002	53.2%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	EIA 2014	AEG-BEST	AEG-BEST
WA	WA	Commercial	Health - WA	New	Heating	Electric Room Heat	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0001	0.0002	53.2%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	EIA 2014	AEG-BEST	AEG-BEST
WA	WA	Commercial	Health - WA	New	Ventilation	Water Heating	Constant Volume	Variable Air Volume	20	\$74,940.23	\$ -	\$ -	157,656	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	43.75	AEO 2015	AEO 2015	AEG Research	AEG Research
WA	WA	Commercial	Health - WA	Existing	Water Heating	Water Heater	Resistance Heater, Standard Standby Wattage	NEA Tier 2 Heat Pump (EF 2.0)	13	\$24,762.74	\$ -	\$ -	73,128	0.0001	0.0003	10.5%	at Turnover	Lost Opportunity	LO12Med	\$	41.33	RTF	RTF	7th Plan	7th Plan
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	Screen-In	ES&G Compliant (13.6 lm/W)	LED 2017 (110.0 lm/W system)	17	\$37,210.42	\$ 942.22	\$ -	70,013.09	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	43.44	7th Plan	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	Line Lighting	TR-132 Standard (69.0 lm/W system)	LED 2017 (110.0 lm/W system)	17	\$37,210.42	\$ 1,171.14	\$ -	59,905	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	43.44	7th Plan	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,031.22	\$ -	\$ -	16,156	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fac	\$	33.05	AEO 2015	AEO 2015	AEO 2015	AEO 2015

Measure															Assumptions in First Year (2015)															Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source											
WA	Commercial	Lodging - WA	New	Refrigeration	Vending Machine	Standard	ENERGY STAR	ENERGY STAR	5	\$1,684.69	\$ -	\$ -	2,943	0.0002	0.0002	75.1%	at Turnover	Lost Opportunity	LO5MEd	\$	84.44	EIA 2011	EIA 2011	EIA 2011										
WA	Commercial	Lodging - WA	New	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	\$4,816.71	\$ 1,572.55	\$ -	62,810	0.0002	0.0003	31.2%	at Turnover	Lost Opportunity	LO5MEd	\$	(12.20)	RTF	RTF	RTF										
WA	Commercial	Lodging - WA	New	Food Preparation	Food Preparation Fryer	Standard	ENERGY STAR	ENERGY STAR	8	\$8,774.76	\$ -	\$ -	25,336	0.0002	0.0003	5.2%	at Turnover	Lost Opportunity	LO5MEd	\$	60.89	7th Plan	7th Plan	7th Plan										
WA	Commercial	Lodging - WA	New	Food Preparation	Blender	Standard	ENERGY STAR	ENERGY STAR	5	\$1,314.35	\$ 1,517.97	\$ -	2,423	0.0002	0.0003	50.7%	at Turnover	Lost Opportunity	LO5MEd	\$	144.83	Illinois TRM	Illinois TRM	ENERGY STAR										
WA	Commercial	Lodging - WA	New	Food Preparation	Hot Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$71,106.01	\$ -	\$ -	61,507	0.0002	0.0003	13.0%	at Turnover	Lost Opportunity	LO5MEd	\$	106.39	7th Plan	7th Plan	7th Plan										
WA	Commercial	Lodging - WA	New	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$7,661.61	\$ 25,209.22	\$ -	55,823	0.0001	0.0002	5.2%	at Turnover	Lost Opportunity	LO5MEd	\$	(40.20)	7th Plan	7th Plan	RTF										
WA	Commercial	Lodging - WA	New	Office Equipment	Desktop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$1.64	\$ -	\$ -	18,834	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Fatl	\$	0.02	7th Plan	7th Plan	7th Plan										
WA	Commercial	Lodging - WA	New	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	4	\$0.80	\$ -	\$ -	2,744	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Fatl	\$	0.09	7th Plan	7th Plan	7th Plan										
WA	Commercial	Lodging - WA	New	Office Equipment	Keyboard	Standard	ENERGY STAR	ENERGY STAR	5	\$1.03	\$ -	\$ -	2,946	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Fatl	\$	0.09	7th Plan	7th Plan	7th Plan										
WA	Commercial	Lodging - WA	New	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	4	\$0.77	\$ -	\$ -	5,317	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5MEd	\$	0.05	7th Plan	7th Plan	7th Plan										
WA	Commercial	Lodging - WA	New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.55	\$ -	\$ -	6,244	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5MEd	\$	0.01	ENERGY STAR	ENERGY STAR	7th Plan										
WA	Commercial	Lodging - WA	New	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	\$0.22	\$ -	\$ -	1,500	0.0002	0.0003	42.8%	at Turnover	Lost Opportunity	LO5MEd	\$	0.02	7th Plan	7th Plan	7th Plan										
WA	Commercial	Lodging - WA	New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0002	0.0003	109.5%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A										
WA	Commercial	Lodging - WA	New	Miscellaneous	Pool Pump	Standard	Variable Speed	Standard	10	\$502.35	\$ -	\$ -	2,694	0.0002	0.0003	80.1%	at Turnover	Lost Opportunity	LO3Slow	\$	27.48	DEER	DEER	SCE Workpaper										
WA	Commercial	Lodging - WA	New	Miscellaneous	Heat Pump	Standard	Electric Resistance	Standard	15	\$1,392.49	\$ -	\$ -	8,002	0.0002	0.0003	3.5%	at Turnover	Lost Opportunity	LO3Slow	\$	27.49	AG Research	AG Research	N/A										
WA	Commercial	Lodging - WA	New	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A										
WA	Commercial	Warehouse - W	Existing	Cooling	Air-Cooled Chiller	COP 3.06 (EER 10.4)	COP 4.40 (EER 15.0)	Standard	20	\$43,631.60	\$ -	\$ -	55,015	-	-	2.5%	at Turnover	Lost Opportunity	LO20fat	\$	72.99	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	COP 10.66 (EER 36.4)	Standard	25	\$30,798.78	\$ -	\$ -	193,121	-	-	2.5%	at Turnover	Lost Opportunity	LO20fat	\$	13.02	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Cooling	Room AC	EER 11.7	EER 13.0	Standard	15	\$10,950.68	\$ -	\$ -	8,993	-	-	11.3%	at Turnover	Lost Opportunity	LO20fat	\$	134.06	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Cooling	Room AC	EER 11.0	EER 13.0	Standard	10	\$7,039.72	\$ -	\$ -	14,344	-	-	1.1%	at Turnover	Lost Opportunity	LO20fat	\$	72.35	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	Standard	15	\$52,700.13	\$ -	\$ -	28,378	-	-	1.7%	at Turnover	Lost Opportunity	LO20fat	\$	135.03	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Cooling	Air-Source Heat Pump	EER 12.0 (COP 3.3)	EER 12.0 (COP 3.4)	Standard	15	\$52,700.13	\$ -	\$ -	28,378	-	-	1.7%	at Turnover	Lost Opportunity	LO20fat	\$	135.03	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Cooling	Geothermal Heat Pump	EER 20.6 (COP 4.0)	EER 20.6 (COP 4.0)	Standard	25	\$64,164.12	\$ -	\$ -	14,593	-	0.0005	1.7%	at Turnover	Lost Opportunity	LO20fat	\$	134.06	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Cooling	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	Standard	25	\$64,164.12	\$ -	\$ -	-	-	0.0005	0.0%	at Turnover	Lost Opportunity	LO20fat	\$	-	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	Standard	25	\$64,164.12	\$ -	\$ -	-	-	0.0005	0.0%	at Turnover	Lost Opportunity	LO20fat	\$	-	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	0.0005	2.1%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	AGC-BEST										
WA	Commercial	Warehouse - W	Existing	Heating	Electric Room Heat	Standard	Standard	Standard	10	\$0.00	\$ -	\$ -	-	-	0.0005	11.3%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	EIA 2014	AGC-BEST										
WA	Commercial	Warehouse - W	Existing	Ventilation	Ventilation	Constant Volume	Variable Air Volume	Standard	20	\$112,413.03	\$ -	\$ -	27,036	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20fat	\$	38.27	AEO 2015	AEO 2015	AGC Research										
WA	Commercial	Warehouse - W	Existing	Water Heating	Water Heater	Resistance Heater, Standard Standby Wattage	NEEA Tier 2 Heat Pump (EF 2.0)	Standard	13	\$1,092.87	\$ -	\$ -	3,327	0.0001	0.0003	38.3%	at Turnover	Lost Opportunity	LO12Med	\$	41.13	RTF	RTF	RTF										
WA	Commercial	Warehouse - W	Existing	Interior Lighting	Interior Lighting	EISA Compliant (13.6 lm/W)	EISA Compliant (13.6 lm/W)	Standard	8	\$461.49	\$ 72.31	\$ -	4,742	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20fat	\$	2.98	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Interior Lighting	Linear Lighting	TR - F32 Standard (69.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)	Standard	17	\$15,278.90	\$ 480.88	\$ -	22,890	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20fat	\$	46.67	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Interior Lighting	High-Bay Fixtures	LED 2017 (67.3 lm/W)	LED 2017 (67.3 lm/W)	Standard	15	\$23,795.39	\$ -	\$ -	72,329	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20fat	\$	35.04	AEO 2015	AEO 2015	7th Plan										
WA	Commercial	Warehouse - W	Existing	Interior Lighting	Screw-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)	Standard	8	\$24.08	\$ 50.78	\$ -	4,419	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20fat	\$	2.12	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Interior Lighting	Linear Lighting	TR - F32 Standard (69.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)	Standard	17	\$15,278.90	\$ 480.88	\$ -	22,890	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20fat	\$	46.67	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Interior Lighting	Area Lighting	LED 2017 (67.3 lm/W)	LED 2017 (67.3 lm/W)	Standard	15	\$2,878.18	\$ 1,908.71	\$ -	42,293	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20fat	\$	(34.34)	AEO 2015	AEO 2015	7th Plan										
WA	Commercial	Warehouse - W	Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	11	\$0.00	\$ -	\$ -	84,491	0.0002	0.0002	1.1%	at Turnover	Lost Opportunity	LO5MEd	\$	-	EIA 2011	EIA 2011	EIA 2011										
WA	Commercial	Warehouse - W	Existing	Refrigeration	Refrigeration	Standard 2017	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	32,684	0.0002	0.0002	2.0%	at Turnover	Lost Opportunity	LO5MEd	\$	-	AEO 2015	AEO 2015	AEO 2015										
WA	Commercial	Warehouse - W	Existing	Refrigeration	Refrigeration	Standard 2017	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	-	0.0002	0.0002	0.0%	at Turnover	Lost Opportunity	LO5MEd	\$	-	RTF	RTF	EIA 2011										
WA	Commercial	Warehouse - W	Existing	Refrigeration	Open Display Case	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	-	0.0002	0.0002	0.0%	at Turnover	Lost Opportunity	LO5MEd	\$	-	EIA 2011	EIA 2011	EIA 2011										
WA	Commercial	Warehouse - W	Existing	Refrigeration	Icemaker	Current Standard	ENERGY STAR	ENERGY STAR	9	\$40,240.91	\$ -	\$ -	14,841	0.0002	0.0002	9.9%	at Turnover	Lost Opportunity	LO5MEd	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR										
WA	Commercial	Warehouse - W	Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	ENERGY STAR	10	\$1,618.69	\$ -	\$ -	2,826	0.0002	0.0003	6.9%	at Turnover	Lost Opportunity	LO5MEd	\$	84.44	EIA 2011	EIA 2011	EIA 2011										
WA	Commercial	Warehouse - W	Existing	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	\$918.54	\$ 299.88	\$ -	-	0.0002	0.0003	0.0%	at Turnover	Lost Opportunity	LO5MEd	\$	-	RTF	RTF	RTF										
WA	Commercial	Warehouse - W	Existing	Food Preparation	Fryer	Standard	ENERGY STAR	ENERGY STAR	8	\$1,673.33	\$ -	\$ -	-	0.0002	0.0003	0.0%	at Turnover	Lost Opportunity	LO5MEd	\$	-	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	ENERGY STAR	15	\$2,162.88	\$ 983.61	\$ -	4,764	0.0002	0.0003	2.0%	at Turnover	Lost Opportunity	LO5MEd	\$	(143.88)	Illinois TRM	Illinois TRM	ENERGY STAR										
WA	Commercial	Warehouse - W	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$1,559.76	\$ -	\$ -	8,002	0.0002	0.0003	0.0%	at Turnover	Lost Opportunity	LO5MEd	\$	-	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$1,461.05	\$ 4,807.34	\$ -	-	0.0002	0.0003	0.0%	at Turnover	Lost Opportunity	LO5MEd	\$	-	7th Plan	7th Plan	RTF										
WA	Commercial	Warehouse - W	Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$1.00	\$ -	\$ -	11,526	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fatl	\$	0.02	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	4	\$0.39	\$ -	\$ -	1,343	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO5Fatl	\$	0.08	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	5	\$0.63	\$ -	\$ -	1,803	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fatl	\$	0.09	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	4	\$0.94	\$ -	\$ -	6,508	0.0002	0.0002	89.0%	at Turnover	Lost Opportunity	LO5MEd	\$	0.05	7th Plan	7th Plan	7th Plan										
WA	Commercial	Warehouse - W	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.07	\$ -	\$ -	1,373	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5MEd	\$	0.01	ENERGY STAR	ENERGY STAR	7th										



Measure					Assumptions in First Year (2015)															Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/Unit	Incremental O&M Costs (\$/Year)	Average Annual Savings (\$/Year)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
ID	Commercial	Small Office - IE	New	Food Preparation	Fryer	ENERGY STAR	Standard	ENERGY STAR	8	\$37,396.30	\$ -	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS5Med	\$ -	7th Plan	7th Plan	RTF
ID	Commercial	Small Office - IE	New	Food Preparation	Dishwasher	ENERGY STAR	Standard	ENERGY STAR	15	\$48,337.00	\$ 21,882.25	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS5Med	\$ -	Illinois TRM	Illinois TRM	ENERGY STAR
ID	Commercial	Small Office - IE	New	Food Preparation	Hot Food Container	ENERGY STAR	Standard	ENERGY STAR	20	\$303,039.84	\$ -	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS5Med	\$ -	7th Plan	7th Plan	RTF
ID	Commercial	Small Office - IE	New	Food Preparation	Food Processor	ENERGY STAR	Standard	ENERGY STAR	9	\$32,137.00	\$ 107,436.73	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS5Med	\$ -	7th Plan	7th Plan	RTF
ID	Commercial	Small Office - IE	New	Office Equipment	Desktop Computer	ENERGY STAR	Standard	ENERGY STAR	5	\$23.17	\$ -	\$ -	-	0.0002	0.0002	140.00%	at Turnover	Lost Opportunity	LOS5Fast	\$ 0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office - IE	New	Office Equipment	Laptop	ENERGY STAR	Standard	ENERGY STAR	4	\$11.31	\$ -	\$ -	-	0.0002	0.0002	140.00%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.09	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office - IE	New	Office Equipment	Monitor	ENERGY STAR	Standard	ENERGY STAR	5	\$14.60	\$ -	\$ -	-	0.0001	0.0002	140.00%	at Turnover	Lost Opportunity	LOS5Fast	\$ 0.09	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office - IE	New	Office Equipment	Scanner	ENERGY STAR	Standard	ENERGY STAR	8	\$5.45	\$ -	\$ -	-	0.0001	0.0002	140.00%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.05	7th Plan	7th Plan	ENERGY STAR
ID	Commercial	Small Office - IE	New	Office Equipment	Printer/Copier/Fax	ENERGY STAR	Standard	ENERGY STAR	6	\$1.91	\$ -	\$ -	-	0.0001	0.0002	135.00%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.01	ENERGY STAR	ENERGY STAR	7th Plan
ID	Commercial	Small Office - IE	New	Office Equipment	POS Terminal	ENERGY STAR	Standard	ENERGY STAR	5	\$1.54	\$ -	\$ -	-	0.0001	0.0002	19.00%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office - IE	New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0001	0.0002	24.20%	at Turnover	Lost Opportunity	LOS12Med	\$ -	N/A	N/A	N/A
ID	Commercial	Small Office - IE	New	Miscellaneous	Pool Pump	Standard	Standard	Variable Speed	10	\$303.22	\$ -	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS3Slow	\$ -	DEER	DEER	WorkAppser
ID	Commercial	Small Office - IE	New	Miscellaneous	Pool Heater	Electric Resistance	Standard	Heat Pump	15	\$643.81	\$ -	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS3Slow	\$ -	AEG Research	AEG Research	AEG Research
ID	Commercial	Small Office - IE	New	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS3Slow	\$ -	N/A	N/A	N/A
ID	Commercial	Large Office - IE	Existing	Cooling	Air-Cooled Chiller	COP 3.40 (IEER 15.0)	Standard	COP 4.40 (IEER 15.0)	20	\$218,158.00	\$ -	\$ -	-	0.0001	0.0002	15.1%	at Turnover	Lost Opportunity	LOS2Fast	\$ 164.68	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Cooling	Water-Cooled Chiller	COP 5.78 (IEER 19.7)	Standard	COP 6.66 (IEER 19.7)	25	\$153,993.88	\$ -	\$ -	-	0.0001	0.0002	9.3%	at Turnover	Lost Opportunity	LOS2Fast	\$ 30.44	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Cooling	RTU	IEER 11.2	Standard	IEER 11.2	15	\$54,753.38	\$ -	\$ -	-	0.0001	0.0002	49.00%	at Turnover	Lost Opportunity	LOS2Fast	\$ 244.03	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Cooling	Room AC	IEER 11.0	Standard	IEER 11.0	10	\$35,198.60	\$ -	\$ -	-	0.0001	0.0002	2.6%	at Turnover	Lost Opportunity	LOS2Fast	\$ 131.70	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	New	Heating	Air-Source Heat Pump	IEER 12.0 (COP 3.3)	Standard	IEER 12.0 (COP 3.4)	15	\$263,500.65	\$ -	\$ -	-	0.0001	0.0003	8.3%	at Turnover	Lost Opportunity	LOS2Fast	\$ 244.78	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Cooling	Geothermal Heat Pump	IEER 14.0 (COP 3.5)	Standard	IEER 20.6 (COP 4.0)	25	\$320,820.59	\$ -	\$ -	-	0.0001	0.0002	7.2%	at Turnover	Lost Opportunity	LOS2Med	\$ 56.28	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Heating	Geothermal Heat Pump	IEER 14.0 (COP 3.5)	Standard	IEER 20.6 (COP 4.0)	25	\$320,820.59	\$ -	\$ -	-	0.0001	0.0002	7.2%	at Turnover	Lost Opportunity	LOS2Med	\$ 56.28	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0000	0.0003	1.6%	at Turnover	Lost Opportunity	LOS12Med	\$ -	AEO 2015	AEO 2015	AEG-BEST
ID	Commercial	Large Office - IE	Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	0.0000	0.0003	30.5%	at Turnover	Lost Opportunity	LOS12Med	\$ -	EIA 2014	EIA 2014	AEG-BEST
ID	Commercial	Large Office - IE	Existing	Ventilation	Ventilation	Constant Volume	Variable Air Volume	Standard	20	\$59,015.43	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS2Med	\$ 16.07	AEO 2015	AEO 2015	AEG Research
ID	Commercial	Large Office - IE	Existing	Water Heating	Water Heating	Heat Exchanger, Standard Standby Wattage	NEEA Tier 2 Heat Pump (E.P. 2.0)	Standard	13	\$6,186.80	\$ -	\$ -	-	0.0001	0.0002	45.12%	at Turnover	Lost Opportunity	LOS2Fast	\$ 41.13	AEO 2015	AEO 2015	RTF
ID	Commercial	Large Office - IE	Existing	Interior Lighting	Screen-In	EISA Compliant (13.6 lm/W)	LED 2017 (86.4 lm/W)	Standard	8	\$5,858.79	\$ 918.04	\$ -	-	0.0001	0.0003	100.00%	at Turnover	Lost Opportunity	LOS2Fast	\$ 2.25	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Interior Lighting	Linear Lighting	IEER 112 Standard (69.0 lm/W in/W system)	LED 2017 (110.0 lm/W system)	Standard	17	\$274,380.06	\$ 8,635.69	\$ -	-	0.0001	0.0003	100.00%	at Turnover	Lost Opportunity	LOS2Fast	\$ 39.42	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Interior Lighting	High-Bay Fixtures	LED 2017 (86.4 lm/W)	LED 2017 (86.4 lm/W)	Standard	8	\$9,236.99	\$ -	\$ -	-	0.0001	0.0003	100.00%	at Turnover	Lost Opportunity	LOS2Fast	\$ 31.81	AEO 2015	AEO 2015	7th Plan
ID	Commercial	Large Office - IE	Existing	Interior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)	Standard	8	\$768.05	\$ 120.35	\$ -	-	0.0001	0.0001	100.00%	at Turnover	Lost Opportunity	LOS2Fast	\$ 1.62	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Interior Lighting	Linear Lighting	IEER 112 Standard (69.0 lm/W in/W system)	LED 2017 (110.0 lm/W system)	Standard	17	\$245,711.11	\$ 773.34	\$ -	-	0.0001	0.0001	100.00%	at Turnover	Lost Opportunity	LOS2Fast	\$ 30.25	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Interior Lighting	Area Lighting	Metal Halide (44.3 lm/W)	LED 2017 (87.3 lm/W)	Standard	15	\$8,777.31	\$ 5,820.84	\$ -	-	0.0001	0.0001	100.00%	at Turnover	Lost Opportunity	LOS2Fast	\$ (21.92)	AEO 2015	AEO 2015	7th Plan
ID	Commercial	Large Office - IE	Existing	Refrigeration	Refrigeration	Standard 2017	Standard 2017	Standard	10	\$0.00	\$ -	\$ -	-	0.0001	0.0002	2.4%	at Turnover	Lost Opportunity	LOS3Med	\$ -	EIA 2011	EIA 2011	EIA 2011
ID	Commercial	Large Office - IE	Existing	Refrigeration	Refrigeration	Current Standard	Current Standard	Current Standard	10	\$0.00	\$ -	\$ -	-	0.0001	0.0002	14.0%	at Turnover	Lost Opportunity	LOS3Med	\$ -	RTF	RTF	EIA 2011
ID	Commercial	Large Office - IE	Existing	Refrigeration	Glass Door Display	Current Standard	Standard 2017	Standard	10	\$0.00	\$ -	\$ -	-	0.0001	0.0002	4.0%	at Turnover	Lost Opportunity	LOS5Med	\$ -	RTF	RTF	EIA 2011
ID	Commercial	Large Office - IE	Existing	Refrigeration	Open Display Case	Current Standard	Standard 2017	Standard	10	\$0.00	\$ -	\$ -	-	0.0001	0.0002	4.8%	at Turnover	Lost Opportunity	LOS5Med	\$ -	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Refrigeration	Refrigeration	Current Standard	Current Standard	Current Standard	9	\$50,490.09	\$ -	\$ -	-	0.0001	0.0002	4.0%	at Turnover	Lost Opportunity	LOS5Med	\$ 426.66	EIA 2011	Illinois TRM	ENERGY STAR
ID	Commercial	Large Office - IE	Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	Standard	10	\$2,030.96	\$ -	\$ -	-	0.0001	0.0002	2.1%	at Turnover	Lost Opportunity	LOS5Med	\$ 84.44	EIA 2011	EIA 2011	EIA 2011
ID	Commercial	Large Office - IE	Existing	Food Preparation	Oven	Standard	ENERGY STAR	Standard	10	\$8,592.24	\$ 2,805.17	\$ -	-	0.0001	0.0002	10.0%	at Turnover	Lost Opportunity	LOS5Med	\$ (12.20)	RTF	RTF	EIA 2011
ID	Commercial	Large Office - IE	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	Standard	15	\$15,652.76	\$ -	\$ -	-	0.0001	0.0002	1.0%	at Turnover	Lost Opportunity	LOS5Med	\$ 60.89	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	Standard	15	\$20,232.14	\$ 9,200.99	\$ -	-	0.0001	0.0003	12.0%	at Turnover	Lost Opportunity	LOS5Med	\$ (143.88)	Illinois TRM	Illinois TRM	ENERGY STAR
ID	Commercial	Large Office - IE	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	Standard	20	\$126,841.67	\$ -	\$ -	-	0.0001	0.0003	1.0%	at Turnover	Lost Opportunity	LOS5Med	\$ 106.39	7th Plan	7th Plan	RTF
ID	Commercial	Large Office - IE	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	Standard	9	\$13,667.08	\$ 44,969.18	\$ -	-	0.0001	0.0002	1.0%	at Turnover	Lost Opportunity	LOS5Med	\$ (40.20)	7th Plan	7th Plan	RTF
ID	Commercial	Large Office - IE	Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	Standard	5	\$26.47	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS5Fast	\$ 0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Office Equipment	Laptop	Standard	ENERGY STAR	Standard	4	\$12.92	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.09	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	Standard	5	\$16.68	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS5Fast	\$ 0.09	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Office Equipment	Scanner	Standard	ENERGY STAR	Standard	4	\$9,208.08	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.05	AEG Research	AEG Research	7th Plan
ID	Commercial	Large Office - IE	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	Standard	6	\$1.46	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.01	ENERGY STAR	ENERGY STAR	7th Plan
ID	Commercial	Large Office - IE	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	Standard	5	\$0.29	\$ -	\$ -	-	0.0001	0.0002	57.6%	at Turnover	Lost Opportunity	LOS5Med	\$ 0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IE	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	Standard	15	\$0.00	\$ -	\$ -	-	0.0001	0.0002	89.6%	at Turnover	Lost Opportunity	LOS12Med	\$ -	N/A	N/A	N/A
ID	Commercial	Large Office - IE	Existing	Miscellaneous	Pool Pump	Standard	Standard	Variable Speed	10	\$303.22	\$ -	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS3Slow	\$ -	DEER	DEER	WorkAppser
ID	Commercial	Large Office - IE	Existing	Miscellaneous	Pool Heater	Electric Resistance	Standard	Heat Pump	15	\$643.81	\$ -	\$ -	-	0.0001	0.0002	0.00%	at Turnover	Lost Opportunity	LOS3Slow	\$ -	AEG Research	AEG Research	AEG Research
ID	Commercial	Large Office - IE	Existing	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0001	0.0002	100.00%	at Turnover	Lost Opportunity	LOS3Slow	\$ -	N/A	N/A	N/A
ID	Commercial	Large Office - IE	Existing	Cooling	Air-Cooled Chiller	COP 3.40 (IEER 15.0)	Standard	COP 4.40 (IEER 15.0)	20	\$218,158.00	\$ -	\$ -	-	0.0001	0.0002	15.1%	at Turnover	Lost Opportunity	LOS2Fast	\$ 153.85	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Large Office - IE	Existing	Cooling	Water-Cooled Chiller	COP 5.78 (IEER																	

Measure					Assumptions in First Year (2015)										Sources											
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/Unit	Incremental O&M Costs (\$/Unit)	Annual Average Savings (kWh/Unit)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source			
ID	Commercial	Restaurant	ID	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	15	5,572.09	\$	260.44	-	1,263	0.0002	0.0002	52.5%	At Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM	ENERGY STAR	
ID	Commercial	Restaurant	ID	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	20	\$3,590.35	\$	-	-	3,106	0.0001	0.0002	84.0%	At Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	9	\$386.86	\$	1,272.89	-	28,191	0.0001	0.0002	16.0%	At Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	5	\$0.05	\$	-	-	604	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	Existing	Office Equipment	Laptop	Standard	ENERGY STAR	4	\$0.02	\$	-	-	70	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	5	\$0.03	\$	-	-	94	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Fast	\$	0.08	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	Existing	Office Equipment	Server	Standard	ENERGY STAR	4	\$0.05	\$	-	-	341	0.0001	0.0002	55.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	6	\$0.01	\$	-	-	148	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.02	ENERGY STAR	ENERGY STAR	AEG Research	
ID	Commercial	Restaurant	ID	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	5	\$0.01	\$	-	-	160	0.0001	0.0002	60.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$	-	-	-	0.0001	0.0002	20.0%	At Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A	
ID	Commercial	Restaurant	ID	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	10	\$2.60	\$	-	-	-	0.0001	0.0002	0.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	DEER	DEER	SCF Workpaper	
ID	Commercial	Restaurant	ID	Existing	Miscellaneous	Heat Pump	Standard	Electric Resistance	10	\$5.52	\$	-	-	-	0.0001	0.0002	0.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	AEG Research	AEG Research	N/A	
ID	Commercial	Restaurant	ID	Existing	Miscellaneous	Miscellaneous	Standard	Standard	5	\$0.00	\$	-	-	-	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A	
ID	Commercial	Restaurant	ID	New	Cooling	Air-Cooled Chiller	COP 3.00 (EER 10.4)	COP 4.40 (EER 15.0)	20	\$3,739.85	\$	-	-	1,730	0.0003	0.0001	0.001	0.3%	At Turnover	Lost Opportunity	LO20Fast	\$	198.91	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Restaurant	ID	New	Cooling	Water-Cooled Chiller	COP 5.75 (EER 19.7)	COP 10.66 (EER 36.4)	25	\$2,639.90	\$	-	-	0.0003	0.0001	0.001	0.0%	At Turnover	Lost Opportunity	LO20Fast	\$	198.91	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Restaurant	ID	New	Cooling	RTU	EER 11.2	EER 11.7	15	\$988.63	\$	-	-	442	0.0003	0.0001	85.6%	At Turnover	Lost Opportunity	LO20Fast	\$	233.82	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Restaurant	ID	New	Cooling	Room AC	EER 11.0	EER 13.0	10	\$669.40	\$	-	-	705	0.0003	0.0001	7.0%	At Turnover	Lost Opportunity	LO20Fast	\$	126.19	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Restaurant	ID	New	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	15	\$4,517.15	\$	-	-	1,395	0.0003	0.0001	8.9%	At Turnover	Lost Opportunity	LO20Med	\$	267.75	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Restaurant	ID	New	Cooling	Geothermal Heat Pump	EER 12.0 (COP 3.3)	EER 12.0 (COP 3.4)	15	\$4,517.15	\$	-	-	1,395	0.0003	0.0001	8.9%	At Turnover	Lost Opportunity	LO20Med	\$	267.75	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Restaurant	ID	New	Cooling	Geothermal Heat Pump	EER 20.6 (COP 3.5)	EER 20.6 (COP 3.5)	25	\$5,499.78	\$	-	-	2,871	0.0003	0.0001	4.8%	At Turnover	Lost Opportunity	LO20Med	\$	95.48	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Restaurant	ID	New	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	25	\$5,499.78	\$	-	-	1,713	-	0.0007	4.8%	At Turnover	Lost Opportunity	LO20Med	\$	95.48	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Restaurant	ID	New	Heating	Electric Furnace	Standard	Standard	18	\$0.00	\$	-	-	-	-	0.0007	2.5%	At Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	AEG-BEST	
ID	Commercial	Restaurant	ID	New	Heating	Electric Room Heat	Standard	Standard	18	\$0.00	\$	-	-	-	-	0.0007	0.2%	At Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	EIA 2014	AEG-BEST	
ID	Commercial	Restaurant	ID	New	Ventilation	Ventilation	Constant Volume	Variable Air Volume	20	\$3,934.36	\$	-	-	2,499	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO12Med	\$	144.88	AEO 2015	AEO 2015	AEG Research	
ID	Commercial	Restaurant	ID	New	Water Heating	Water Heater	Resistance Heater, Standard Standby Wattage	NEA Tier 2 Heat Pump (EF 2.0)	13	\$530.91	\$	-	-	1,568	0.0001	0.0002	15.9%	At Turnover	Lost Opportunity	LO12Med	\$	41.13	RTF	RTF	AEG Research	
ID	Commercial	Restaurant	ID	New	Interior Lighting	Interior Lighting	EISA Compliant (13.6 lm/W)	EISA Compliant (13.6 lm/W)	8	\$98.56	\$	15.44	-	63.78	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	1.31	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Interior Lighting	Linear Lighting	T8 - F32 Standard (69.0 lm/W in/W system)	LED 2017 (110.0 lm/W system)	17	\$1,209.98	\$	38.08	-	3,525	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	24.00	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$264.92	\$	-	-	2,310	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	12.38	AEO 2015	AEO 2015	RTF	
ID	Commercial	Restaurant	ID	New	Interior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)	8	\$41.50	\$	6.50	-	734	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	1.63	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Interior Lighting	Area Lighting	T8 - F32 Standard (69.0 lm/W in/W system)	LED 2017 (110.0 lm/W system)	17	\$326.57	\$	10.28	-	758	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	30.13	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Interior Lighting	Area Lighting	Metal Halide (44.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$312.30	\$	87.73	-	3,020	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	(22.12)	AEO 2015	AEO 2015	RTF	
ID	Commercial	Restaurant	ID	New	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	11	\$0.00	\$	-	-	4,116	0.0001	0.0002	76.1%	At Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011	
ID	Commercial	Restaurant	ID	New	Refrigeration	Refrigerator	Current Standard	Standard 2017	11	\$0.00	\$	-	-	3,185	0.0001	0.0002	7.2%	At Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011	
ID	Commercial	Restaurant	ID	New	Refrigeration	Glass Door Display Case	Current Standard	Standard 2017	10	\$0.00	\$	-	-	1,634	0.0001	0.0002	79.8%	At Turnover	Lost Opportunity	LO5Med	\$	-	RTF	RTF	EIA 2011	
ID	Commercial	Restaurant	ID	New	Refrigeration	Open Display Case	Current Standard	Standard 2017	10	\$0.00	\$	-	-	1,841	0.0001	0.0002	26.7%	At Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011	
ID	Commercial	Restaurant	ID	New	Refrigeration	Ice Maker	Current Standard	ENERGY STAR	10	\$1,960.65	\$	-	-	723	0.0001	0.0002	78.1%	At Turnover	Lost Opportunity	LO12Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR	
ID	Commercial	Restaurant	ID	New	Refrigeration	Vending Machine	Current Standard	ENERGY STAR	10	\$78.86	\$	-	-	0.0001	0.0002	0.0%	At Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011		
ID	Commercial	Restaurant	ID	New	Food Preparation	Oven	Standard	ENERGY STAR	10	\$486.42	\$	158.80	-	6,343	0.0002	0.0002	40.0%	At Turnover	Lost Opportunity	LO5Med	\$	(12.20)	RTF	RTF	AEG Research	
ID	Commercial	Restaurant	ID	New	Food Preparation	Fryer	Standard	ENERGY STAR	8	\$886.13	\$	260.44	-	2,559	0.0002	0.0002	156.2%	At Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Food Preparation	Dishwasher	Standard	ENERGY STAR	15	\$2,927.28	\$	260.44	-	6,261	0.0002	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM	ENERGY STAR	
ID	Commercial	Restaurant	ID	New	Food Preparation	Hot Food Container	Standard	ENERGY STAR	20	\$3,590.35	\$	-	-	3,106	0.0001	0.0002	160.0%	At Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Food Preparation	Steamer	Standard	ENERGY STAR	9	\$386.86	\$	1,272.89	-	28,191	0.0001	0.0002	30.5%	At Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Office Equipment	Desktop Computer	Standard	ENERGY STAR	5	\$0.05	\$	-	-	604	0.0001	0.0002	110.0%	At Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Office Equipment	Laptop	Standard	ENERGY STAR	4	\$0.02	\$	-	-	70	0.0001	0.0002	110.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Office Equipment	Monitor	Standard	ENERGY STAR	5	\$0.03	\$	-	-	94	0.0001	0.0002	110.0%	At Turnover	Lost Opportunity	LO5Fast	\$	0.08	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Office Equipment	Server	Standard	ENERGY STAR	4	\$0.05	\$	-	-	341	0.0001	0.0002	55.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	6	\$0.01	\$	-	-	148	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.02	ENERGY STAR	ENERGY STAR	AEG Research	
ID	Commercial	Restaurant	ID	New	Office Equipment	POS Terminal	Standard	ENERGY STAR	5	\$0.01	\$	-	-	160	0.0001	0.0002	78.0%	At Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Restaurant	ID	New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$	-	-	-	0.0001	0.0002	24.0%	At Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A	
ID	Commercial	Restaurant	ID	New	Miscellaneous	Pool Pump	Standard	Variable Speed	10	\$2.60	\$	-	-	-	0.0001	0.0002	0.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	DEER	DEER	SCF Workpaper	
ID	Commercial	Restaurant	ID	New	Miscellaneous	Heat Pump	Standard	Electric Resistance	10	\$5.52	\$	-	-	-	0.0001	0.0002	0.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	AEG Research	AEG Research	N/A	
ID	Commercial	Restaurant	ID	New	Miscellaneous	Miscellaneous	Standard	Standard	5	\$0.00	\$	-	-	-	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A	
ID	Commercial	Retail																								

Measure					Assumptions in First Year (2015)													Sources							
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Average	Summer	Winter	Base Year	Applicability	Replacement	7th Plan Measure	TRC Levelized	Lifetime Source	Costs Source	Savings Source					
									Measure Life (Years)	Incremental \$/Unit	Peak (kW/Unit)	Peak (kWh/Unit)	Saturation		Type	Rate Name	Cost (\$/MWh (20-Year))								
ID	Commercial	Retail	ID	New	Food Preparation	Hot Food Container	Standard	ENERGY STAR	20	\$199,205.81	\$	-	172,313	0.0002	0.0002	1.5%	at Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	RTF	
ID	Commercial	Retail	ID	New	Food Preparation	Steamer	Standard	ENERGY STAR	9	\$21,464.25	\$	70,624.45	\$	-	0.0001	0.0002	0.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	7th Plan	7th Plan	RTF
ID	Commercial	Retail	ID	New	Office Equipment	Desktop Computer	Standard	ENERGY STAR	5	\$16.66	\$	-	19,104	0.0001	0.0002	110.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Retail	ID	New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	4	\$2,783	\$	-	2,783	0.0002	0.0002	110.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.01	7th Plan	7th Plan	RTF	
ID	Commercial	Retail	ID	New	Office Equipment	Monitor	Standard	ENERGY STAR	5	\$105.05	\$	-	2,988	0.0001	0.0002	110.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	RTF	
ID	Commercial	Retail	ID	New	Office Equipment	Server	Standard	ENERGY STAR	4	\$0.78	\$	-	5,394	0.0001	0.0002	98.4%	at Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	RTF	
ID	Commercial	Retail	ID	New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	6	\$0.11	\$	-	2,276	0.0001	0.0002	110.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	RTF	
ID	Commercial	Retail	ID	New	Office Equipment	Terminal	Standard	ENERGY STAR	5	\$0.00	\$	-	5,073	0.0002	0.0002	92.3%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Retail	ID	New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$	-	0.0002	0.0002	0.0002	48.2%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	N/A		
ID	Commercial	Retail	ID	New	Miscellaneous	Pool Pump	Standard	Variable Speed	10	\$13.06	\$	-	-	0.0002	0.0002	0.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	DEER	DEER	SCE Workpaper	
ID	Commercial	Retail	ID	New	Miscellaneous	Pool Heater	Standard	Electric Resistance	15	\$246.55	\$	-	-	0.0002	0.0002	0.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	AEI Research	AEI Research	N/A	
ID	Commercial	Retail	ID	New	Miscellaneous	Miscellaneous	Standard	Miscellaneous	5	\$0.00	\$	-	-	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A	
ID	Commercial	Grocery	ID	Existing	Cooling	Air-Cooled Chiller	Standard	COP 4.0 (EER 10.4)	20	\$36,359.67	\$	-	59,067	0.0003	0.0001	0.5%	at Turnover	Lost Opportunity	LO20Fast	\$	54.56	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Cooling	Water-Cooled Chiller	Standard	COP 5.78 (EER 19.7)	25	\$25,665.65	\$	-	126,038	0.0003	0.0001	0.3%	at Turnover	Lost Opportunity	LO20Fast	\$	16.62	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Cooling	RTU	Standard	EER 11.7	15	\$9,125.56	\$	-	4,992	0.0003	0.0002	75.3%	at Turnover	Lost Opportunity	LO20Fast	\$	201.27	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Cooling	Room AC	Standard	EER 13.0	10	\$5,866.43	\$	-	7,962	0.0003	0.0001	3.5%	at Turnover	Lost Opportunity	LO20Fast	\$	108.61	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Cooling	Air-Source Heat Pump	Standard	EER 11.0 (COP 3.3)	15	\$43,916.77	\$	-	14,931	0.0003	0.0001	3.3%	at Turnover	Lost Opportunity	LO20Fast	\$	257.86	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Heating	Air-Source Heat Pump	Standard	EER 12.0 (COP 3.4)	15	\$43,916.77	\$	-	3,821	0.0003	0.0001	3.3%	at Turnover	Lost Opportunity	LO20Fast	\$	257.86	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Heating	Geothermal Heat Pump	Standard	EER 20.6 (COP 4.0)	25	\$53,470.10	\$	-	23,465	0.0003	0.0001	0.5%	at Turnover	Lost Opportunity	LO20Fast	\$	123.67	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Heating	Geothermal Heat Pump	Standard	EER 20.6 (COP 4.0)	25	\$53,470.10	\$	-	11,831	0.0003	0.0001	0.5%	at Turnover	Lost Opportunity	LO20Fast	\$	123.67	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Heating	Electric Furnace	Standard	Standard	18	\$0.00	\$	-	-	-	-	9.8%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Heating	Electric Room Heat	Standard	Standard	18	\$0.00	\$	-	-	-	-	1.8%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Ventilation	Ventilation	Standard	Variable Air Volume	20	\$11,241.03	\$	-	25,783	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	34.74	EIA 2014	AEO 2015	AEI Research	
ID	Commercial	Grocery	ID	Existing	Water Heating	Water Heater	Standard	Resistance Heater, Standard Standby Wattage	13	\$2,057.50	\$	-	6,076	0.0002	0.0003	17.5%	at Turnover	Lost Opportunity	LO12Med	\$	41.13	RTF	RTF		
ID	Commercial	Grocery	ID	Existing	Interior Lighting	Screen-In	Standard	EISA Compliant (13.6 lm/W)	8	\$90.78	\$	92.57	19,322	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.99	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Interior Lighting	High-Bay Fixtures	Standard	T8 - F32 Standard (69.0 lm/W in/W system)	15	\$36,414.13	\$	1,146.08	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	24.08	7th Plan	7th Plan	RTF		
ID	Commercial	Grocery	ID	Existing	Interior Lighting	High-Bay Fixtures	Standard	Metal Halide (44.3 lm/W)	15	\$7,020.59	\$	-	49,318	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	15.07	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Interior Lighting	Screen-In	Standard	EISA Compliant (17.4 lm/W)	8	\$634.26	\$	99.39	12,932	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	1.59	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Interior Lighting	Screen-In	Standard	T8 - F32 Standard (69.0 lm/W in/W system)	15	\$7,416.56	\$	233.43	16,579	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	31.25	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Interior Lighting	Area Lighting	Standard	Metal Halide (44.3 lm/W)	15	\$1,784.67	\$	1,183.54	37,297	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	24.15	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	Existing	Refrigeration	Walk-In Refrigerator/Freezer	Standard	Standard 2017	11	\$0.00	\$	-	50,483	0.0002	0.0002	16.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011	
ID	Commercial	Grocery	ID	Existing	Refrigeration	Reach-In Refrigerator/Freezer	Standard	Standard 2017	10	\$0.00	\$	-	5,580	0.0002	0.0002	83.1%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011	
ID	Commercial	Grocery	ID	Existing	Refrigeration	Open Display Case	Standard	Standard 2017	10	\$0.00	\$	-	52,254	0.0002	0.0002	96.6%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011	
ID	Commercial	Grocery	ID	Existing	Refrigeration	Iceemaker	Standard	Current Standard	9	\$3,434.78	\$	-	1,267	0.0002	0.0002	66.6%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR	
ID	Commercial	Grocery	ID	Existing	Refrigeration	Vending Machine	Standard	Current Standard	10	\$276.33	\$	-	482	0.0002	0.0002	67.3%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011	ENERGY STAR	
ID	Commercial	Grocery	ID	Existing	Food Preparation	Ovens	Standard	Current Standard	10	\$1,028.08	\$	335.97	13,419	0.0001	0.0002	15.4%	at Turnover	Lost Opportunity	LO5Med	\$	12.20	RTF	RTF		
ID	Commercial	Grocery	ID	Existing	Food Preparation	Dishwasher	Standard	Standard	8	\$1,874.71	\$	-	5,413	0.0001	0.0002	121.8%	at Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Food Preparation	Hot Food Container	Standard	Standard	15	\$2,423.18	\$	1,101.99	5,337	0.0001	0.0002	76.8%	at Turnover	Lost Opportunity	LO5Med	\$	143.88	Illinois TRM	Illinois TRM	ENERGY STAR	
ID	Commercial	Grocery	ID	Existing	Food Preparation	Hot Food Container	Standard	Standard	20	\$15,191.69	\$	-	13,141	0.0001	0.0002	102.2%	at Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Food Preparation	Steamer	Standard	Standard	9	\$16,636.89	\$	5,385.91	119,284	0.0001	0.0002	28.0%	at Turnover	Lost Opportunity	LO5Med	\$	40.20	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Office Equipment	Desktop Computer	Standard	Standard	5	\$0.36	\$	-	4,164	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Office Equipment	Laptop	Standard	Standard	4	\$0.18	\$	-	607	0.0001	0.0002	70.4%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Office Equipment	Server	Standard	Standard	4	\$0.12	\$	-	651	0.0001	0.0002	110.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.01	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Office Equipment	Laptop	Standard	Standard	4	\$0.17	\$	-	1,176	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Office Equipment	Printer/Copier/Fax	Standard	Standard	6	\$0.02	\$	-	496	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	RTF	
ID	Commercial	Grocery	ID	Existing	Office Equipment	Terminal	Standard	Standard	5	\$0.00	\$	-	1,382	0.0001	0.0002	94.6%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	RTF	
ID	Commercial	Grocery	ID	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$	-	-	0.0001	0.0002	34.6%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A	
ID	Commercial	Grocery	ID	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	10	\$43.32	\$	-	-	0.0001	0.0002	0.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	DEER	DEER	SCE Workpaper	
ID	Commercial	Grocery	ID	Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	15	\$91.97	\$	-	-	0.0001	0.0002	0.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	AEI Research	AEI Research	N/A	
ID	Commercial	Grocery	ID	Existing	Miscellaneous	Miscellaneous	Standard	Miscellaneous	5	\$0.00	\$	-	-	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A	
ID	Commercial	Grocery	ID	New	Cooling	Air-Cooled Chiller	Standard	COP 4.0 (EER 10.4)	20	\$53,470.10	\$	-	69,290	0.0003	0.0001	0.6%	at Turnover	Lost Opportunity	LO20Fast	\$	68.04	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	New	Cooling	Water-Cooled Chiller	Standard	COP 5.78 (EER 19.7)	25	\$25,665.65	\$	-	137,191	0.0003	0.0001	0.4%	at Turnover	Lost Opportunity	LO20Fast	\$	15.27	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	New	Cooling	RTU	Standard	EER 11.7	15	\$9,125.56	\$	-	6,495	0.0003	0.0002	79.0%	at Turnover	Lost Opportunity	LO20Fast	\$	156.86	AEO 2015	AEO 2015	AEO 2015	
ID	Commercial	Grocery	ID	New	Cooling																				

Measure					Assumptions in First Year (2015)													Sources							
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Average	Summer	Winter	Base Year	Applicability	Replacement	7th Plan Measure	TRC Levelized	Lifetime Source	Costs Source	Savings Source					
									Measure Life (Years)	Incremental \$/Unit	Peak Factor (kW/WH)	Incremental O&M Costs (\$/Year)	Peak Factor (kW/WH)	Peak Factor (kW/WH)	Year Saturation	Type	Cost (\$/MWh (20-Year))	Source	Source	Source					
ID	Commercial	College-ID	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$1,389.53	5,572.00	-	101,258	0.0001	0.0002	100.0%	11.9%	at Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	RTF	RTF
ID	Commercial	College-ID	Existing	Office Equipment	Laptop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$149.5	-	-	17,053	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	7th Plan	7th Plan
ID	Commercial	College-ID	Existing	Office Equipment	Desktop	Standard	ENERGY STAR	ENERGY STAR	4	\$0.22	-	-	745	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	7th Plan	7th Plan
ID	Commercial	College-ID	Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	5	\$0.01	-	-	2,000	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.01	7th Plan	7th Plan	7th Plan	7th Plan
ID	Commercial	College-ID	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	4	\$0.14	-	-	963	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	7th Plan	7th Plan
ID	Commercial	College-ID	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.12	-	-	2,539	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	7th Plan	7th Plan
ID	Commercial	College-ID	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	\$0.05	-	-	566	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	7th Plan	7th Plan
ID	Commercial	College-ID	Existing	Miscellaneous	Non-HVAC Motors	Standard	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	-	-	100.0	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	N/A	N/A	N/A
ID	Commercial	College-ID	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	Variable Speed	10	\$49.27	-	-	264	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Low	\$	27.48	DEER	DEER	SCE Workpaper	
ID	Commercial	College-ID	Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	Heat Pump	15	\$135.60	-	-	543	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Low	\$	27.49	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	College-ID	Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	Heat Pump	15	\$0.00	-	-	543	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Low	\$	N/A	N/A	N/A	N/A	
ID	Commercial	College-ID	Existing	Cooling	Air-Cooled Chiller	Standard	COP 3.06 (EER 10.4)	COP 4.40 (EER 15.0)	20	\$64,164.12	-	-	67,044	0.0005	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	88.08	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Cooling	Water-Cooled Chiller	Standard	COP 5.78 (EER 19.7)	COP 10.66 (EER 36.4)	25	\$30,798.78	-	-	166,510	0.0005	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	15.10	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Cooling	RTU	Standard	EER 11.2	EER 11.7	15	\$10,950.68	-	-	4,659	0.0005	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	258.76	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Cooling	Room AC	Standard	EER 13.0	EER 13.0	10	\$7,099.72	-	-	7,585	0.0005	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	136.82	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Cooling	Air-Source Heat Pump	Standard	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	15	\$52,700.13	-	-	14,681	0.0005	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Med	\$	219.72	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Heating	Air-Source Heat Pump	Standard	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	15	\$52,700.13	-	-	11,727	-	0.0003	4.3%	at Turnover	Lost Opportunity	LO20Med	\$	219.72	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Heating	Geothermal Heat Pump	Standard	EER 20.6 (COP 4.0)	EER 20.6 (COP 4.0)	25	\$64,164.12	-	-	36,612	0.0005	0.0001	1.1%	at Turnover	Lost Opportunity	LO20Med	\$	53.84	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Heating	Geothermal Heat Pump	Standard	EER 14.0 (COP 3.5)	EER 14.0 (COP 3.5)	25	\$64,164.12	-	-	60,045	-	0.0003	1.1%	at Turnover	Lost Opportunity	LO20Med	\$	53.84	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	-	-	-	-	0.0003	0.0%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	-	-	-	-	0.0003	19.1%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	EIA 2014	AEQ-BEST	
ID	Commercial	College-ID	Existing	Heating	Ventilation	Standard	Constant Volume	Constant Volume	20	\$53,521.74	-	-	46,477	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Med	\$	102.02	AEQ 2015	AEQ 2015	AEQ 2015	
ID	Commercial	College-ID	Existing	Water Heating	Water Heater	Standard	Resistance Heater, Standard Sandby Wattage	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$2,594.77	-	-	7,663	0.0002	0.0003	15.1%	at Turnover	Lost Opportunity	LO12Med	\$	41.13	RTF	RTF		
ID	Commercial	College-ID	Existing	Interior Lighting	Screen-In	Standard	EISA Compliant (13.6 lm/W)	LED 2017 (86.4 lm/W)	8	\$208.52	32.67	-	2,718	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	2.30	7th Plan	7th Plan	7th Plan	
ID	Commercial	College-ID	Existing	Interior Lighting	Linear Lighting	Standard	F18 - F32 Standard (89.0 lm/W in/W system)	LED 2017 (110.0 lm/W system)	17	\$21,214.75	667.70	-	40,379	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	36.74	7th Plan	7th Plan	7th Plan	
ID	Commercial	College-ID	Existing	Interior Lighting	Non-Ray Features	Standard	LED 2017 (86.4 lm/W)	LED 2017 (86.4 lm/W)	15	\$1,899.62	-	-	7,141	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	26.70	7th Plan	7th Plan	7th Plan	
ID	Commercial	College-ID	Existing	Interior Lighting	Screen-In	Standard	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)	8	\$417.99	65.50	-	9,001	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	1.51	7th Plan	7th Plan	7th Plan	
ID	Commercial	College-ID	Existing	Interior Lighting	Linear Lighting	Standard	F18 - F32 Standard (89.0 lm/W in/W system)	LED 2017 (110.0 lm/W system)	17	\$8,322.05	261.92	-	18,820	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	30.76	7th Plan	7th Plan	7th Plan	
ID	Commercial	College-ID	Existing	Interior Lighting	Non-Ray Features	Standard	LED 2017 (86.4 lm/W)	LED 2017 (86.4 lm/W)	15	\$356.00	236.09	-	7,183	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(23.40)	7th Plan	7th Plan	7th Plan	
ID	Commercial	College-ID	Existing	Refrigeration	Walk-In Refrigerator/Freezer	Standard	Standard 2017	Standard 2017	11	\$0.00	-	-	3,888	0.0002	0.0002	10.8%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011	
ID	Commercial	College-ID	Existing	Refrigeration	Reach-In Refrigerator/Freezer	Standard	Standard 2017	Standard 2017	10	\$0.00	-	-	3,008	0.0002	0.0002	18.7%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011	
ID	Commercial	College-ID	Existing	Refrigeration	Glass Door Display	Standard	Standard 2017	Standard 2017	10	\$0.00	-	-	1,544	0.0002	0.0002	11.2%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011	
ID	Commercial	College-ID	Existing	Refrigeration	Open Display Case	Standard	Standard 2017	Standard 2017	10	\$0.00	-	-	1,758	0.0002	0.0002	6.7%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011		
ID	Commercial	College-ID	Existing	Refrigeration	Kemarker	Standard	ENERGY STAR	ENERGY STAR	9	\$3,703.76	-	-	1,366	0.0002	0.0002	39.5%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR	
ID	Commercial	College-ID	Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	ENERGY STAR	10	\$148.98	-	-	260	0.0002	0.0002	12.3%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	EIA 2011		
ID	Commercial	College-ID	Existing	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	\$974.57	285.20	-	34,026	0.0001	0.0001	34.0%	at Turnover	Lost Opportunity	LO5Med	\$	(120.20)	RTF	RTF		
ID	Commercial	College-ID	Existing	Food Preparation	Freezer	Standard	ENERGY STAR	ENERGY STAR	8	\$1,591.41	-	-	4,955	0.0002	0.0003	1.5%	at Turnover	Lost Opportunity	LO5Med	\$	-	60.89	7th Plan	7th Plan	
ID	Commercial	College-ID	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	ENERGY STAR	15	\$2,057.00	935.46	-	4,531	0.0002	0.0003	22.8%	at Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM		
ID	Commercial	College-ID	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$12,895.95	-	-	11,155	0.0002	0.0003	14.8%	at Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan		
ID	Commercial	College-ID	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$1,389.53	4,572.00	-	101,258	0.0001	0.0002	11.9%	at Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan		
ID	Commercial	College-ID	Existing	Office Equipment	Laptop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$149.5	-	-	17,053	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan		
ID	Commercial	College-ID	Existing	Office Equipment	Desktop	Standard	ENERGY STAR	ENERGY STAR	4	\$0.22	-	-	745	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan		
ID	Commercial	College-ID	Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	5	\$0.01	-	-	2,000	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.01	7th Plan	7th Plan		
ID	Commercial	College-ID	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.12	-	-	2,539	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR		
ID	Commercial	College-ID	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	\$0.05	-	-	566	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan		
ID	Commercial	College-ID	Existing	Miscellaneous	Non-HVAC Motors	Standard	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	-	-	100.0	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	N/A		
ID	Commercial	College-ID	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	Variable Speed	10	\$49.27	-	-	264	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Low	\$	27.48	DEER	SCE Workpaper		
ID	Commercial	College-ID	Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	Heat Pump	15	\$135.60	-	-	543	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Low	\$	27.49	AEQ Research	AEQ Research		
ID	Commercial	College-ID	Existing	Miscellaneous	Pool Heater	Standard	Electric Resistance	Heat Pump	15	\$0.00	-	-	543	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Low	\$	N/A	N/A	N/A		
ID	Commercial	College-ID	Existing	Cooling	Air-Cooled Chiller	Standard	COP 3.06 (EER 10.4)	COP 4.40 (EER 15.0)	20	\$43,831.60	-	-	18,323	0.0005	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	215.15	AEQ 2015	AEQ 2015		
ID	Commercial	College-ID	Existing	Cooling	Water-Cooled Chiller	Standard	COP 5.78 (EER 19.7)	COP 10.66 (EER 36.4)	25	\$30,798.78	-	-	83,169	-	-	5.0%	at Turnover	Lost Opportunity	LO20Fast	\$	30.23	AEQ 2015	AEQ 2015		
ID	Commercial	College-ID	Existing	Cooling	RTU	Standard	EER 11.2																		

Measure					Assumptions in First Year (2015)													Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$)	Average Annual Savings (\$/kW/yr)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
ID	Commercial	School-ID	New	Office Equipment	Desktop Computer	ENERGY STAR	Standard	ENERGY STAR	5	\$1.04	\$ -	\$ -	11,916	0.0000	0.0002	140.0%	At Turnover	Lost Opportunity	LO50Fast	\$	0.02	7th Plan	7th Plan
ID	Commercial	School-ID	New	Office Equipment	Laptop	ENERGY STAR	Standard	ENERGY STAR	4	\$0.20	\$ -	\$ -	694	0.0000	0.0002	140.0%	At Turnover	Lost Opportunity	LO5MFast	\$	0.09	7th Plan	7th Plan
ID	Commercial	School-ID	New	Office Equipment	Monitor	ENERGY STAR	Standard	ENERGY STAR	5	\$0.65	\$ -	\$ -	1,864	0.0000	0.0002	140.0%	At Turnover	Lost Opportunity	LO50Fast	\$	0.09	7th Plan	7th Plan
ID	Commercial	School-ID	New	Office Equipment	Printer/Copier/Fax	ENERGY STAR	Standard	ENERGY STAR	5	\$0.20	\$ -	\$ -	1,420	0.0000	0.0002	140.0%	At Turnover	Lost Opportunity	LO5MFast	\$	0.01	ENERGY STAR	ENERGY STAR
ID	Commercial	School-ID	New	Office Equipment	Printer/Copier/Fax	ENERGY STAR	Standard	ENERGY STAR	6	\$0.07	\$ -	\$ -	1,420	0.0000	0.0002	140.0%	At Turnover	Lost Opportunity	LO5MFast	\$	0.01	ENERGY STAR	ENERGY STAR
ID	Commercial	School-ID	New	Office Equipment	POS Terminal	ENERGY STAR	Standard	ENERGY STAR	5	\$0.03	\$ -	\$ -	316	0.0000	0.0001	11.5%	At Turnover	Lost Opportunity	LO5MMed	\$	0.02	7th Plan	7th Plan
ID	Commercial	School-ID	New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	0.0000	0.0001	48.0%	At Turnover	Lost Opportunity	LO12MMed	\$	N/A	N/A	N/A	
ID	Commercial	School-ID	New	Miscellaneous	Pool Pump	Variable Speed	Standard	Variable Speed	10	\$38.70	\$ -	\$ -	208	0.0000	0.0001	39.4%	At Turnover	Lost Opportunity	LO35Low	\$	27.48	DEER	DEER Workpaper
ID	Commercial	School-ID	New	Miscellaneous	Pool Heater	Electric Resistance	Standard	Heat Pump	15	\$106.51	\$ -	\$ -	427	0.0000	0.0001	39.4%	At Turnover	Lost Opportunity	LO35Low	\$	27.49	AEQ Research	AEQ Research
ID	Commercial	School-ID	New	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	0.0000	0.0001	100.0%	At Turnover	Lost Opportunity	LO35Low	\$	N/A	N/A	N/A	
ID	Commercial	Health-ID	Existing	Cooling	Air-Cooled Chiller	COP 3.0 (EER 10.4)	New	COP 4.40 (EER 15.0)	20	\$198,325.46	\$ -	\$ -	352,818	0.0002	0.0001	16.7%	At Turnover	Lost Opportunity	LO20Fast	\$	49.82	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	New	COP 10.66 (EER 36.4)	25	\$139,994.44	\$ -	\$ -	862,673	0.0002	0.0001	66.7%	At Turnover	Lost Opportunity	LO20Fast	\$	13.25	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Cooling	RTU	EER 11.2	New	EER 11.7	15	\$49,775.80	\$ -	\$ -	34,662	0.0002	0.0001	11.0%	At Turnover	Lost Opportunity	LO20Fast	\$	158.11	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Cooling	Room AC	EER 11.0	New	EER 13.0	10	\$31,998.73	\$ -	\$ -	55,283	0.0002	0.0001	0.4%	At Turnover	Lost Opportunity	LO20Fast	\$	85.32	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Cooling	Air-Source Heat Pump	EER 12.0 (COP 3.3)	New	EER 12.0 (COP 3.4)	15	\$239,546.04	\$ -	\$ -	109,293	0.0002	0.0001	1.1%	At Turnover	Lost Opportunity	LOEve20	\$	159.08	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	New	EER 12.0 (COP 3.4)	15	\$239,546.04	\$ -	\$ -	56,498	0.0000	0.0003	1.1%	At Turnover	Lost Opportunity	LOEve20	\$	159.08	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Cooling	Geothermal Heat Pump	EER 14.0 (COP 3.5)	New	EER 20.6 (COP 3.5)	25	\$291,655.08	\$ -	\$ -	330,669	0.0002	0.0001	0.4%	At Turnover	Lost Opportunity	LOEve20	\$	35.80	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	New	EER 20.6 (COP 4.0)	25	\$291,655.08	\$ -	\$ -	314,970	0.0000	0.0003	0.4%	At Turnover	Lost Opportunity	LOEve20	\$	35.80	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	0.0000	0.0003	0.1%	At Turnover	Lost Opportunity	LO12MMed	\$	-	EIA 2014	AE0-BEST	
ID	Commercial	Health-ID	Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	0.0000	0.0003	3.6%	At Turnover	Lost Opportunity	LO12MMed	\$	-	EIA 2014	AE0-BEST	
ID	Commercial	Health-ID	Existing	Ventilation	Ventilation	Constant Volume	Standard	Variable Air Volume	20	\$17,094.10	\$ -	\$ -	672,258	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LOEve20	\$	16.02	AE0 2015	AE0 2015
ID	Commercial	Health-ID	Existing	Water Heating	Water Heater	Resistance Heater, Standard Standby Wattage	Standard	NEEA Tier 2 Heat Pump (EF 2.0)	13	\$24,102.28	\$ -	\$ -	71,174	0.0001	0.0002	32.0%	At Turnover	Lost Opportunity	LO12MMed	\$	41.13	RTF	RTF
ID	Commercial	Health-ID	Existing	Interior Lighting	Screen-In	EISA Compliant (13.6 lm/W)	Standard	LED 1017 (86.4 lm/W)	8	\$4,433.61	\$ 694.72	\$ -	100,411	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	1.33	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Interior Lighting	Linear Lighting	F8 - F32 Standard (69.0 lm/W in/W system)	Standard	LED 1017 (110.0 lm/W in/W system)	17	\$101,533.50	\$ 3,195.61	\$ -	343,326	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	20.68	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Interior Lighting	Linear Lighting	F8 - F32 Standard (69.0 lm/W in/W system)	Standard	LED 1017 (86.4 lm/W in/W system)	15	\$11,462.69	\$ -	\$ -	77,125	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	15.75	AE0 2015	7th Plan
ID	Commercial	Health-ID	Existing	Interior Lighting	High-Bay Fixtures	EISA Compliant (17.4 lm/W)	Standard	LED 2017 (110.0 lm/W in/W system)	8	\$795.40	\$ 110.53	\$ -	110,251	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	3.89	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Interior Lighting	Linear Lighting	F8 - F32 Standard (69.0 lm/W in/W system)	Standard	LED 1017 (110.0 lm/W in/W system)	17	\$12,371.15	\$ 389.36	\$ -	28,940	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	29.89	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Interior Lighting	Area Lighting	Metal Halide (44.3 lm/W)	Standard	LED 2017 (97.3 lm/W)	15	\$3,548.30	\$ 2,353.12	\$ -	78,519	0.0001	0.0001	100.0%	At Turnover	Lost Opportunity	LO20Fast	\$	(22.81)	AE0 2015	7th Plan
ID	Commercial	Health-ID	Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	11	\$0.00	\$ -	\$ -	67,250	0.0001	0.0002	36.3%	At Turnover	Lost Opportunity	LO5MMed	\$	-	EIA 2011	EIA 2011
ID	Commercial	Health-ID	Existing	Refrigeration	Refrigeration	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	26,015	0.0001	0.0002	50.0%	At Turnover	Lost Opportunity	LO5MMed	\$	-	RTF	EIA 2011
ID	Commercial	Health-ID	Existing	Refrigeration	Refrigeration	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	26,699	0.0001	0.0002	8.6%	At Turnover	Lost Opportunity	LO5MMed	\$	-	RTF	EIA 2011
ID	Commercial	Health-ID	Existing	Refrigeration	Refrigeration	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	30,071	0.0001	0.0002	6.7%	At Turnover	Lost Opportunity	LO5MMed	\$	-	EIA 2011	EIA 2011
ID	Commercial	Health-ID	Existing	Refrigeration	Refrigeration	Current Standard	Standard 2017	Standard 2017	10	\$32,028.05	\$ -	\$ -	18,813	0.0000	0.0001	21.3%	At Turnover	Lost Opportunity	LO5MMed	\$	426.66	EIA 2011	Illinois TRM
ID	Commercial	Health-ID	Existing	Refrigeration	Vending Machine	Current Standard	Standard 2017	Standard 2017	10	\$1,288.37	\$ -	\$ -	2,249	0.0001	0.0002	27.9%	At Turnover	Lost Opportunity	LO5MMed	\$	84.44	EIA 2011	EIA 2011
ID	Commercial	Health-ID	Existing	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	\$14,909.86	\$ 4,867.73	\$ -	194,246	0.0002	0.0002	62.2%	At Turnover	Lost Opportunity	LO5MMed	\$	(12.20)	RTF	RTF
ID	Commercial	Health-ID	Existing	Food Preparation	Fryer	Standard	ENERGY STAR	ENERGY STAR	8	\$27,161.77	\$ -	\$ -	78,425	0.0002	0.0002	19.1%	At Turnover	Lost Opportunity	LO5MMed	\$	60.89	7th Plan	Illinois TRM
ID	Commercial	Health-ID	Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	ENERGY STAR	15	\$35,108.24	\$ 15,966.20	\$ -	77,328	0.0002	0.0002	30.9%	At Turnover	Lost Opportunity	LO5MMed	\$	(143.88)	Illinois TRM	ENERGY STAR
ID	Commercial	Health-ID	Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$220,104.61	\$ -	\$ -	190,390	0.0001	0.0002	12.3%	At Turnover	Lost Opportunity	LO5MMed	\$	106.39	7th Plan	RTF
ID	Commercial	Health-ID	Existing	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$23,716.08	\$ 78,033.70	\$ -	1,728,250	0.0001	0.0002	3.6%	At Turnover	Lost Opportunity	LO5MMed	\$	(40.20)	7th Plan	RTF
ID	Commercial	Health-ID	Existing	Office Equipment	Desktop Computer	ENERGY STAR	Standard	ENERGY STAR	5	\$8.28	\$ -	\$ -	95,097	0.0001	0.0002	125.0%	At Turnover	Lost Opportunity	LO50Fast	\$	0.02	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Office Equipment	Laptop	ENERGY STAR	Standard	ENERGY STAR	4	\$16.2	\$ -	\$ -	5,541	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO5MMed	\$	0.09	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Office Equipment	Monitor	ENERGY STAR	Standard	ENERGY STAR	5	\$5.22	\$ -	\$ -	14,873	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO50Fast	\$	0.09	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Office Equipment	Server	ENERGY STAR	Standard	ENERGY STAR	4	\$156	\$ -	\$ -	10,740	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO5MMed	\$	0.05	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Office Equipment	Printer/Copier/Fax	ENERGY STAR	Standard	ENERGY STAR	5	\$0.55	\$ -	\$ -	11,328	0.0001	0.0002	100.0%	At Turnover	Lost Opportunity	LO50Fast	\$	0.02	ENERGY STAR	ENERGY STAR
ID	Commercial	Health-ID	Existing	Office Equipment	POS Terminal	ENERGY STAR	Standard	ENERGY STAR	5	\$0.55	\$ -	\$ -	6,313	0.0001	0.0002	51.0%	At Turnover	Lost Opportunity	LO50Fast	\$	0.02	7th Plan	7th Plan
ID	Commercial	Health-ID	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	0.0000	0.0002	74.1%	At Turnover	Lost Opportunity	LO12MMed	\$	N/A	N/A	N/A	
ID	Commercial	Health-ID	Existing	Miscellaneous	Pool Pump	Variable Speed	Standard	Variable Speed	10	\$38.70	\$ -	\$ -	208	0.0000	0.0001	39.4%	At Turnover	Lost Opportunity	LO35Low	\$	27.48	DEER	DEER Workpaper
ID	Commercial	Health-ID	Existing	Miscellaneous	Pool Heater	Electric Resistance	Standard	Heat Pump	15	\$407.48	\$ -	\$ -	1,632	0.0001	0.0002	5.7%	At Turnover	Lost Opportunity	LO35Low	\$	27.49	AEQ Research	AEQ Research
ID	Commercial	Health-ID	Existing	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	0.0000	0.0001	100.0%	At Turnover	Lost Opportunity	LO35Low	\$	-	N/A	N/A	
ID	Commercial	Health-ID	New	Cooling	Air-Cooled Chiller	COP 4.0 (EER 15.0)	New	COP 4.40 (EER 15.0)	20	\$201,655.08	\$ -	\$ -	414,000	0.0002	0.0001	16.7%	At Turnover	Lost Opportunity	LO20Fast	\$	62.10	AE0 2015	AE0 2015
ID	Commercial	Health-ID	New	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	New	COP 10.66 (EER 36.4)	25	\$139,994.44	\$ -	\$ -	845,720	0.0002	0.0001	66.7%	At Turnover	Lost Opportunity	LO20Fast	\$	12.11	AE0 2015	AE0 2015
ID	Commercial	Health-ID	New	Cooling	RTU	EER 11.2	New	EER 11.7	15	\$49,775.80	\$ -	\$ -	44,472	0.0002	0.0001	11.0%	At Turnover	Lost Opportunity	LO20Fast	\$	123.23	AE0 2015	AE0 2015
ID	Commercial	Health-ID	New	Cooling	Room AC	EER 11.0	New	EER 13.0	10	\$31,998.73	\$ -	\$ -	72,395	0.0002	0.0001	0.4%	At Turnover	Lost Opportunity	LO				

Measure					Assumptions in First Year (2015)															Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Benefits Annual \$/Unit	Incremental O&M Costs (\$)	Average Annual Savings (\$/kW/yr)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
ID	Commercial	Lodging-ID	Existing	Office Equipment	Laptop	Standard	ENERGY STAR	ENERGY STAR	4	\$0.80	\$ -	\$ -	2,744	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.09	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	Existing	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	5	\$1.03	\$ -	\$ -	2,946	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	4	\$0.77	\$ -	\$ -	5,317	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	4	\$0.24	\$ -	\$ -	2,000	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	7th Plan
ID	Commercial	Lodging-ID	Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	\$0.22	\$ -	\$ -	2,500	0.0002	0.0002	38.9%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0002	0.0002	91.3%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A
ID	Commercial	Lodging-ID	Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	Variable Speed	10	\$502.35	\$ -	\$ -	2,694	0.0002	0.0002	66.7%	at Turnover	Lost Opportunity	LO3Slow	\$	27.48	DEER	DEER	SCE Workpaper
ID	Commercial	Lodging-ID	Existing	Miscellaneous	Heat Pump	Standard	Electric Resistance	Heat Pump	15	\$1,362.49	\$ -	\$ -	5,537	0.0002	0.0002	2.0%	at Turnover	Lost Opportunity	LO3Slow	\$	27.49	DEER Research	DEER Research	N/A
ID	Commercial	Lodging-ID	Existing	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A
ID	Commercial	Lodging-ID	New	Cooling	Air-Cooled Chiller	COP 3.06 (EER 10.4)	COP 4.00 (EER 15.0)	COP 4.00 (EER 15.0)	20	\$120,363.04	\$ -	\$ -	44,473	0.0003	0.0000	2.5%	at Turnover	Lost Opportunity	LO20Fast	\$	249.07	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	COP 10.66 (EER 36.4)	COP 10.66 (EER 36.4)	25	\$84,962.14	\$ -	\$ -	58,112	0.0003	0.0000	9.0%	at Turnover	Lost Opportunity	LO20Fast	\$	38.51	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Cooling	RTU	EER 11.7	EER 13.0	EER 13.0	15	\$30,208.76	\$ -	\$ -	16,937	0.0003	0.0000	19.5%	at Turnover	Lost Opportunity	LO20Fast	\$	196.38	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Cooling	Room AC	EER 11.0	EER 13.0	EER 13.0	10	\$19,419.92	\$ -	\$ -	31,939	0.0003	0.0000	48.6%	at Turnover	Lost Opportunity	LO20Fast	\$	89.63	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	EER 12.0 (COP 3.4)	15	\$145,379.67	\$ -	\$ -	53,864	0.0003	0.0000	20.9%	at Turnover	Lost Opportunity	LO20Fast	\$	191.69	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Cooling	Air-Source Heat Pump	EER 12.0 (COP 3.3)	EER 12.0 (COP 3.3)	EER 12.0 (COP 3.3)	15	\$145,379.67	\$ -	\$ -	53,864	0.0003	0.0000	20.9%	at Turnover	Lost Opportunity	LO20Fast	\$	191.69	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Cooling	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	EER 20.6 (COP 4.0)	25	\$177,004.46	\$ -	\$ -	207,322	0.0003	0.0000	4.0%	at Turnover	Lost Opportunity	LO20Fast	\$	42.39	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.6 (COP 4.0)	EER 20.6 (COP 4.0)	25	\$177,004.46	\$ -	\$ -	207,322	0.0003	0.0000	4.0%	at Turnover	Lost Opportunity	LO20Fast	\$	42.39	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	0.0006	4.0%	at Turnover	Lost Opportunity	LO20Fast	\$	-	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	0.0006	1.5%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Lodging-ID	New	Ventilation	Ventilation	Constant Volume	Constant Volume	Constant Volume	20	\$11,241.03	\$ -	\$ -	27,036	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO12Med	\$	35.74	EIA 2014	EIA 2014	7th Plan
ID	Commercial	Lodging-ID	New	Ventilation	Ventilation	Variable Air Volume	Variable Air Volume	Variable Air Volume	20	\$74,940.23	\$ -	\$ -	129,296	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	53.34	AEO 2015	AEO 2015	7th Plan
ID	Commercial	Lodging-ID	New	Water Heating	Water Heater	Resistance Heater, Standard Standby Wattage	Resistance Heater, Standard Standby Wattage	Resistance Heater, Standard Standby Wattage	13	\$24,762.74	\$ -	\$ -	73,128	0.0001	0.0002	38.3%	at Turnover	Lost Opportunity	LO12Med	\$	41.13	RTF	RTF	7th Plan
ID	Commercial	Lodging-ID	New	Water Heating	Water Heater	EISA Compliant (13.6 Mw)	EISA Compliant (13.6 Mw)	EISA Compliant (13.6 Mw)	8	\$61,049.59	\$ 72.31	\$ -	4,742	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	2.98	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Interior Lighting	Linear Lighting	T8 - F32 Standard (69.0 lm/W system)	T8 - F32 Standard (69.0 lm/W system)	T8 - F32 Standard (69.0 lm/W system)	17	\$37,210.42	\$ 1,171.14	\$ -	59,905	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	43.44	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Interior Lighting	High-Bay Fixtures	LED 2017 (97.3 lm/W)	LED 2017 (97.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$5,101.22	\$ -	\$ -	16,156	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	33.05	AEO 2015	AEO 2015	7th Plan
ID	Commercial	Lodging-ID	New	Interior Lighting	Linear Lighting	EISA Compliant (17.4 lm/W)	EISA Compliant (17.4 lm/W)	EISA Compliant (17.4 lm/W)	8	\$1,231.47	\$ 192.97	\$ -	18,516	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	1.93	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Interior Lighting	Linear Lighting	T8 - F32 Standard (69.0 lm/W system)	T8 - F32 Standard (69.0 lm/W system)	T8 - F32 Standard (69.0 lm/W system)	17	\$1,820.09	\$ 57.28	\$ -	4,000	0.0002	0.0002	92.0%	at Turnover	Lost Opportunity	LO20Fast	\$	30.31	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Interior Lighting	Area Lighting	LED 2017 (97.3 lm/W)	LED 2017 (97.3 lm/W)	LED 2017 (97.3 lm/W)	15	\$4,995.63	\$ 3,312.94	\$ -	99,331	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(25.28)	AEO 2015	AEO 2015	7th Plan
ID	Commercial	Lodging-ID	New	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Current Standard	Current Standard	11	\$0.00	\$ -	\$ -	43,968	0.0002	0.0002	3.9%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
ID	Commercial	Lodging-ID	New	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Current Standard	Current Standard	11	\$0.00	\$ -	\$ -	43,968	0.0002	0.0002	3.9%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
ID	Commercial	Lodging-ID	New	Refrigeration	Glass Door Display	Current Standard	Current Standard	Current Standard	10	\$0.00	\$ -	\$ -	17,456	0.0002	0.0002	52.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	RTF	EIA 2011	EIA 2011
ID	Commercial	Lodging-ID	New	Refrigeration	Open Display Case	Current Standard	Current Standard	Current Standard	10	\$0.00	\$ -	\$ -	-	0.0002	0.0002	0.0%	at Turnover	Lost Opportunity	LO5Med	\$	-	EIA 2011	EIA 2011	EIA 2011
ID	Commercial	Lodging-ID	New	Refrigeration	Overen	Current Standard	Current Standard	Current Standard	9	\$41,881.68	\$ -	\$ -	15,446	0.0002	0.0002	115.6%	at Turnover	Lost Opportunity	LO5Med	\$	426.66	EIA 2011	Illinois TRM	ENERGY STAR
ID	Commercial	Lodging-ID	New	Refrigeration	Wending Machine	Current Standard	Current Standard	Current Standard	9	\$1,618.69	\$ -	\$ -	2,826	0.0002	0.0002	8.3%	at Turnover	Lost Opportunity	LO5Med	\$	84.44	EIA 2011	Illinois TRM	ENERGY STAR
ID	Commercial	Lodging-ID	New	Food Preparation	Oven	Standard	ENERGY STAR	ENERGY STAR	10	\$4,816.71	\$ 1,572.55	\$ -	62,810	0.0002	0.0003	31.2%	at Turnover	Lost Opportunity	LO5Med	\$	(12.20)	RTF	RTF	7th Plan
ID	Commercial	Lodging-ID	New	Food Preparation	Fryer	Standard	ENERGY STAR	ENERGY STAR	8	\$8,774.76	\$ -	\$ -	25,336	0.0002	0.0003	5.2%	at Turnover	Lost Opportunity	LO5Med	\$	60.89	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Food Preparation	Dishwasher	Standard	ENERGY STAR	ENERGY STAR	8	\$11,241.03	\$ 1,557.97	\$ -	20,000	0.0002	0.0003	13.0%	at Turnover	Lost Opportunity	LO5Med	\$	(143.88)	Illinois TRM	Illinois TRM	
ID	Commercial	Lodging-ID	New	Food Preparation	Hot Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$71,106.01	\$ -	\$ -	61,507	0.0002	0.0003	13.0%	at Turnover	Lost Opportunity	LO5Med	\$	106.39	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$7,661.61	\$ 25,209.22	\$ -	58,321	0.0001	0.0002	5.2%	at Turnover	Lost Opportunity	LO5Med	\$	(40.20)	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Office Equipment	Desktop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$1.64	\$ -	\$ -	18,834	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	4	\$0.77	\$ -	\$ -	2,946	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	5	\$1.03	\$ -	\$ -	2,946	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.09	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	4	\$0.77	\$ -	\$ -	5,317	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Fast	\$	0.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.11	\$ -	\$ -	2,244	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LO5Med	\$	0.01	ENERGY STAR	ENERGY STAR	
ID	Commercial	Lodging-ID	New	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	\$0.22	\$ -	\$ -	2,500	0.0002	0.0002	42.8%	at Turnover	Lost Opportunity	LO5Med	\$	0.02	7th Plan	7th Plan	7th Plan
ID	Commercial	Lodging-ID	New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0002	0.0002	109.5%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	N/A	N/A
ID	Commercial	Lodging-ID	New	Miscellaneous	Pool Pump	Standard	Variable Speed	Variable Speed	10	\$502.35	\$ -	\$ -	2,694	0.0002	0.0002	80.1%	at Turnover	Lost Opportunity	LO3Slow	\$	27.48	DEER	DEER	SCE Workpaper
ID	Commercial	Lodging-ID	New	Miscellaneous	Heat Pump	Standard	Electric Resistance	Heat Pump	15	\$1,362.49	\$ -	\$ -	5,537	0.0002	0.0002	3.5%	at Turnover	Lost Opportunity	LO3Slow	\$	27.49	DEER Research	DEER Research	N/A
ID	Commercial	Lodging-ID	New	Miscellaneous	Miscellaneous	Standard	Standard	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LO3Slow	\$	-	N/A	N/A	N/A
ID	Commercial	Warehouse-ID	Existing	Cooling	Air-Cooled Chiller	COP 3.06 (EER 10.4)	COP 4.00 (EER 15.0)	COP 4.00 (EER 15.0)	20	\$43,631.60	\$ -	\$ -	55,015	-	-	2.5%	at Turnover	Lost Opportunity	LO20Fast	\$	72.99	AEO 2015	AEO 2015	AEO 2015
ID	Commercial	Warehouse-ID	Existing	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	COP 10.66 (EER 36.4)	COP 10.66 (EER 36.4)																

Measure					Assumptions in First Year (2015)														Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Annual Savings (kWh/Unit \$/Year)	Summer Coincident (kW/Unit)	Winter Coincident (kW/Unit)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
19	ID	Commercial	Warehouse - ID New	Office Equipment	Monitor	Standard	ENERGY STAR	ENERGY STAR	5	\$0.63	\$ -	\$ -	1,803	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LOS5Fast	\$	0.09	7th Plan	7th Plan	7th Plan
19	ID	Commercial	Warehouse - ID New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	4	\$0.94	\$ -	\$ -	6,508	0.0001	0.0002	111.3%	at Turnover	Lost Opportunity	LOS5Med	\$	0.05	7th Plan	7th Plan	7th Plan
19	ID	Commercial	Warehouse - ID New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.07	\$ -	\$ -	1,373	0.0001	0.0002	125.0%	at Turnover	Lost Opportunity	LOS5Med	\$	0.01	ENERGY STAR	ENERGY STAR	ENERGY STAR
19	ID	Commercial	Warehouse - ID New	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	5	\$0.00	\$ -	\$ -	3,061	0.0002	0.0003	6.7%	at Turnover	Lost Opportunity	LOS5Med	\$	0.02	7th Plan	7th Plan	7th Plan
19	ID	Commercial	Warehouse - ID New	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0002	0.0003	59.8%	at Turnover	Lost Opportunity	LO12Med	\$	N/A	N/A	N/A	
19	ID	Commercial	Warehouse - ID New	Miscellaneous	Pool Pump	Standard	Variable Speed	Standard	10	\$86.63	\$ -	\$ -	-	0.0002	0.0003	0.0%	at Turnover	Lost Opportunity	LOS3Low	\$	-	DEER	SCF Workpaper	
19	ID	Commercial	Warehouse - ID New	Miscellaneous	Pool Heater	Electric Resistance	Heat Pump	Standard	15	\$189.95	\$ -	\$ -	-	0.0002	0.0003	0.0%	at Turnover	Lost Opportunity	LOS3Low	\$	-	AG Research	AG Research	
19	ID	Commercial	Warehouse - ID New	Miscellaneous	Pool Pump	Standard	Variable Speed	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LOS3Low	\$	-	N/A	AG Research	
19	ID	Commercial	Miscellaneous - Existing	Cooling	Air-Cooled Chiller	COP 4.40 (EER 10.4)	COP 4.40 (EER 10.4)	Standard	20	\$9,972.94	\$ -	\$ -	5,574	0.0007	0.0007	7.8%	at Turnover	Lost Opportunity	LO20Fast	\$	164.66	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	COP 5.78 (EER 19.7)	Standard	25	\$7,039.72	\$ -	\$ -	19,313	0.0007	-	4.0%	at Turnover	Lost Opportunity	LO20Fast	\$	29.76	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Cooling	RTU	EER 11.2	EER 11.2	Standard	15	\$2,503.01	\$ -	\$ -	765	0.0007	-	45.9%	at Turnover	Lost Opportunity	LO20Fast	\$	360.27	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Cooling	Room AC	EER 11.0	EER 11.0	Standard	10	\$1,609.08	\$ -	\$ -	1,220	0.0007	-	4.1%	at Turnover	Lost Opportunity	LO20Fast	\$	194.42	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	Standard	15	\$12,045.74	\$ -	\$ -	2,414	0.0007	-	7.2%	at Turnover	Lost Opportunity	LOEve20	\$	316.54	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Heating	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	Standard	15	\$12,045.74	\$ -	\$ -	1,776	0.0007	0.0005	7.2%	at Turnover	Lost Opportunity	LOEve20	\$	316.54	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.0 (COP 4.0)	Standard	25	\$14,666.08	\$ -	\$ -	7,211	0.0007	0.0005	1.9%	at Turnover	Lost Opportunity	LOEve20	\$	66.74	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 20.0 (COP 4.0)	Standard	25	\$14,666.08	\$ -	\$ -	10,086	-	0.0005	1.9%	at Turnover	Lost Opportunity	LOEve20	\$	66.74	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - Existing	Heating	Electric Furnace	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	0.0005	7.5%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO BEST	
19	ID	Commercial	Miscellaneous - Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	0.0005	8.9%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	AEO BEST	
19	ID	Commercial	Miscellaneous - Existing	Heating	Electric Room Heat	Standard	Standard	Standard	18	\$0.00	\$ -	\$ -	-	-	0.0005	8.9%	at Turnover	Lost Opportunity	LO12Med	\$	-	EIA 2014	AEO BEST	
19	ID	Commercial	Miscellaneous - Existing	Water Heating	Water Heater	Resistance Heat, Standard Standby Wattage	NEA Tier 2 Heat Pump (EF 2.0)	Standard	13	\$483.44	\$ -	\$ -	1,428	0.0001	0.0004	12.4%	at Turnover	Lost Opportunity	LO12Med	\$	23.26	EIA 2014	AG Research	
19	ID	Commercial	Miscellaneous - Existing	Water Heating	Water Heater	Resistance Heat, Standard Standby Wattage	NEA Tier 2 Heat Pump (EF 2.0)	Standard	13	\$483.44	\$ -	\$ -	1,428	0.0001	0.0004	12.4%	at Turnover	Lost Opportunity	LO12Med	\$	23.26	EIA 2014	AG Research	
19	ID	Commercial	Miscellaneous - Existing	Interior Lighting	Screen-In	EISA Compliant (13.6 lm/W)	LED 2017 (86.4 lm/W)	Standard	8	\$72.35	\$ 11.34	\$ -	1,224	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	1.85	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Interior Lighting	Screen-In	F18 - F32 Standard (89.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)	Standard	17	\$2,808.25	\$ 88.39	\$ -	6,263	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	31.36	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Interior Lighting	High-Bay Fixtures	Standard	Metal Halide (44.3 lm/W)	Standard	15	\$377.03	\$ -	\$ -	2,002	0.0001	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	20.14	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Interior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)	Standard	8	\$61.13	\$ 9.58	\$ -	1,174	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	1.64	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Interior Lighting	Screen-In	F18 - F32 Standard (89.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)	Standard	17	\$502.62	\$ 15.82	\$ -	1,176	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	29.89	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Interior Lighting	Screen-In	EISA Compliant (14.3 lm/W)	LED 2017 (86.4 lm/W)	Standard	15	\$58.26	\$ 38.64	\$ -	1,336	0.0001	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(21.03)	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	11	\$0.00	\$ -	\$ -	1,870	0.0001	0.0002	9.0%	at Turnover	Lost Opportunity	LOS5Med	\$	-	EIA 2011	EIA 2011	
19	ID	Commercial	Miscellaneous - Existing	Refrigeration	Walk-In Refrigerator/Freezer	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	-	0.0001	0.0002	0.0%	at Turnover	Lost Opportunity	LOS5Med	\$	-	RTF	EIA 2011	
19	ID	Commercial	Miscellaneous - Existing	Refrigeration	Glass Door Display	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	742	0.0001	0.0002	21.0%	at Turnover	Lost Opportunity	LOS5Med	\$	-	RTF	EIA 2011	
19	ID	Commercial	Miscellaneous - Existing	Refrigeration	Open Display Case	Current Standard	Standard 2017	Standard 2017	10	\$0.00	\$ -	\$ -	-	0.0001	0.0002	0.0%	at Turnover	Lost Opportunity	LOS5Med	\$	-	EIA 2011	EIA 2011	
19	ID	Commercial	Miscellaneous - Existing	Refrigeration	Kemarker	Current Standard	ENERGY STAR	ENERGY STAR	9	\$890.45	\$ -	\$ -	328	0.0001	0.0002	41.6%	at Turnover	Lost Opportunity	LOS5Med	\$	426.66	EIA 2011	Illinois TRM	
19	ID	Commercial	Miscellaneous - Existing	Refrigeration	Vending Machine	Standard	ENERGY STAR	ENERGY STAR	10	\$17.64	\$ -	\$ -	125	0.0001	0.0002	28.6%	at Turnover	Lost Opportunity	LOS5Med	\$	84.44	EIA 2011	EIA 2011	
19	ID	Commercial	Miscellaneous - Existing	Food Preparation	Fryer	Standard	ENERGY STAR	ENERGY STAR	10	\$125.27	\$ 40.90	\$ -	1,634	0.0001	0.0002	40.1%	at Turnover	Lost Opportunity	LOS5Med	\$	(12.20)	EIA 2011	RTF	
19	ID	Commercial	Miscellaneous - Existing	Food Preparation	Fryer	Standard	ENERGY STAR	ENERGY STAR	8	\$228.21	\$ -	\$ -	659	-	-	4.1%	at Turnover	Lost Opportunity	LOS5Med	\$	60.89	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Food Preparation	Dishwasher	Standard	ENERGY STAR	ENERGY STAR	15	\$294.98	\$ 134.15	\$ -	650	-	-	4.1%	at Turnover	Lost Opportunity	LOS5Med	\$	(143.89)	Illinois TRM	Illinois TRM	
19	ID	Commercial	Miscellaneous - Existing	Food Preparation	Hot Food Container	Standard	ENERGY STAR	ENERGY STAR	20	\$1,848.32	\$ -	\$ -	1,600	-	-	18.9%	at Turnover	Lost Opportunity	LOS5Med	\$	106.39	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Food Preparation	Steamer	Standard	ENERGY STAR	ENERGY STAR	9	\$199.26	\$ 65.64	\$ -	14,521	0.0002	0.0002	2.4%	at Turnover	Lost Opportunity	LOS5Med	\$	(40.20)	7th Plan	RTF	
19	ID	Commercial	Miscellaneous - Existing	Office Equipment	Desktop Computer	Standard	ENERGY STAR	ENERGY STAR	5	\$0.17	\$ -	\$ -	1,986	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOS5Fast	\$	0.02	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Office Equipment	Laptop	Standard	ENERGY STAR	ENERGY STAR	4	\$0.08	\$ -	\$ -	289	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOS5Fast	\$	0.09	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	4	\$0.08	\$ -	\$ -	289	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOS5Fast	\$	0.09	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Office Equipment	Server	Standard	ENERGY STAR	ENERGY STAR	4	\$0.08	\$ -	\$ -	563	0.0002	0.0002	66.0%	at Turnover	Lost Opportunity	LOS5Med	\$	0.05	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Office Equipment	Printer/Copier/Fax	Standard	ENERGY STAR	ENERGY STAR	6	\$0.01	\$ -	\$ -	237	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOS5Med	\$	0.01	ENERGY STAR	ENERGY STAR	
19	ID	Commercial	Miscellaneous - Existing	Office Equipment	POS Terminal	Standard	ENERGY STAR	ENERGY STAR	5	\$0.02	\$ -	\$ -	264	0.0002	0.0002	22.7%	at Turnover	Lost Opportunity	LOS5Med	\$	0.02	7th Plan	7th Plan	
19	ID	Commercial	Miscellaneous - Existing	Miscellaneous	Non-HVAC Motors	Standard (NEMA Premium)	Standard (NEMA Premium)	Standard (NEMA Premium)	15	\$0.00	\$ -	\$ -	-	0.0002	0.0003	59.8%	at Turnover	Lost Opportunity	LO12Med	\$	-	N/A	AG Research	
19	ID	Commercial	Miscellaneous - Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	Standard	10	\$21.09	\$ -	\$ -	113	0.0002	0.0002	11.6%	at Turnover	Lost Opportunity	LOS3Low	\$	27.48	DEER	SCF Workpaper	
19	ID	Commercial	Miscellaneous - Existing	Miscellaneous	Pool Heater	Electric Resistance	Heat Pump	Standard	15	\$58.05	\$ -	\$ -	233	0.0002	0.0002	5.6%	at Turnover	Lost Opportunity	LOS3Low	\$	27.49	AG Research	AG Research	
19	ID	Commercial	Miscellaneous - Existing	Miscellaneous	Pool Pump	Standard	Variable Speed	Standard	5	\$0.00	\$ -	\$ -	-	0.0002	0.0003	100.0%	at Turnover	Lost Opportunity	LOS3Low	\$	-	N/A	AG Research	
19	ID	Commercial	Miscellaneous - New	Cooling	Air-Cooled Chiller	COP 4.40 (EER 10.4)	COP 4.40 (EER 10.4)	Standard	20	\$9,972.94	\$ -	\$ -	8,989	0.0007	0.0007	10.6%	at Turnover	Lost Opportunity	LO20Fast	\$	98.78	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - New	Cooling	Water-Cooled Chiller	COP 5.78 (EER 19.7)	COP 5.78 (EER 19.7)	Standard	25	\$7,039.72	\$ -	\$ -	21,022	0.0007	-	5.5%	at Turnover	Lost Opportunity	LO20Fast	\$	27.34	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - New	Cooling	RTU	EER 11.2	EER 11.2	Standard	15	\$2,503.01	\$ -	\$ -	1,002	0.0007	-	62.3%	at Turnover	Lost Opportunity	LO20Fast	\$	275.08	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - New	Cooling	Room AC	EER 11.0	EER 11.0	Standard	10	\$1,609.08	\$ -	\$ -	1,298	0.0007	-	5.6%	at Turnover	Lost Opportunity	LO20Fast	\$	146.46	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - New	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)	Standard	15	\$12,045.74	\$ -	\$ -	3,161	0.0007	-	9.8%	at Turnover	Lost Opportunity	LOEve20	\$	254.51	AEO 2015	AEO 2015	
19	ID	Commercial	Miscellaneous - New																					

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Commercial	Small Office - V	Existing	Cooling	Ductless Mini Split Heat Pump	None	Installed	15	\$155,107.61	\$ -	\$ -	4,915	0.0008	-	15.2%	75.0%	RetiroMed	\$	721.15	RTF	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Heating	Ductless Mini Split Heat Pump	None	Installed	15	\$155,107.61	\$ -	\$ -	13,690	-	0.0006	-	10.2%	75.0%	RetiroMed	\$	721.15	RTF	7th Plan	7th Plan
WA	Commercial	Small Office - V	Existing	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$ -	\$ -	4,065	0.0008	-	10.0%	10.0%	RetiroVen20	\$	70.37	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$ -	\$ -	10,046	0.0006	-	10.0%	10.0%	RetiroVen20	\$	70.37	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$ -	\$ -	1,596	0.0001	0.0002	10.0%	10.0%	RetiroVen20	\$	70.37	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Water Heating	Water Heater - Faucet Aer/1.39 GPM Average Baseline	Standard Faucet	1.5 GPM Showerhead	10	\$102.01	\$ -	\$ -	43	0.0001	0.0002	25.1%	65.0%	Retiro20fast	\$	269.78	DEER	Illinois TRM	Illinois TRM	
WA	Commercial	Small Office - V	Existing	Water Heating	Water Heater - Faucet Aer/1.39 GPM Average Baseline	Standard Faucet	Motion Sensor-Controlled Faucet	3	\$76.51	\$ -	\$ -	18	0.0001	0.0002	25.0%	65.0%	Retiro20fast	\$	269.78	DEER	Illinois TRM	Illinois TRM	
WA	Commercial	Small Office - V	Existing	Water Heating	Water Heater - Low Flow/1.2 GPM Showerhead	Standard Efficiency Pump	High Efficiency Pump	15	\$89.98	\$ -	\$ -	251	0.0001	0.0002	15.0%	25.0%	Retiro20fast	\$	(14,742.5)	AEQ Research	AEQ Research	AEQ Research	
WA	Commercial	Small Office - V	Existing	Water Heating	Water Heater - High Efficiency	Uninsulated Pipe	R-1.5 Insulation Installed	15	\$75.75	\$ -	\$ -	480	0.0001	0.0002	25.2%	75.0%	Retiro12Med	\$	31.81	Hawaii TRM	Hawaii TRM	Hawaii TRM	
WA	Commercial	Small Office - V	Existing	Water Heating	Water Heater - Pre-Rinse 1.33 GPM Kitchen Spray Valve	Water Heater - Pre-Rinse 1.33 GPM Kitchen Spray Valve	Water Set at 135°F	15	\$136.68	\$ 897.43	\$ -	30	0.0001	0.0002	25.1%	65.0%	Retiro12Med	\$	14.35	Illinois TRM	Illinois TRM	AEQ BEST	
WA	Commercial	Small Office - V	Existing	Water Heating	Water Heater - Pre-Rinse 1.33 GPM Kitchen Spray Valve	Water Heater - Pre-Rinse 1.33 GPM Kitchen Spray Valve	Water Set at 135°F	15	\$121.15	\$ -	\$ -	246	0.0001	0.0002	15.2%	75.0%	Retiro12Med	\$	(14,647.40)	RTF	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Water Heating	Water Heater - Solar System	Standard Electric Unit	SEF 2.5 Solar Unit	20	\$1,091.85	\$ -	\$ -	1,654	0.0001	0.0002	1.0%	15.0%	Retiro12Med	\$	23.67	Illinois TRM	Illinois TRM	AEQ BEST	
WA	Commercial	Small Office - V	Existing	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	\$2,728.60	\$ -	\$ -	2,218	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L020fast	\$	102.68	7th Plan	7th Plan	7th Plan
WA	Commercial	Small Office - V	Existing	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$4,502.19	\$ -	\$ -	3,059	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L020fast	\$	121.02	7th Plan	7th Plan	7th Plan
WA	Commercial	Small Office - V	Existing	Interior Lighting	Interior Lighting - LEC Exit	Baseline LED Sign	Light Emitting Capacitor Sign	15	\$221.19	\$ -	\$ -	260	0.0002	0.0003	1.7%	5.0%	Retiro20fast	\$	71.20	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Interior Lighting	Interior Fluorescent - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls	16	\$14,696.31	\$ -	\$ -	1,424	0.0002	0.0003	6.7%	15.0%	Retiro12Med	\$	795.87	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Interior Lighting	Interior Fluorescent - Deluxe	Overlfit Fixture	Property LIT Fixture	11	\$25.04	\$ -	\$ -	2,184	0.0002	0.0003	16.7%	25.0%	Retiro12Med	\$	1.20	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Exterior Lighting	Exterior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls	8.6	\$446.85	\$ -	\$ -	875	0.0001	0.0001	15.4%	25.0%	Retiro12Med	\$	61.03	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Exterior Lighting	Exterior Lighting - Photo	None	PhotoCell and/or Motion Based Controls	8	\$483.70	\$ -	\$ -	487	0.0001	0.0001	60.0%	60.0%	Retiro12Med	\$	121.75	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper	
WA	Commercial	Small Office - V	Existing	Exterior Lighting	Exterior Lighting - Photocell	None	Solar-Powered Unit Installed	7	\$29,664.65	\$ -	\$ -	599	0.0001	0.0001	15.4%	25.0%	Retiro12Med	\$	6,664.20	AEQ Research	AEQ Research	AEQ Research	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - Anti-Sweat	No Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.25	\$ -	\$ -	158	0.0002	0.0002	1.6%	25.0%	Retiro12Med	\$	902.84	RTF	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - Door Gasket	Leaky Case Doors	Sealed Case Doors	4	\$21.26	\$ -	\$ -	125	0.0002	0.0002	1.6%	25.0%	Retiro12Med	\$	45.27	RTF	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - Evaporator	Load-Based Fan Controls	Fixed Fan Controls	16	\$503.65	\$ -	\$ -	381	0.0002	0.0002	1.6%	25.0%	Retiro12Med	\$	117.13	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - Floating Head	Wet/Bub Flow Controls	Wet/Bub Flow Controls	15	\$14,471.14	\$ -	\$ -	753	0.0002	0.0002	1.6%	25.0%	Retiro12Med	\$	1,747.91	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - Strip Curtains	No Strip Curtains	Strip Curtains Installed	15	\$296.14	\$ -	\$ -	296	0.0002	0.0002	1.6%	25.0%	Retiro12Med	\$	1,747.91	7th Plan	7th Plan	7th Plan	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$ -	\$ -	37	0.0002	0.0002	1.6%	25.0%	Retiro12Med	\$	1,469.57	AEQ 2015	RTF	RTF	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - Variable Speed	Inefficient Compressor Loading	Variable Speed Compressor Loading	15	\$31,946.43	\$ -	\$ -	1,465	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	1,947.13	DEER	Illinois TRM	AEQ 2015	
WA	Commercial	Small Office - V	Existing	Refrigeration	Refrigeration - Demand Defrost	Standard Demand Defrost																	

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Advanced Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Annual Average Savings (\$/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	WA	Commercial	Small Office - V New	Water Heating	Water Heater - Temperature	Water Heater at 125°F	Water Set at 120°F	Water Set at 120°F	2	\$12.15	\$	\$	263	0.0001	0.0002	15.2%	75.0%	Retrofit	Retro12Med	\$	22.54	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Small Office - V New	Water Heating	Water Heater - Solar System	Standard Electric Unit	SEF 2.5 Solar Unit	SEF 2.5 Solar Unit	20	\$1,091.85	\$	\$	1,752	0.0001	0.0002	1.0%	15.0%	Retrofit	Retro12Med	\$	46.59	AEO 2015	AEO 2015	AGG BEST
WA	WA	Commercial	Small Office - V New	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	Enhanced Controls	15	\$2,728.60	\$	\$	2,376	0.0002	0.0003	13.1%	at Turnover	Low Opportunity	L020Fast	\$	103.66	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	Enhanced Controls	13	\$4,502.19	\$	\$	3,902	0.0002	0.0003	13.1%	at Turnover	Low Opportunity	L020Fast	\$	122.02	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Interior Lighting	Interior Lighting - LEC Exit	Baseline LED Sign	Light Emitting Capacitor Sign	Light Emitting Capacitor Sign	15	\$221.19	\$	\$	255	0.0002	0.0003	6.7%	15.0%	Retrofit	Retro20Fast	\$	71.80	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Interior Lighting	Interior Fluorescent - Bi-LED	Single Level Lighting Controls	Two Level Lighting Controls	Two Level Lighting Controls	16	\$14,696.31	\$	\$	1,386	0.0002	0.0003	1.7%	15.0%	Retrofit	Retro12Med	\$	790.33	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Interior Lighting	Interior Fluorescent - Deluxe	OverLight Fixture	Property LIT Fixture	Property LIT Fixture	11	\$25.04	\$	\$	2,168	0.0002	0.0003	16.7%	25.0%	Retrofit	Retro12Med	\$	1.19	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Small Office - V New	Interior Lighting	Interior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls	Two Level Lighting Controls	8.6	\$446.85	\$	\$	834	0.0001	0.0001	25.0%	15.0%	Retrofit	Retro12Med	\$	62.39	7th Plan	7th Plan	Michigan Energy Measures Datab
WA	WA	Commercial	Small Office - V New	Exterior Lighting	Exterior Lighting - Enhanced	Standard Controls	PhotoCell and/or Motion Based Controls	PhotoCell and/or Motion Based Controls	8	\$483.70	\$	\$	461	0.0001	0.0001	60.0%	60.0%	Retrofit	Retro12Med	\$	124.47	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
WA	WA	Commercial	Small Office - V New	Exterior Lighting	Exterior Lighting - PhotoVoc	None	Solar Powered Unit Installed	Solar Powered Unit Installed	7	\$29,664.65	\$	\$	555	0.0001	0.0001	15.6%	30.0%	Retrofit	Retro12Med	\$	6,811.02	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Anti-Sweat	None	Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$	\$	125	0.0002	0.0002	1.6%	25.0%	Retrofit	Retro12Med	\$	1,155.08	RTF	RTF	RTF
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Door Gasket	Sealed Case Doors	Sealed Case Doors	Sealed Case Doors	4	\$121.26	\$	\$	98	0.0002	0.0002	1.6%	25.0%	Retrofit	Retro12Med	\$	58.05	RTF	RTF	RTF
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Evaporator	Standard Controls	Load-Based Fan Controls	Load-Based Fan Controls	16	\$503.65	\$	\$	296	0.0002	0.0002	1.6%	25.0%	Retrofit	Retro12Med	\$	150.30	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Floating Head	Fixed Discharge Pressure Controls	Webtub Breat Controls	Webtub Breat Controls	15	\$14,471.14	\$	\$	678	0.0002	0.0002	1.6%	25.0%	Retrofit	Retro12Med	\$	1,959.58	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Strip Curtains	None	Strip Curtains Installed	Strip Curtains Installed	2	\$296.14	\$	\$	0	0.0002	0.0002	1.6%	25.0%	Retrofit	Retro12Med	\$	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$	\$	33	0.0002	0.0002	1.6%	25.0%	Retrofit	Retro12Med	\$	1,647.61	AEO 2015	RTF	RTF
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Variable Sp	Inefficient Compressor Loading	Variable Speed Compressor Loading	Variable Speed Compressor Loading	15	\$31,946.43	\$	\$	1,330	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	2,183.03	DEER	DEER	AEO 2015
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Demand Def	Timer Based Defrost	Demand Defrost	Demand Defrost	10	\$51,331.29	\$	\$	1,045	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	5,972.42	Vermont TRM	AEO 2015	7th Plan
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	LED Case Lighting	6	\$1,107.44	\$	\$	268	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	762.69	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Display Case - LE	Manual Controls	Motion Based Controls	Motion Based Controls	8	\$75.74	\$	\$	6	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	1,833.37	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - Open Display Ch	No Covers	Night Covers	Night Covers	5	\$233.37	\$	\$	2,221	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	23.05	DEER	DEER	Illinois TRM
WA	WA	Commercial	Small Office - V New	Refrigeration	Refrigeration - ECM for Display	Standard Motors	ECM Motors	ECM Motors	16	\$335.77	\$	\$	14	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	1,208.22	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Refrigeration	Vending Machine - Occup	None	Lighting and Compressor Controls	Lighting and Compressor Controls	5	\$243.84	\$	\$	1,596	0.0002	0.0002	0.6%	25.0%	Retrofit	Retro12Med	\$	33.44	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Small Office - V New	Ventilation	Exhaust Hoods - None	Constant Speed Hoods	Demand-Controlled Hoods	Demand-Controlled Hoods	18	\$2,790.69	\$	\$	684	0.0001	0.0002	8.0%	10.0%	Retrofit	RetroVen20	\$	305.14	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Smart	Standard Unit	Lead Sensing Strip	Lead Sensing Strip	4	\$588.21	\$	\$	1,821	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro12Med	\$	79.09	RTF	RTF	RTF
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Guest Room	Manual Controls	Occupancy Controls	Occupancy Controls	14	\$4,201.76	\$	\$	0	0.0008	0.0008	0.0%	0.0%	Retrofit	Retro12Med	\$	418.08	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Best Practice Measures Installed	Best Practice Measures Installed	15	\$4,201.76	\$	\$	(1,996)	-	0.0006	0.0%	0.0%	Retrofit	Retro12Med	\$	542.36	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	5	\$51.28	\$	\$	650	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro5Med	\$	15.84	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$	\$	83	0.0008	0.0008	0.0%	0.0%	Retrofit	Retro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$	\$	22	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$	\$	171	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$	\$	154	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$	\$	154	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	6	\$6.50	\$	\$	52	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro5Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	6	\$6.50	\$	\$	52	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro5Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	18	\$4,519.24	\$	\$	76	0.0001	0.0002	0.0%	0.0%	Retrofit	RetroVen20	\$	4,039.00	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Small Office - V New	Office Equipment	Office Equipment - Best Practice	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	25	\$33,386.90	\$	\$	2,522	0.0001	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
WA</																								

Measure										Assumptions in First Year (2015)										Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Benefits Annual \$/Unit	Incremental O&M Costs (\$/Unit)	Annual Savings (kWh/Unit)	Summer Coincident Peak (kW/Unit)	Winter Coincident Peak (kW/Unit)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Door Gaskets	Leaky Case Doors	Sealed Case Doors		4	521.26	\$	-	-	4,242	0.0002	0.0002	1.6%	25.0%	Retrofitted	Retrol2Med	\$	1.33	RTF	DEER	RTF
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Evaporator	Standard Controls	Load-Based Fan Controls		15	5503.65	\$	-	-	13,859	0.0002	0.0002	1.6%	25.0%	Retrofitted	Retrol2Med	\$	3.22	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Floating Head	Fixed Discharge Pressure Controls	Webb/B Reset Controls		16	514,471.14	\$	-	-	20,190	0.0002	0.0002	1.6%	25.0%	Retrofitted	Retrol2Med	\$	65.45	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Strip Curtains	Strip Curtains Installed	Strip Curtains Installed		2	5296.14	\$	-	-	6,715	0.0002	0.0002	1.6%	25.0%	Retrofitted	Retrol2Med	\$	21.76	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor		15	5601.12	\$	-	-	999	0.0002	0.0002	1.6%	25.0%	Retrofitted	Retrol2Med	\$	55.03	AEO 2015	RTF	RTF
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Variable Speed	Inefficient Compressor Loading	Variable Speed Compressor Loading		15	513,946.43	\$	-	-	39,254	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	72.91	DEER	DEER	AEO 2015
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Demand Defrost	Manual Based Defrost	Demand Defrost		10	51,539.94	\$	-	-	31,506	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	5.38	Vermont TRM	Vermont TRM	AEO 2015
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - LED Case Lighting	Fluorescent Case Lighting	LED Case Lighting		6	51,107.44	\$	-	-	7,037	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	28.61	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Display Case	Manual Controls	Motion Based Controls		8	575.74	\$	-	-	157	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	68.77	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Open Display Case	No Covers	Night Covers		5	5233.37	\$	-	-	57,672	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	0.88	DEER	DEER	Illinois TRM
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - ECMs for Display	Standard Motors	ECM Motors		16	5335.77	\$	-	-	364	0.0002	0.0002	70.0%	10.0%	Retrofitted	Retrol2Med	\$	79.09	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Refri	Refrigeration - Venting Machine - Occupancy	Standard Controls	Lighting and Compressor Controls		5	5,951.52	\$	-	-	38,118	0.0002	0.0002	1.6%	25.0%	Retrofitted	Retrol2Med	\$	33.23	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Large Office - V Existing	Vent	Exhaust Hoods	Demand-Controlled Hoods	Demand-Controlled Hoods		18	5122,092.70	\$	-	-	63,070	0.0001	0.0002	25.1%	50.0%	Retrofitted	Retrol2Med	\$	153.19	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Office Equipment - Smart	Standard Unit	Load Sensing Strip		4	525,734.02	\$	-	-	74,339	0.0001	0.0002	10.1%	50.0%	Retrofitted	Retrol2Med	\$	84.74	RTF	RTF	RTF
WA	WA	Commercial	Large Office - V Existing	Heating	LogJacking - Guest Room Control	Manual Controls	Occupancy Controls		15	5183,827.00	\$	-	-	58,373	0.0002	0.0001	0.0%	0.0%	Retrofitted	Retrol2Med	\$	12,445.90	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Data Center - Best Practice	Baseline Data Center	Best Practice Measures Installed		5	55,125.89	\$	-	-	63,623	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	16.17	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	579.52	\$	-	-	1,362	0.0002	0.0001	0.0%	0.0%	Retrofitted	Retrol2Med	\$	3.31	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	579.52	\$	-	-	1,369	0.0001	0.0001	0.0%	0.0%	Retrofitted	Retrol2Med	\$	2.31	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Interior Lighting	Data Center - Commercial	Commercially Available Measures Installed		8	579.52	\$	-	-	10,360	0.0002	0.0003	0.0%	0.0%	Retrofitted	Retrol2Med	\$	3.31	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	579.52	\$	-	-	15,098	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	3.31	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting-Edge Measures Installed		6	521.49	\$	-	-	5,099	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting-Edge Measures Installed		6	521.49	\$	-	-	5,099	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Vent	Optimized Variable Volume	Demand-Controlled Hoods	Demand-Controlled Hoods		18	54,159.24	\$	-	-	7,093	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	46.35	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V Existing	Vent	Pool Pump - Timer	Standard Controls	Scheduled Controls		10	586.76	\$	-	-	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	66.81	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM	
WA	WA	Commercial	Large Office - V Existing	Vent	Advanced New Constructs	LED Average Design	LED Average Design		25	51,460,676.91	\$	-	-	213,382	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	66.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Heating	Advanced New Constructs	Standard Building Practices	LED Average Design		25	51,460,676.91	\$	-	-	506,997	0.0001	0.0004	0.0%	0.0%	Retrofitted	Retrol2Med	\$	66.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Vent	Advanced New Constructs	Standard Building Practices	LED Average Design		25	51,460,676.91	\$	-	-	176,201	0.0001	0.0004	0.0%	0.0%	Retrofitted	Retrol2Med	\$	66.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Vent	Advanced New Constructs	Standard Building Practices	LED Average Design		25	51,460,676.91	\$	-	-	96,020	0.0001	0.0004	0.0%	0.0%	Retrofitted	Retrol2Med	\$	66.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Interior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design		25	51,460,676.91	\$	-	-	262,235	0.0002	0.0003	0.0%	0.0%	Retrofitted	Retrol2Med	\$	66.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Exterior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design		25	51,460,676.91	\$	-	-	94,856	0.0001	0.0001	0.0%	0.0%	Retrofitted	Retrol2Med	\$	66.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Water Heating	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	29,718	0.0002	0.0001	3.0%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Water Heating	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	71,890	0.0001	0.0002	14.0%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Vent	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	33,338	0.0001	0.0002	3.0%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Water Heating	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	33,529	0.0002	0.0004	3.0%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Interior Lighting	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	43,974	0.0001	0.0002	14.0%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Exterior Lighting	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	16,234	0.0001	0.0001	3.5%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Refrigeration	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	4,533	0.0002	0.0002	3.2%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Office Equipment	Strategic Energy Management	None	Implemented		3	517,070.88	\$	-	-	41,834	0.0001	0.0002	3.0%	14.0%	Retrofitted	Retrol2Med	\$	21.37	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Commissioning	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	41,148	0.0002	0.0001	0.0%	0.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Heating	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	99,540	0.0001	0.0004	0.0%	0.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Vent	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	46,160	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Water Heating	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	6,244	0.0002	0.0004	0.0%	0.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Exterior Lighting	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	47,159	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Exterior Lighting	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	18,731	0.0001	0.0001	0.0%	0.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Refrigeration	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	5,662	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Water Heating	Commissioning	None	Commissioned		3	518,327.00	\$	-	-	40,884	0.0001	0.0002	10.1%	14.0%	Retrofitted	Retrol2Med	\$	21.69	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Heating	Retrocommissioning	None	Commissioned		3	580,830.89	\$	-	-	98,155	0.0002	0.0004	10.1%	50.0%	Retrofitted	Retrol2Med	\$	95.66	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Water Heating	Retrocommissioning	None	Commissioned		3	580,830.89	\$	-	-	98,155	0.0002	0.0004	10.1%	50.0%	Retrofitted	Retrol2Med	\$	95.66	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Vent	Retrocommissioning	None	Commissioned		3	580,830.89	\$	-	-	45,993	0.0001	0.0002	10.1%	50.0%	Retrofitted	Retrol2Med	\$	95.66	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Water Heating	Retrocommissioning	None	Commissioned		3	580,830.89	\$	-	-	6,213	0.0002	0.0004	10.1%	50.0%	Retrofitted	Retrol2Med	\$	95.66	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Large Office - V Existing	Interior Lighting	Retrocommissioning	None	Commissioned		3	580,830.89	\$	-	-	47,019											

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Annual Savings (kWh/Unit/Year)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	Large Office - V New	Refrigeration	Vending Machine - Occup	None	Lighting and Compressor Controls	Implemented	5	55,951.52	\$	-	38,447	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	33.44	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	Large Office - V New	Ventilation	Cooking - Exhaust Hoods	Standard Speed Hoods	Demand-Controlled Hoods	Implemented	18	12,092.70	\$	-	58,605	0.0001	0.0002	35.1%	50.0%	Retrol2Med	\$	163.48	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Office Equipment	Office Equipment - Smart I	Standard Unit	Low Sensing Strip	Implemented	4	526,734.02	\$	-	104,090	0.0001	0.0002	10.1%	50.0%	Retrol2Med	\$	60.70	RTF	RTF	7th Plan
WA	WA	Commercial	Large Office - V New	Occupancy Controls	Occupancy Controls	Manual Controls	Occupancy Controls	Implemented	8	518,827.00	\$	-	82,187	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	520.82	Illinois TRM	Illinois TRM	7th Plan
WA	WA	Commercial	Large Office - V New	Heating	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	Implemented	15	518,827.00	\$	-	(57,226)	0.0000	0.0004	0.0%	0.0%	Retrol2Med	\$	529.16	Illinois TRM	Illinois TRM	7th Plan
WA	WA	Commercial	Large Office - V New	Office Equipment	Data Center - Best Practice	Baseline Data Center	Best Practice Measures Installed	Implemented	5	55,125.89	\$	-	65,134	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	15.84	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Implemented	8	5704.28	\$	-	2,364	0.0002	0.0001	0.0%	0.0%	Retrol2Med	\$	3.19	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Implemented	8	5704.28	\$	-	1,848	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	3.19	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Implemented	8	5704.28	\$	-	10,165	0.0002	0.0001	0.0%	0.0%	Retrol2Med	\$	3.19	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Implemented	8	5704.28	\$	-	15,457	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	3.19	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Implemented	6	524.20	\$	-	60,835	0.0002	0.0001	0.0%	0.0%	Retrol2Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Implemented	6	524.20	\$	-	5,220	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Ventilation	Optimized Variable Volum	Standard Speed Hoods	Demand-Controlled Hoods	Implemented	18	14,519.24	\$	-	6,631	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	49.46	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Miscellaneous	Floor Pump - Time	Manual Controls	Scheduled Controls	Implemented	25	1,460,676.91	\$	-	586.76	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	49.46	Ontario Power TRM	Ontario Power TRM	7th Plan
WA	WA	Commercial	Large Office - V New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Implemented	25	1,460,676.91	\$	-	243,608	0.0002	0.0001	10.3%	50.0%	Retrol2Med	\$	66.38	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Heating	Advanced New Constructio	Standard Building Practices	LED Average Design	Implemented	25	1,460,676.91	\$	-	486,766	0.0000	0.0004	10.1%	50.0%	Retrol2Med	\$	66.38	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Ventilation	Advanced New Constructio	Standard Building Practices	LED Average Design	Implemented	25	1,460,676.91	\$	-	207,553	0.0001	0.0002	10.1%	50.0%	Retrol2Med	\$	66.38	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Water Heating	Advanced New Constructio	Standard Building Practices	LED Average Design	Implemented	25	1,460,676.91	\$	-	94,047	0.0002	0.0004	10.3%	50.0%	Retrol2Med	\$	66.38	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Exterior Lighting	Advanced New Constructio	Standard Building Practices	LED Average Design	Implemented	25	1,460,676.91	\$	-	622,862	0.0002	0.0003	16.3%	50.0%	Retrol2Med	\$	66.38	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Ventilation	Advanced New Constructio	Standard Building Practices	LED Average Design	Implemented	25	1,460,676.91	\$	-	96,004	0.0001	0.0001	11.7%	50.0%	Retrol2Med	\$	66.38	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Large Office - V New	Cooling	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	35,669	0.0002	0.0001	3.0%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Heating	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	71,988	0.0000	0.0004	3.0%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Ventilation	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	30,730	0.0001	0.0001	3.0%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Water Heating	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	14,005	0.0002	0.0004	3.0%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Interior Lighting	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	39,207	0.0002	0.0003	4.9%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Exterior Lighting	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	18,133	0.0001	0.0001	4.9%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Refrigeration	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	2,634	0.0002	0.0002	3.2%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Office Equipment	Strategic Energy Managem	None	Implemented	3	119,344.16	\$	-	59,573	0.0001	0.0002	3.0%	14.0%	Retrol2Med	\$	22.37	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Commissioning	Commissioning	None	Commissioned	3	518,375.12	\$	-	49,745	0.0002	0.0002	10.2%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Heating	Commissioning	None	Commissioned	3	518,375.12	\$	-	100,394	0.0000	0.0004	10.2%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Ventilation	Commissioning	None	Commissioned	3	518,375.12	\$	-	42,857	0.0001	0.0002	10.2%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Water Heating	Commissioning	None	Commissioned	3	518,375.12	\$	-	6,479	0.0002	0.0004	10.2%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Exterior Lighting	Commissioning	None	Commissioned	3	518,375.12	\$	-	45,469	0.0002	0.0002	10.2%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Refrigeration	Commissioning	None	Commissioned	3	518,375.12	\$	-	16,612	0.0001	0.0001	12.8%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Water Heating	Commissioning	None	Commissioned	3	518,375.12	\$	-	6,152	0.0002	0.0002	10.3%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Cooling	Commissioning	None	Commissioned	3	518,375.12	\$	-	3,283	0.0002	0.0002	10.3%	75.0%	Retrol2Med	\$	21.34	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Heating	Commissioning	None	Commissioned	3	518,375.12	\$	-	99,056	0.0000	0.0004	10.0%	0.0%	Retrol2Med	\$	94.10	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Ventilation	Commissioning	None	Commissioned	3	518,375.12	\$	-	6,956	0.0001	0.0002	10.0%	0.0%	Retrol2Med	\$	94.10	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Water Heating	Commissioning	None	Commissioned	3	518,375.12	\$	-	42,512	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	94.10	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Exterior Lighting	Commissioning	None	Commissioned	3	518,375.12	\$	-	6,458	0.0002	0.0004	0.0%	0.0%	Retrol2Med	\$	94.10	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Interior Lighting	Commissioning	None	Commissioned	3	518,375.12	\$	-	45,205	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	94.10	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Refrigeration	Commissioning	None	Commissioned	3	518,375.12	\$	-	16,502	0.0001	0.0001	0.0%	0.0%	Retrol2Med	\$	94.10	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Large Office - V New	Water Heating	Commissioning	None	Commissioned	3	518,375.12	\$	-	6,074	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	94.10	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Restaurant - W Existing	Cooling	Insulation - Ceiling	R-13	R-38	Implemented	45	\$3,021.85	\$	-	1,209	0.0003	0.0001	15.4%	50.0%	Retrol2Med	\$	46.67	RTF	RTF	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Heating	Insulation - Ceiling	R-13	R-38	Implemented	45	\$3,021.85	\$	-	1,803	0.0001	0.0002	15.4%	50.0%	Retrol2Med	\$	46.67	RTF	RTF	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Ventilation	Insulation - Ceiling	R-13	R-38	Implemented	45	\$3,021.85	\$	-	662	0.0001	0.0002	15.4%	50.0%	Retrol2Med	\$	46.67	RTF	RTF	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Cooling	Insulation - Ducting	R-4	R-8	Implemented	20	\$1,277.46	\$	-	11	0.0003	0.0001	15.2%	35.0%	Retrol2Med	\$	9,999.00	DEER	DEER	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Heating	Insulation - Ducting	R-4	R-8	Implemented	20	\$1,277.46	\$	-	15	0.0002	0.0007	15.2%	35.0%	Retrol2Med	\$	9,999.00	DEER	DEER	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Ventilation	Insulation - Ducting	R-4	R-8	Implemented	20	\$1,277.46	\$	-	0	0.0001	0.0002	15.3%	35.0%	Retrol2Med	\$	9,999.00	DEER	DEER	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Implemented	20	\$1,190.23	\$	-	278	0.0003	0.0001	45.1%	50.0%	Retrol2Med	\$	-	DEER	DEER	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Implemented	20	\$1,190.23	\$	-	(699)	-	0.0007	45.1%	50.0%	Retrol2Med	\$	-	DEER	DEER	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Implemented	20	\$1,190.23	\$	-	45	0.0002	0.0001	45.1%	50.0%	Retrol2Med	\$	-	DEER	DEER	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Cooling	Insulation - Wall Cavity	R-9	R-23	Implemented	45	\$3,907.62	\$	-	(533)	0.0003	0.0001	30.2%	50.0%	Retrol2Med	\$	169.45	RTF	RTF	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Heating	Insulation - Wall Cavity	R-9	R-23	Implemented	45	\$3,907.62	\$	-	1,852	0.0001	0.0007	30.2%	50.0%	Retrol2Med	\$	169.45	RTF	RTF	7th Plan
WA	WA	Commercial	Restaurant - W Existing	Ventilation	Insulation - Wall Cavity	R-9	R-23	Implemented	45	\$3,907.													

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Unit)	Annual Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Commercial	Restaurant - W/ Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$ 50.24	\$ -	-	20	0.0001	0.0002	0.0%	0.0%	0.0%	0.0%	RetrosMed	\$ 0.28	7th Plan	7th Plan	7th Plan	
WA	Commercial	Restaurant - W/ Existing	Ventilation	Optimized Variable Volume	Constant Speed Hoods	Demand-Controlled Hoods	18	\$4,159.24	\$ -	-	58	0.0001	0.0002	0.0%	0.0%	0.0%	0.0%	RetrosEven20	\$ 5,461.77	7th Plan	7th Plan	7th Plan	
WA	Commercial	Restaurant - W/ Existing	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	-	0.0002	0.0002	0.0%	0.0%	0.0%	0.0%	RetrosEven20	\$ -	Ontario Power TRM	Ontario Power TRM	7th Plan		
WA	Commercial	Restaurant - W/ Existing	Heating	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$12,520.09	\$ -	-	3,336	0.0003	0.0002	0.0%	0.0%	0.0%	0.0%	Retros15low	\$ 33.61	AEQ Research	AEQ Research	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Ventilation	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$12,520.09	\$ -	-	1,548	0.0001	0.0002	0.0%	0.0%	0.0%	0.0%	Retros15low	\$ 33.61	AEQ Research	AEQ Research	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Water Heating	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$12,520.09	\$ -	-	8,518	0.0001	0.0002	0.0%	0.0%	0.0%	0.0%	Retros15low	\$ 33.61	AEQ Research	AEQ Research	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Exterior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$12,520.09	\$ -	-	3,338	0.0002	0.0002	0.0%	0.0%	0.0%	0.0%	Retros15low	\$ 33.61	AEQ Research	AEQ Research	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Exterior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$12,520.09	\$ -	-	1,498	0.0001	0.0001	0.0%	0.0%	0.0%	0.0%	Retros15low	\$ 33.61	AEQ Research	AEQ Research	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Cooling	Strategic Energy Management	None	Implemented	3	\$721.41	\$ -	-	451	0.0003	0.0001	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 49.81	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Heating	Strategic Energy Management	None	Implemented	3	\$721.41	\$ -	-	789	0.0007	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 49.81	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Ventilation	Strategic Energy Management	None	Implemented	3	\$721.41	\$ -	-	289	0.0001	0.0001	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 49.81	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Water Heating	Strategic Energy Management	None	Implemented	3	\$721.41	\$ -	-	1,180	0.0001	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 49.81	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Interior Lighting	Strategic Energy Management	None	Implemented	3	\$721.41	\$ -	-	526	0.0002	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 49.81	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Refrigeration	Strategic Energy Management	None	Implemented	3	\$721.41	\$ -	-	255	0.0001	0.0001	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 49.81	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Office Equipment	Strategic Energy Management	None	Implemented	3	\$721.41	\$ -	-	1,056	0.0002	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 49.81	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Cooling	Commissioning	None	Commissioned	3	\$409.11	\$ -	-	643	0.0003	0.0001	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 21.78	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Heating	Commissioning	None	Commissioned	3	\$409.11	\$ -	-	1,100	0.0007	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 21.78	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Ventilation	Commissioning	None	Commissioned	3	\$409.11	\$ -	-	400	0.0001	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 21.78	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Water Heating	Commissioning	None	Commissioned	3	\$409.11	\$ -	-	545	0.0001	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 21.78	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$409.11	\$ -	-	607	0.0002	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 21.78	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$409.11	\$ -	-	295	0.0001	0.0001	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 21.78	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Refrigeration	Commissioning	None	Commissioned	3	\$409.11	\$ -	-	2,588	0.0002	0.0002	0.0%	0.0%	0.0%	0.0%	Retros12Med	\$ 21.78	AEQ Research	7th Plan	AEQ Research	
WA	Commercial	Restaurant - W/ Existing	Cooling	Retrocommissioning	None	Commissioned	3	\$1,804.36	\$ -	-	624	0.0003	0.0001	10.1%	50.0%	Retros12Med	\$ 96.05	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Heating	Retrocommissioning	None	Commissioned	3	\$1,804.36	\$ -	-	1,088	0.0007	0.0007	10.1%	50.0%	Retros12Med	\$ 96.05	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Ventilation	Retrocommissioning	None	Commissioned	3	\$1,804.36	\$ -	-	400	0.0001	0.0002	10.1%	50.0%	Retros12Med	\$ 96.05	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Water Heating	Retrocommissioning	None	Commissioned	3	\$1,804.36	\$ -	-	545	0.0001	0.0002	10.1%	50.0%	Retros12Med	\$ 96.05	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$1,804.36	\$ -	-	607	0.0002	0.0002	16.6%	50.0%	Retros12Med	\$ 96.05	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$1,804.36	\$ -	-	295	0.0001	0.0001	11.7%	50.0%	Retros12Med	\$ 96.05	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Refrigeration	Retrocommissioning	None	Commissioned	3	\$1,804.36	\$ -	-	2,437	0.0002	0.0002	10.6%	50.0%	Retros12Med	\$ 96.05	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Cooling	Insulation - Ceiling	R-13	R-38	45	\$3,021.85	\$ -	-	1,365	0.0003	0.0001	75.2%	99.0%	RetrosEven20	\$ 42.84	RTF	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Heating	Insulation - Ceiling	R-13	R-38	45	\$3,021.85	\$ -	-	1,866	0.0003	0.0001	75.2%	99.0%	RetrosEven20	\$ 42.84	RTF	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Ventilation	Insulation - Ceiling	R-13	R-38	45	\$3,021.85	\$ -	-	581	0.0001	0.0002	75.2%	99.0%	RetrosEven20	\$ 42.84	RTF	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Cooling	Insulation - Ducting	R-4	R-8	20	\$1,277.46	\$ -	-	789	0.0003	0.0001	15.2%	35.0%	RetrosEven20	\$ -	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Heating	Insulation - Ducting	R-4	R-8	20	\$1,277.46	\$ -	-	(148)	-	0.0007	15.2%	35.0%	RetrosEven20	\$ -	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Ventilation	Insulation - Ducting	R-4	R-8	20	\$1,277.46	\$ -	-	-	-	-	15.3%	35.0%	RetrosEven20	\$ -	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$1,190.23	\$ -	-	84	0.0003	0.0001	45.1%	50.0%	RetrosEven20	\$ -	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$1,190.23	\$ -	-	(133)	-	0.0007	45.1%	50.0%	RetrosEven20	\$ -	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Water Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$1,190.23	\$ -	-	1,866	0.0003	0.0001	45.1%	50.0%	RetrosEven20	\$ -	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Cooling	Insulation - Wall Cavity	R-9	R-23	45	\$3,907.62	\$ -	-	(211)	0.0003	0.0001	65.3%	99.0%	RetrosEven20	\$ 998.19	RTF	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Heating	Insulation - Wall Cavity	R-9	R-23	45	\$3,907.62	\$ -	-	430	-	0.0007	65.3%	99.0%	RetrosEven20	\$ 998.19	RTF	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Ventilation	Insulation - Wall Cavity	R-9	R-23	45	\$3,907.62	\$ -	-	(7)	0.0001	0.0002	65.4%	99.0%	RetrosEven20	\$ 998.19	RTF	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Water Heating	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$9.92	\$ -	-	18	0.0001	0.0002	66.4%	99.0%	RetrosEven20	\$ 999.00	DEER	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Ventilation	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$9.92	\$ -	-	(251)	-	0.0007	99.0%	99.0%	RetrosEven20	\$ 999.00	DEER	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Water Heating	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$9.92	\$ -	-	154	0.0001	0.0002	99.0%	99.0%	RetrosEven20	\$ 999.00	DEER	RTF	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Heating	High Efficiency Glaz	High Efficiency Glaz	High Efficiency Glaz	30	\$26,988.27	\$ -	-	708	0.0003	0.0001	66.4%	66.4%	Retros15low	\$ 250.33	7th Plan	7th Plan	7th Plan			
WA	Commercial	Restaurant - W/ Existing	Heating	High Efficiency Glaz	High Efficiency Glaz	High Efficiency Glaz	30	\$26,988.27	\$ -	-	4,674	-	0.0007	66.4%	66.4%	Retros15low	\$ 250.33	7th Plan	7th Plan	7th Plan			
WA	Commercial	Restaurant - W/ Existing	Ventilation	High Efficiency Glaz	High Efficiency Glaz	High Efficiency Glaz	30	\$26,988.27	\$ -	-	1,032	0.0001	0.0002	66.4%	66.4%	Retros15low	\$ 250.33	7th Plan	7th Plan	7th Plan			
WA	Commercial	Restaurant - W/ Existing	Cooling	Chiller - Chilled Water	None	Enabled	10	\$45.75	\$ -	-	20	0.0003	0.0001	15.1%	45.0%	Retros12Med	\$ 262.13	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Water Heating	Chiller - Chilled Water	None	Enabled	10	\$45.75	\$ -	-	20	0.0003	0.0001	15.1%	45.0%	Retros12Med	\$ 262.13	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Constant Flow	15	\$273.07	\$ -	-	647	0.0003	0.0001	15.1%	50.0%	Retros12Med	\$ 38.27	DEER	DEER	New Jersey TRM			
WA	Commercial	Restaurant - W/ Existing	Cooling	Water-Cooled Chiller - Con	Standard Temperature	Standard Temperature	10	\$45.75	\$ -	-	0.0003	0.0001	15.3%	75.0%	Retros12Med	\$ -	DEER	DEER	AEQ - BEST				
WA	Commercial	Restaurant - W/ Existing	Heating	HVAC - Economizer	None	Installed	15	\$2,207.15	\$ -	-	2,809	0.0003	0.0001	50.0%	50.0%	Retros12Med	\$ 91.30	DEER	DEER	AEQ - BEST			
WA	Commercial	Restaurant - W/ Existing	Heating	Space Heating - Heat Rec	None	Installed	14	\$10,870.02	\$ -	-	1,410	0.0007	0.0002	5.6%	10.0%	Retros12Med	\$ 706.04	DEER	DEER	7th Plan			
WA	Commercial	Restaurant - W/ Existing	Ventilation	ECM on HVAC	None	Installed	18	\$758.41	\$ -	-	262	0.0001	0.0001	15.1%	50.0%	RetrosEven20	\$ 219.61	7th Plan	7th Plan	7th Plan			
WA	Commercial	Restaurant - W/ Existing	Ventilation	Ventilation - Variable Speed	None	Installed	15	\$586,237.59	\$ -	-	1,317	0.0001	0.0002	15.2%	50.0%	Retros12Med	\$ 37,412.93	DEER	DEER	Illinois TRM			
WA	Commercial	Restaurant - W/ Existing	Cooling	Desatratification Fans (VLS)	Standard	Installed	15	\$1,792.57	\$ -	-	179	0.0001	0.0001	15.0%	15.0%	Retros12Med	\$ 360.84	7th Plan	7th Plan	7th Plan			
WA	Commercial	Restaurant - W/ Existing	Heating	Desatratification Fans (VLS)	Standard	Installed	15	\$1,880.32	\$ -	-	1,338	0.0003	0.0001	15.0%	15.0%	Retros12Med	\$ 35.03	AEQ Research	AEQ Research	AEQ Research			
WA	Commercial	Restaurant - W/ Existing	Heating	Desatratification Fans (VLS)	Standard	Installed	15	\$1,880.32	\$ -	-	3,541	0.											

Measure										Assumptions in First Year (2015)										Sources									
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Unit)	Annual Average Savings (\$/Unit)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source						
WA	WA	Commercial	Restaurant - W/ New	Existing	Ventilation	Strategic Energy Management	None	Implemented	3	\$736.98	\$ -	\$ -	248	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	50.19	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Water Heating	Strategic Energy Management	None	Implemented	3	\$736.98	\$ -	\$ -	1,202	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	50.19	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Interior Lighting	Strategic Energy Management	None	Implemented	3	\$736.98	\$ -	\$ -	491	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	50.19	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Exterior Lighting	Strategic Energy Management	None	Implemented	3	\$736.98	\$ -	\$ -	227	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	50.19	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Strategic Energy Management	None	Implemented	3	\$736.98	\$ -	\$ -	1,011	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	50.19	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Office Equipment	Strategic Energy Management	None	Implemented	3	\$736.98	\$ -	\$ -	108	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	50.19	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Cooling	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	798	0.0001	0.0001	10.2%	75.0%	Retrofit	Retro12Med	\$	23.17	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Heating	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	1,121	0.0001	0.0002	10.2%	75.0%	Retrofit	Retro12Med	\$	23.17	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Ventilation	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	346	0.0001	0.0002	10.2%	75.0%	Retrofit	Retro12Med	\$	23.17	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Water Heating	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	556	0.0001	0.0002	10.2%	75.0%	Retrofit	Retro12Med	\$	23.17	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	569	0.0002	0.0002	20.2%	75.0%	Retrofit	Retro12Med	\$	23.17	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	264	0.0001	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	23.17	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	2,438	0.0002	0.0002	10.3%	75.0%	Retrofit	Retro12Med	\$	23.17	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Cooling	Retrocommissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	790	0.0003	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	102.20	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Heating	Retrocommissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	1,108	0.0007	0.0007	0.0%	0.0%	Retrofit	Retro12Med	\$	102.20	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Ventilation	Retrocommissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	343	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	102.20	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Water Heating	Retrocommissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	555	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	102.20	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	566	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	102.20	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	262	0.0001	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	102.20	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Restaurant - W/ New	Existing	Refrigeration	Retrocommissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	2,334	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	102.20	AEG Research	7th Plan	AEG Research					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Insulation - Ceiling	R-13	R-38	45	\$131,450.42	\$ -	\$ -	27,338	0.0008	0.0008	15.4%	50.0%	Retrofit	Retro12Med	\$	60.61	RTF	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	Insulation - Ceiling	R-13	R-38	45	\$131,450.42	\$ -	\$ -	75,219	0.0008	0.0008	15.4%	50.0%	Retrofit	Retro12Med	\$	60.61	RTF	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	Insulation - Ceiling	R-13	R-38	45	\$131,450.42	\$ -	\$ -	12,445	0.0001	0.0002	15.4%	50.0%	Retrofit	Retro12Med	\$	60.61	RTF	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Insulation - Ducting	R-4	R-8	20	\$27,784.74	\$ -	\$ -	11,013	0.0008	0.0008	15.2%	35.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	Insulation - Ducting	R-4	R-8	20	\$27,784.74	\$ -	\$ -	40,701	0.0001	0.0001	15.2%	35.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	Insulation - Ducting	R-4	R-8	20	\$27,784.74	\$ -	\$ -	229	0.0001	0.0001	15.2%	35.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$25,887.56	\$ -	\$ -	21,887	0.0001	0.0001	45.3%	75.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$25,887.56	\$ -	\$ -	40,389	0.0008	0.0008	45.3%	75.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$25,887.56	\$ -	\$ -	278	0.0001	0.0001	45.3%	75.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Insulation - Wall Cavity	R-9	R-23	45	\$34,380.27	\$ -	\$ -	6,623	0.0008	0.0008	30.2%	50.0%	Retrofit	Retro12Med	\$	24.83	RTF	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	Insulation - Wall Cavity	R-9	R-23	45	\$34,380.27	\$ -	\$ -	79,422	0.0001	0.0002	30.2%	50.0%	Retrofit	Retro12Med	\$	24.83	RTF	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	Insulation - Wall Cavity	R-9	R-23	45	\$34,380.27	\$ -	\$ -	1,924	0.0001	0.0001	30.2%	50.0%	Retrofit	Retro12Med	\$	24.83	RTF	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$302.18	\$ -	\$ -	1,063	0.0001	0.0001	30.1%	35.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$302.18	\$ -	\$ -	12,768	0.0002	0.0002	30.1%	35.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	RTF	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	High Efficiency Glaze	Single Glaze	High Efficiency Glaze	38	\$38,298.98	\$ -	\$ -	3,464	0.0001	0.0001	48.1%	75.0%	Retrofit	Retro15Low	\$	10.29	7th Plan	7th Plan	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	High Efficiency Glaze	Single Glaze	High Efficiency Glaze	38	\$38,298.98	\$ -	\$ -	20,712	0.0002	0.0002	48.1%	75.0%	Retrofit	Retro15Low	\$	10.29	7th Plan	7th Plan	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	High Efficiency Glaze	Single Glaze	High Efficiency Glaze	38	\$38,298.98	\$ -	\$ -	23,801	0.0001	0.0002	48.1%	75.0%	Retrofit	Retro15Low	\$	10.29	7th Plan	7th Plan	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Chiller - Chilled Water Res	None	Enabled	10	\$1,393.19	\$ -	\$ -	5,236	0.0008	0.0008	15.1%	45.0%	Retrofit	Retro12Med	\$	31.90	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	Chiller - Chilled Water Res	None	Enabled	15	\$1,393.19	\$ -	\$ -	80,624	0.0001	0.0001	15.1%	45.0%	Retrofit	Retro12Med	\$	31.90	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Variable Flow	Constant Flow	Variable Flow	15	\$83,015.01	\$ -	\$ -	26,075	0.0008	0.0008	15.1%	50.0%	Retrofit	Retro12Med	\$	28.50	DEER	DEER	New Jersey TRM					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	\$1,393.19	\$ -	\$ -	55,882	0.0008	0.0008	15.3%	75.0%	Retrofit	Retro12Med	\$	3.00	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Cooling	HVAC - Economizer	None	Installed	10	\$67,207.73	\$ -	\$ -	56,204	0.0008	0.0008	45.1%	60.0%	Retrofit	Retro12Med	\$	138.41	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Heating	HVAC - Economizer	None	Installed	15	\$155,363.98	\$ -	\$ -	1,475	0.0001	0.0001	45.1%	60.0%	Retrofit	Retro12Med	\$	245.21	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	ECM on VAV	None	Installed	18	\$32,990.99	\$ -	\$ -	5,734	0.0001	0.0001	50.0%	50.0%	Retrofit	Retro12Med	\$	430.89	7th Plan	7th Plan	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	Ventilation - Variable Speed	None	Installed	15	#####	\$ -	\$ -	28,398	0.0001	0.0002	10.3%	50.0%	Retrofit	Retro12Med	\$	73,407.81	DEER	DEER	Illinois TRM					
WA	WA	Commercial	Retail - WA	Existing	Ventilation	Demand Controlled Fans	None	Installed	15	\$38,720.70	\$ -	\$ -	3,780	0.0001	0.0002	15.0%	30.0%	Retrofit	Retro12Med	\$	73.15	DEER	DEER	Illinois TRM					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Desaturation Fans (HVLS)	None	Installed	15	\$81,793.85	\$ -	\$ -	26,522	0.0008	0.0008	15.0%	30.0%	Retrofit	Retro12Med	\$	43.03	AEG Research	AEG Research	AEG Research					
WA	WA	Commercial	Retail - WA	Existing	Heating	Desaturation Fans (HVLS)	None	Installed	15	\$81,793.85	\$ -	\$ -	141,329	0.0001	0.0008	15.0%	30.0%	Retrofit	Retro12Med	\$	43.03	AEG Research	AEG Research	AEG Research					
WA	WA	Commercial	Retail - WA	Existing	Cooling	RTU - Maintenance	Standard Unit	Turned Up Unit	3	\$19,063.83	\$ -	\$ -	13,322	0.0008	0.0008	15.0%	25.0%	Retrofit	Retro20Fast	\$	445.25	Illinois TRM	Illinois TRM	AEG Research					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Advanced Controls	None	Advanced Rooftop Controller	15	\$9,083.48	\$ -	\$ -	11,268	0.0001	0.0001	15.1%	25.0%	Retrofit	Retro15Low	\$	72.17	DEER	DEER	AEG - BEST					
WA	WA	Commercial	Retail - WA	Existing	Cooling	RTU - Evaporative Precool	None	Pre-cooler Installed	15	\$371,226.49	\$ -	\$ -	27,341	0.0008	0.0008	15.2%	75.0%	Retrofit	Retro15Low	\$	1,149.18	DEER	DEER	AEG Research					
WA	WA	Commercial	Retail - WA	Existing	Cooling	Ductless Mini Split Heat Pu	None	Installed	15	\$1,771,135.00																			

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	Retail	WA	Existing	Exterior Lighting	Commissioning	None	3	\$ 7,750.92	\$ -	\$ -	7,818	0.0001	0.0001	0.00%	0.0%	Retrol2Med	\$	22.33	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	Existing	Refrigeration	Commissioning	None	3	\$ 7,750.92	\$ -	\$ -	8,449	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	22.33	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	Existing	Cooling	Retroc Commissioning	None	3	\$ 34,185.30	\$ -	\$ -	15,824	0.0008	0.0008	10.1%	50.0%	Retrol2Med	\$	98.47	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	Existing	Commissioning	Commissioning	None	3	\$ 34,185.30	\$ -	\$ -	43,256	0.0008	0.0008	10.1%	50.0%	Retrol2Med	\$	98.47	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	Existing	Ventilation	Retroc Commissioning	None	3	\$ 34,185.30	\$ -	\$ -	7,518	0.0001	0.0002	10.1%	50.0%	Retrol2Med	\$	98.47	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	Existing	Water Heating	Retroc Commissioning	None	3	\$ 34,185.30	\$ -	\$ -	2,394	0.0001	0.0003	10.1%	50.0%	Retrol2Med	\$	98.47	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	Existing	Interior Lighting	Retroc Commissioning	None	3	\$ 34,185.30	\$ -	\$ -	23,028	0.0002	0.0003	16.6%	50.0%	Retrol2Med	\$	98.47	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	Existing	Exterior Lighting	Retroc Commissioning	None	3	\$ 34,185.30	\$ -	\$ -	7,811	0.0001	0.0001	10.1%	50.0%	Retrol2Med	\$	98.47	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	New	Refrigeration	Retroc Commissioning	None	3	\$ 34,185.30	\$ -	\$ -	8,441	0.0002	0.0002	10.6%	50.0%	Retrol2Med	\$	98.47	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Retail	WA	New	Cooling	Insulation - Ceiling	R-13	45	\$ 313,450.42	\$ -	\$ -	31,308	0.0008	0.0008	75.2%	99.0%	Retrol2Med	\$	59.74	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Heating	Insulation - Ceiling	R-13	45	\$ 313,450.42	\$ -	\$ -	31,310	0.0008	0.0008	75.2%	99.0%	Retrol2Med	\$	59.74	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Ventilation	Insulation - Ceiling	R-13	45	\$ 313,450.42	\$ -	\$ -	11,485	0.0001	0.0002	75.2%	99.0%	Retrol2Med	\$	59.74	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Cooling	Insulation - Ducting	R-4	20	\$ 27,784.74	\$ -	\$ -	14,276	0.0001	0.0001	15.2%	35.0%	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Heating	Insulation - Ducting	R-4	20	\$ 27,784.74	\$ -	\$ -	9,742	0.0001	0.0008	15.2%	35.0%	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Ventilation	Insulation - Ducting	R-4	20	\$ 27,784.74	\$ -	\$ -	4,065	0.0001	0.0002	15.2%	35.0%	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Cooling	Building Shell - Cool Roofs	Standard Roof	20	\$ 25,887.56	\$ -	\$ -	10,399	0.0008	0.0008	45.3%	75.0%	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Heating	Building Shell - Cool Roofs	Standard Roof	20	\$ 25,887.56	\$ -	\$ -	9,721	0.0008	0.0008	45.3%	75.0%	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Ventilation	Building Shell - Cool Roofs	Standard Roof	20	\$ 25,887.56	\$ -	\$ -	1,168	0.0001	0.0002	45.3%	75.0%	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Cooling	Insulation - Wall Cavity	R-9	45	\$ 34,380.27	\$ -	\$ -	14,711	0.0008	0.0008	65.3%	99.0%	Retrol2Med	\$	23.93	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Heating	Insulation - Wall Cavity	R-9	45	\$ 34,380.27	\$ -	\$ -	9,560	0.0008	0.0008	65.3%	99.0%	Retrol2Med	\$	23.93	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Ventilation	Insulation - Wall Cavity	R-9	45	\$ 34,380.27	\$ -	\$ -	1,200	0.0001	0.0002	65.3%	99.0%	Retrol2Med	\$	23.93	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	18	\$ 302.18	\$ -	\$ -	1,185	0.0001	0.0001	99.0%	99.0%	Retrol2Med	\$	9,999.00	DEER	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Heating	HVAC - Duct Leakage Redu	20% Leakage	18	\$ 302.18	\$ -	\$ -	1,185	0.0001	0.0002	99.0%	99.0%	Retrol2Med	\$	9,999.00	DEER	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	18	\$ 302.18	\$ -	\$ -	3,292	0.0001	0.0002	99.0%	99.0%	Retrol2Med	\$	9,999.00	DEER	RTF	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Cooling	Windows - High Efficiency	Single Glaze	30	\$ 39,574.98	\$ -	\$ -	17,219	0.0008	0.0008	66.4%	75.0%	Retrol2Med	\$	10.40	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Heating	Windows - High Efficiency	Single Glaze	30	\$ 39,574.98	\$ -	\$ -	20,013	0.0008	0.0008	66.4%	75.0%	Retrol2Med	\$	10.40	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Ventilation	Windows - High Efficiency	Single Glaze	30	\$ 39,574.98	\$ -	\$ -	21,594	0.0001	0.0002	66.4%	75.0%	Retrol2Med	\$	10.40	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Cooling	Chiller - Chilled Water Res	None	10	\$ 11,393.19	\$ -	\$ -	5,585	0.0008	-	15.1%	45.0%	Retrol2Med	\$	30.12	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Heating	Chiller - Chilled Water Res	None	15	\$ 13,707.18	\$ -	\$ -	68,207	0.0008	-	15.1%	45.0%	Retrol2Med	\$	119.74	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Ventilation	Chiller - Chilled Water Res	None	15	\$ 13,707.18	\$ -	\$ -	68,207	0.0008	-	15.1%	45.0%	Retrol2Med	\$	119.74	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Retail	WA	New	Cooling	Chiller - Variable Speed Fan																

Measure				Assumptions in First Year (2015)														Sources						
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/Unit	Incremental O&M Costs (\$)	Average Annual Savings (kWh/Unit/Year)	Summer Coincident Peak Factor (kW/MW)	Winter Coincident Peak Factor (kW/MW)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Insulation - Ceiling	R-13	R-38	45	\$50,364.15	\$	\$	8,760	0.0001	0.0002	15.4%	50.0%	Retrofit	Retrolven20	\$	50.98	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Insulation - Ducting	R-4	R-8	20	\$10,645.49	\$	\$	1,351	0.0003	0.0001	15.2%	35.0%	Retrofit	Retrolven20	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Heating	Insulation - Ducting	R-4	R-8	20	\$10,645.49	\$	\$	(42)	-	-	15.2%	35.0%	Retrofit	Retrolven20	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Insulation - Ducting	R-4	R-8	20	\$10,645.49	\$	\$	(42)	-	-	15.2%	35.0%	Retrofit	Retrolven20	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$9,918.61	\$	\$	12,021	0.0003	0.0001	45.1%	50.0%	Retrofit	Retrolven20	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$9,918.61	\$	\$	(14,814)	-	-	45.1%	50.0%	Retrofit	Retrolven20	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$9,918.61	\$	\$	(14,814)	-	-	45.1%	50.0%	Retrofit	Retrolven20	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Heating	Insulation - Wall Cavity	R-9	R-23	45	\$28,282.80	\$	\$	(5,783)	0.0003	0.0001	30.2%	50.0%	Retrofit	Retrolven20	\$	390.64	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Heating	Insulation - Wall Cavity	R-9	R-23	45	\$28,282.80	\$	\$	6,200	-	-	30.2%	50.0%	Retrofit	Retrolven20	\$	390.64	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Insulation - Wall Cavity	R-9	R-23	45	\$28,282.80	\$	\$	3,647	0.0001	0.0002	30.2%	50.0%	Retrofit	Retrolven20	\$	390.64	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$96.48	\$	\$	(707)	0.0003	0.0001	30.1%	35.0%	Retrofit	Retrolven20	\$	77.44	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$96.48	\$	\$	(73)	0.0003	0.0001	30.1%	35.0%	Retrofit	Retrolven20	\$	77.44	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$96.48	\$	\$	875	0.0001	0.0002	30.1%	35.0%	Retrofit	Retrolven20	\$	77.44	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$216,824.33	\$	\$	8,389	0.0003	0.0001	47.8%	47.8%	Retrofit	Retrolven20	\$	134.72	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$216,824.33	\$	\$	74,090	0.0003	0.0001	47.8%	47.8%	Retrofit	Retrolven20	\$	134.72	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$216,824.33	\$	\$	15,823	0.0001	0.0002	47.8%	47.8%	Retrofit	Retrolven20	\$	134.72	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Chiller - Chilled Water Res	None	Enabled	10	\$444.82	\$	\$	3,056	0.0003	0.0001	15.1%	45.0%	Retrofit	Retrolven20	\$	17.82	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Chiller - Chilled Water Res	Constant Flow	Variable Flow	15	\$42,371.39	\$	\$	51,527	0.0003	0.0001	15.1%	45.0%	Retrofit	Retrolven20	\$	73.44	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part Load Operation	15	\$2,654.86	\$	\$	15,253	0.0003	0.0001	15.1%	45.0%	Retrofit	Retrolven20	\$	15.92	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	\$2,448.82	\$	\$	32,482	0.0003	0.0001	15.3%	75.0%	Retrofit	Retrolven20	\$	1.68	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Cooling	HVAC - Economizer	None	Installed	10	\$21,458.41	\$	\$	33,059	0.0003	0.0001	45.1%	60.0%	Retrofit	Retrolven20	\$	77.56	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Heating	Space Heating - Heat Exch	None	Installed	14	\$31,057.19	\$	\$	22,615	0.0003	0.0001	15.0%	10.0%	Retrofit	Retrolven20	\$	120.76	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Ventilation - ECM on VAV	None	Installed	18	\$12,640.23	\$	\$	4,031	0.0001	0.0002	15.1%	50.0%	Retrofit	Retrolven20	\$	244.47	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Ventilation - Variable Speed	None	Installed	15	\$9,770,626.52	\$	\$	19,497	0.0001	0.0002	10.3%	50.0%	Retrofit	Retrolven20	\$	41,648.51	DEER	DEER	Illinois TRM
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Ventilation - Demand Cont	Standard	Demand-Controlled Fans	15	\$12,542.80	\$	\$	2,657	0.0001	0.0002	15.2%	75.0%	Retrofit	Retrolven20	\$	410.28	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Destratification Fans (DVS)	None	Installed	15	\$13,388.64	\$	\$	15,473	0.0003	0.0001	15.0%	15.0%	Retrofit	Retrolven20	\$	40.57	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	Existing	Heating	Destratification Fans (DVS)	None	Installed	15	\$13,388.64	\$	\$	54,36	-	-	15.0%	15.0%	Retrofit	Retrolven20	\$	40.57	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	Existing	Cooling	RTU - Maintenance	Standard Unit	Tuned Up Unit	3	\$6,086.15	\$	\$	7,874	0.0003	0.0001	15.0%	25.0%	Retrofit	Retrolven20	\$	248.74	Illinois TRM	Illinois TRM	AEQ Research
WA	WA	Commercial	Grocery - WA	Existing	Cooling	RTU - Advanced Controls	None	Installed	15	\$3,480.26	\$	\$	6,577	0.0003	0.0001	30.1%	35.0%	Retrofit	Retrolven20	\$	40.57	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	Existing	Cooling	RTU - Evaporative Precool	No Precooler	Precooler Installed	15	\$118,526.98	\$	\$	16,089	0.0003	0.0001	15.2%	75.0%	Retrofit	Retrolven20	\$	641.99	DEER	DEER	AEQ Research
WA	WA	Commercial	Grocery - WA	Existing	Cooling	Installed Mini Split Heat Pa	None	Installed	15	\$565,496.49	\$	\$	33,113	0.0003	0.0001	15.0%	25.0%	Retrofit	Retrolven20	\$	473.59	RTF	RTF	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Heating	Ductless Mini Split Heat Pa	None	Installed	15	\$565,496.49	\$	\$	72,887	0.0003	0.0001	15.0%	25.0%	Retrofit	Retrolven20	\$	473.59	RTF	RTF	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Heating	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$	\$	1,233	0.0003	0.0001	10.0%	10.0%	Retrofit	Retrolven20	\$	74.92	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Heating	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$	\$	51,294	-	-	10.0%	10.0%	Retrofit	Retrolven20	\$	74.92	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Ventilation	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$	\$	15,063	0.0001	0.0002	10.0%	10.0%	Retrofit	Retrolven20	\$	74.92	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	0.84 GPM Showerhead	None	0.84 GPM Showerhead	10	\$10,210.11	\$	\$	583	0.0002	0.0003	65.0%	20.0%	Retrofit	Retrolven20	\$	20.34	DEER	Illinois TRM	Illinois TRM
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	Water Heater - Faucet/Mo	Standard Faucet	Standard Faucet	1	\$76.51	\$	\$	-	0.0003	0.0003	25.0%	60.0%	Retrofit	Retrolven20	\$	15.92	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	Water Heater - Low Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$79.29	\$	\$	241	0.0002	0.0003	25.1%	65.0%	Retrofit	Retrolven20	\$	314.78	RTF	RTF	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	Water Heater - High Effici	1.5 GPM Efficiency Pump	High Efficiency Pump	15	\$1,163.44	\$	\$	3,249	0.0002	0.0003	15.0%	25.0%	Retrofit	Retrolven20	\$	31.02	Hawaii TRM	Hawaii TRM	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	R-2.5 Insulation	Insulated Pipe	R-2.5 Insulation	18	\$75.75	\$	\$	6,360	0.0003	0.0001	25.3%	25.0%	Retrofit	Retrolven20	\$	1.08	Illinois TRM	Illinois TRM	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	Water Heater - Pre-Rinse	1.3 GPM Kitchen Spray Valve	1.0 GPM Kitchen Spray Valve	4	\$1,361.68	\$	\$	897.43	-	-	25.1%	65.0%	Retrofit	Retrolven20	\$	(1,104.55)	RTF	RTF	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	Water Heater - Temperature	Water Set at 120°F	Water Set at 120°F	2	\$157.09	\$	\$	398	0.0002	0.0003	15.2%	75.0%	Retrofit	Retrolven20	\$	23.08	Illinois TRM	Illinois TRM	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Water Heating	Water Heater - Solar Syst	Standard Electric Unit	Solar Electric Unit	2	\$9,091.85	\$	\$	21,967	0.0002	0.0003	1.0%	15.0%	Retrofit	Retrolven20	\$	8.69	AEQ 2015	AEQ 2015	AEQ - BEST
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Interior Lighting - Embode	Standard Controls	Enhanced Controls	15	\$28,138.69	\$	\$	517,033.5	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L020Fast	\$	74.92	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$28,138.69	\$	\$	70,305	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L020Fast	\$	74.92	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Interior Lighting - LED Exit	Baseline LED Sign	Light Emitting Capacitor Sign	15	\$221.19	\$	\$	5,823	0.0002	0.0003	1.7%	15.0%	Retrofit	Retrolven20	\$	3.21	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Two Level Lighting Controls	Baseline Level Lighting Controls	Two Level Lighting Controls	15	\$923,851.02	\$	\$	8,213	0.0003	0.0003	6.3%	20.0%	Retrofit	Retrolven20	\$	283.34	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Interior Fluorescent - Ball	Property LA Fixture	Property LA Fixture	11	\$156.50	\$	\$	3,812	0.0002	0.0003	1.6%	25.0%	Retrofit	Retrolven20	\$	0.43	7th Plan	7th Plan	Illinois TRM
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Interior Fluorescent - Ball	Single Level Lighting Controls	Two Level Lighting Controls	8.6	\$79,949.39	\$	\$	14,141	0.0001	0.0001	15.4%	25.0%	Retrofit	Retrolven20	\$	67.80	7th Plan	7th Plan	Michigan Energy Measures Datab
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Interior Fluorescent - Ball	Standard Controls	PhotoCell and/or Motion Based Controls	8	\$9,141.36	\$	\$	7,881	0.0001	0.0001	60.0%	60.0%	Retrofit	Retrolven20	\$	144.30	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
WA	WA	Commercial	Grocery - WA	Existing	Interior Lighting	Interior Fluorescent - Ball	Standard Controls	Solar Powered Unit Installed	8	\$5,620.85	\$	\$	1,650	0.0001	0.0001	15.4%	25.0%	Retrofit	Retrolven20	\$	280.11	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	Existing	Refrigeration	Refrigeration - Anti-Sweat	None	Anti-Sweat Heater Controls	8	\$981.35	\$	\$	5,125	0.0002	0.0002	23.5%	75.0%	Retrofit	Retrolven20					

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (\$/Unit/Year)	Incremental O&M Costs (\$/Unit/Year)	Average Annual Savings (\$/Unit/Year)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	Grocery - WA	New	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed		18	\$96.48	\$ -	\$ -	861	0.0001	0.0002	99.0%	99.0%	Retrolven20	\$	10.35	DEER	RTF	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed		18	\$96.48	\$ -	\$ -	862	0.0001	0.0002	99.0%	99.0%	Retrolven20	\$	10.35	DEER	RTF	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze		30	\$216,824.33	\$ -	\$ -	10,547	0.0003	0.0001	66.4%	66.4%	Retrol50w	\$	131.51	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	High Efficiency Glaze	Single Glaze	High Efficiency Glaze		30	\$216,824.33	\$ -	\$ -	10,548	0.0003	0.0001	66.4%	66.4%	Retrol50w	\$	131.51	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze		30	\$216,824.33	\$ -	\$ -	14,599	0.0001	0.0002	66.4%	66.4%	Retrol50w	\$	131.51	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	Chiller - Chilled Water Res	None	Enabled		10	\$444.82	\$ -	\$ -	3,226	0.0003	0.0001	15.1%	45.0%	Retrol2Med	\$	16.83	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	Chiller - Chilled Water Var	Constant Flow	Variable Flow		15	\$42,371.39	\$ -	\$ -	55,049	0.0003	0.0001	15.1%	45.0%	Retrol2Med	\$	69.36	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Variable Speed Fan		15	\$2,054.86	\$ -	\$ -	16,099	0.0003	0.0001	15.1%	45.0%	Retrol2Med	\$	15.03	DEER	DEER	New Jersey TRM
WA	WA	Commercial	Grocery - WA	New	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature		10	\$444.82	\$ -	\$ -	38,724	0.0003	0.0001	15.1%	75.0%	Retrol2Med	\$	1.40	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	HVAC - Economizer	None	Installed		10	\$21,458.41	\$ -	\$ -	42,304	0.0003	0.0001	50.0%	60.0%	Retrol2Med	\$	61.18	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Heating	Space Heating - Heat Recor	None	Installed		18	\$31,027.19	\$ -	\$ -	22,358	0.0003	0.0001	5.0%	30.0%	Retrol2Med	\$	128.79	DEER	7th Plan	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Ventilation	Ventilation - ECM on VAV	None	Installed		18	\$12,640.23	\$ -	\$ -	3,689	0.0001	0.0002	15.0%	60.0%	Retrolven20	\$	263.37	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Ventilation	Ventilation - Variable Speed	None	Installed		15	\$9,770,626.52	\$ -	\$ -	18,416	0.0001	0.0002	15.2%	50.0%	Retrol2Med	\$	44,527.24	DEER	DEER	Illinois TRM
WA	WA	Commercial	Grocery - WA	New	Ventilation	Ventilation - Demand Control	Standard	Demand-Controlled Fans		15	\$12,542.80	\$ -	\$ -	2,439	0.0001	0.0002	15.2%	75.0%	Retrol2Med	\$	438.64	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	RTU - Evaporative Precool	None	Installed		15	\$31,338.64	\$ -	\$ -	19,882	0.0002	0.0001	15.0%	15.0%	Retrol2Med	\$	37.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	New	Heating	Destratiification Fans (HVLS)	None	Installed		15	\$31,338.64	\$ -	\$ -	55,820	0.0001	0.0001	15.0%	15.0%	Retrol2Med	\$	37.81	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	New	Cooling	RTU - Maintenance	Standard Unit	Turned Up Unit		3	\$6,086.15	\$ -	\$ -	10,711	0.0003	0.0001	15.0%	25.0%	Retrol2Fast	\$	180.06	Illinois TRM	Illinois TRM	AEQ Research
WA	WA	Commercial	Grocery - WA	New	Cooling	RTU - Advanced Control	RTU with Constant Speed Fan	Advanced Rooftop Controller		5	\$9,480.26	\$ -	\$ -	9,057	0.0003	0.0001	15.1%	45.0%	Retrol30w	\$	35.03	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Cooling	RTU - Evaporative Precool	None	Installed		15	\$18,226.98	\$ -	\$ -	21,991	0.0003	0.0001	15.3%	75.0%	Retrol15w	\$	464.74	DEER	DEER	7th Plan
WA	WA	Commercial	Grocery - WA	New	Cooling	Ductless Mini Split Heat Pu	None	Installed		15	\$565,496.49	\$ -	\$ -	45,534	0.0003	0.0001	15.0%	25.0%	Retrol5Med	\$	441.95	RTF	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Heating	Ductless Mini Split Heat Pu	None	Installed		15	\$565,496.49	\$ -	\$ -	64,673	0.0003	0.0001	15.0%	25.0%	Retrol5Med	\$	441.95	RTF	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Heating	Smart/WiFi Enabled Unit	Standard Unit	Smart/WiFi Enabled Unit		5	\$33,386.90	\$ -	\$ -	50,446	0.0001	0.0001	15.0%	10.0%	Retrolven20	\$	69.43	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit		5	\$33,386.90	\$ -	\$ -	50,446	0.0001	0.0001	10.0%	10.0%	Retrolven20	\$	69.43	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit		5	\$33,386.90	\$ -	\$ -	13,823	0.0001	0.0002	10.0%	10.0%	Retrolven20	\$	69.43	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - Faucet Aeri	1.39 GPM Average Baseline	0.94 GPM Unit		10	\$102.01	\$ -	\$ -	608	0.0002	0.0001	25.1%	65.0%	Retrol2Fast	\$	19.87	DEER	Illinois TRM	Illinois TRM
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - Faucet Mo	1.5 GPM Showerhead	1.5 GPM Showerhead		10	\$76.51	\$ -	\$ -	276	0.0001	0.0001	65.0%	25.0%	Retrol2Fast	\$	10.35	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - Low Flow	5.2 GPM Showerhead	1.5 GPM Showerhead		10	\$79.29	\$96.18	\$ -	252	0.0002	0.0003	25.1%	65.0%	Retrol2Fast	\$	(307.39)	RTF	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - High Effici	Standard Efficiency Pump	High Efficiency Pump		15	\$1,163.44	\$ -	\$ -	3,400	0.0002	0.0003	15.0%	25.0%	Retrolven20	\$	30.29	Hawaii TRM	Hawaii TRM	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - Insulated Pipe	R-5.5 Insulation Installed	Insulated Pipe		15	\$75.75	\$ -	\$ -	6,498	0.0002	0.0003	25.1%	65.0%	Retrol2Fast	\$	10.35	RTF	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - Pre-Rinse	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve		4	\$136.68	\$897.43	\$ -	411	0.0002	0.0003	25.1%	65.0%	Retrol2Med	\$	(1,078.64)	RTF	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - Tempratu	Water Set at 120°F	Water Set at 135°F		2	\$157.09	\$ -	\$ -	3,279	0.0002	0.0003	15.2%	75.0%	Retrol2Med	\$	22.54	Illinois TRM	Illinois TRM	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Water Heating	Water Heater - Solar Syst	Standard Electric Unit	SEF 2.5 Solar Unit		20	\$9,091.85	\$ -	\$ -	22,697	0.0002	0.0003	1.0%	15.0%	Retrol2Med	\$	3.60	AEO 2015	AEO 2015	AEQ - BEST
WA	WA	Commercial	Grocery - WA	New	Interior Lighting	Enhanced Controls	Standard Controls	Enhanced Controls		15	\$157,053.75	\$ -	\$ -	48,000	0.0002	0.0003	13.3%	13.3%	at Turnover, LO20Fast	\$	29.07	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls		15	\$28,138.69	\$ -	\$ -	67,281	0.0002	0.0003	1.0%	15.0%	at Turnover, LO20Fast	\$	34.29	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Interior Lighting	Interior Lighting - LEC Effic	Baseline LED Sign	Light Emitting Capacitor Sign		15	\$221.19	\$ -	\$ -	5,552	0.0002	0.0003	1.7%	5.0%	Retrol2Fast	\$	3.31	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Interior Lighting	Interior Lighting - Photocon	Baseline Level Lighting Controls	Two Level Lighting Controls		19	\$99,253.92	\$ -	\$ -	15,020	0.0002	0.0003	1.6%	6.0%	Retrol2Fast	\$	282.67	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Interior Lighting	Interior Fluorescent - Deta	Property 14 Fixture	Property 14 Fixture		11	\$116,550.50	\$ -	\$ -	37,895	0.0002	0.0003	1.7%	25.0%	Retrol2Med	\$	0.43	Illinois TRM	Illinois TRM	Michigan Energy Measures Datab
WA	WA	Commercial	Grocery - WA	New	Exterior Lighting	Exterior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls		8.6	\$7,904.39	\$ -	\$ -	12,802	0.0001	0.0001	15.4%	25.0%	Retrol2Med	\$	71.47	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Exterior Lighting	Exterior Lighting - Enhanc	Standard Controls	Photocontrol and/or Motion Based Controls		8	\$9,141.36	\$ -	\$ -	7,032	0.0001	0.0001	60.0%	60.0%	Retrol2Med	\$	152.33	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Solar-Powered Unit Install	Standard Unit	Solar-Powered Unit		10	\$566,021.85	\$ -	\$ -	15,727	0.0001	0.0001	15.0%	15.0%	Retrol2Med	\$	439.12	7th Plan	7th Plan	AEQ Research
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Refrigeration - Anti-Sweat	None	Anti-Sweat Heater Controls		8	\$981.35	\$ -	\$ -	4,111	0.0002	0.0002	28.2%	75.0%	Retrol2Med	\$	34.78	RTF	RTF	AEQ Research
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Refrigeration - Door Gask	Standard Controls	Sealed Case Doors		4	\$21.26	\$ -	\$ -	2,265	0.0002	0.0002	75.0%	75.0%	Retrol2Med	\$	2.49	RTF	DEER	RTF
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Refrigeration - Evaporator	Standard Controls	Load-Based Fan Controls		16	\$3,357.65	\$ -	\$ -	3,023	0.0002	0.0002	28.2%	75.0%	Retrol2Med	\$	75.51	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Cooling - Exhaust Heat Redu	Refrigeration Controls	Refrigeration - Floating Hel		14	\$14,471.14	\$ -	\$ -	24,266	0.0002	0.0002	4.3%	54.0%	Retrol2Med	\$	100.00	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Refrigeration - Strip Curtai	None	Strip Curtains Installed		2	\$296.14	\$ -	\$ -	2,610	0.0002	0.0002	28.2%	75.0%	Retrol2Med	\$	51.87	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Refrigeration - High Effici	Standard Efficiency Compressor	High Efficiency Compressor		15	\$601.12	\$ -	\$ -	1,199	0.0002	0.0002	34.7%	30.0%	Retrol2Med	\$	45.72	AEO 2015	AEO 2015	RTF
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Refrigeration - Variable Sp	Standard Efficiency Compressor	Variable Speed Compressor		13	\$1,946.43	\$ -	\$ -	4,648	0.0002	0.0002	28.2%	75.0%	Retrol2Med	\$	100.00	DEER	DEER	AEO 2015
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Refrigeration - Demand Def	Time Based Defrost	Demand Defrost		10	\$5,131.29	\$ -	\$ -	35,180	0.0002	0.0002	34.2%	75.0%	Retrol2Med	\$	165.73	Vermont TRM	Vermont TRM	RTF
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Grocery - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting		6	\$7,382.93	\$ -	\$ -	8,104	0.0002	0.0002	9.4%	75.0%	Retrol2Med	\$	153.11	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Grocery - Display Case - M	Manual Controls	Motion Based Controls		8	\$75.74	\$ -	\$ -	186	0.0002	0.0002	9.4%	75.0%	Retrol2Med	\$	55.21	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Grocery - WA	New	Refrigeration	Grocery - Open Display Ca	None	Night Covers		3	\$233.37	\$ -	\$ -	72,953	0.0002	0.0002	9.4%	75.0%	Retrol2Med	\$	63.48	7th Plan	7th Plan	Illinois TRM
WA																								

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak (kW/Unit)	Winter Coincident Peak (kW/Unit)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	Commercial	College	WA	Existing	Ventilation	Ventilation - ECM on VAV	None	Installed	18	\$12,640.23	\$ -	\$ -	3,772	0.0001	0.0002	15.1%	50.0%	Retrol2Med	\$	254.72	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Ventilation	Ventilation - Variable Speed	Standard	Installed	15	\$9,770,626.52	\$ -	\$ -	18,299	0.0001	0.0002	10.3%	50.0%	Retrol2Med	\$	43,994.94	DEER	DEER	Illinois TRM	
WA	Commercial	College	WA	Existing	Ventilation	Ventilation - Demand Control	Standard	Demand-Controlled Fans	15	\$12,542.80	\$ -	\$ -	2,485	0.0001	0.0002	15.2%	75.0%	Retrol2Med	\$	427.49	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Cooling	Cooling - HVAC	Standard	Coilless HVAC	15	\$31,338.64	\$ -	\$ -	15,338	0.0005	0.0001	15.0%	25.0%	Retrol2Med	\$	21,791.79	DEER	DEER	Illinois TRM	
WA	Commercial	College	WA	Existing	Heating	Destratification Fans (HVLS)	Standard Unit	Installed	15	\$31,338.64	\$ -	\$ -	116,311	0.0004	0.0001	15.0%	25.0%	Retrol2Med	\$	21.79	AEG Research	AEG Research	AEG Research	
WA	Commercial	College	WA	Existing	Cooling	RTU - Maintenance	Standard Unit	Turned Up Unit	3	\$7,303.38	\$ -	\$ -	5,243	0.0005	0.0001	15.0%	25.0%	Retrol2Med	\$	410.34	Illinois TRM	Illinois TRM	AEG Research	
WA	Commercial	College	WA	Existing	Cooling	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Rooftop Controller	15	\$3,480.26	\$ -	\$ -	4,346	0.0005	0.0001	15.1%	45.0%	Retrol2Med	\$	66.52	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Cooling	RTU - Evaporative Precool	With Precool	Precooler Installed	15	\$142,232.37	\$ -	\$ -	10,683	0.0005	0.0001	15.0%	25.0%	Retrol2Med	\$	1,059.08	DEER	DEER	AEG Research	
WA	Commercial	College	WA	Existing	Cooling	Ductless Mini Split Heat Pk	None	Installed	15	\$678,595.79	\$ -	\$ -	2,448	0.0005	0.0001	15.0%	25.0%	Retrol2Med	\$	345.82	RTF	RTF	7th Plan	
WA	Commercial	College	WA	Existing	Heating	Ductless Mini Split Heat Pk	None	Installed	15	\$678,595.79	\$ -	\$ -	149,729	0.0005	0.0004	15.0%	25.0%	Retrol2Med	\$	345.82	RTF	RTF	7th Plan	
WA	Commercial	College	WA	Existing	Cooling	Smart/WFI Enabled Unit	Standard Unit	Smart/WFI Enabled Unit	5	\$33,386.90	\$ -	\$ -	23,400	0.0005	0.0002	10.0%	10.0%	Retrol2Med	\$	47.55	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Heating	Thermostat - WFI/Interact	Standard Unit	Smart/WFI Enabled Unit	5	\$33,386.90	\$ -	\$ -	107,535	0.0005	0.0004	10.0%	10.0%	Retrol2Med	\$	47.55	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Ventilation	Thermostat - WFI/Interact	Standard Unit	Smart/WFI Enabled Unit	5	\$33,386.90	\$ -	\$ -	14,090	0.0001	0.0002	10.0%	10.0%	Retrol2Med	\$	47.55	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Water Heating	Water Heater - Faucet Aer	1.9 GPM Average Baseline	0.94 GPM Unit	10	\$103.01	\$ -	\$ -	725	0.0002	0.0004	25.1%	65.0%	Retrol2Med	\$	16.35	DEER	Illinois TRM	Illinois TRM	
WA	Commercial	College	WA	Existing	Water Heating	Water Heater - Faucet Aer	2.2 GPM Showerhead	1.5 GPM Showerhead	3	\$76.51	\$ -	\$ -	968	0.0002	0.0004	25.1%	65.0%	Retrol2Med	\$	16.35	AEG Research	AEG Research	7th Plan	
WA	Commercial	College	WA	Existing	Water Heating	Water Heater - High Effic	Standard Efficiency Pump	High Efficiency Pump	10	\$79.29	96.18	\$ -	3,001	0.0002	0.0004	25.1%	65.0%	Retrol2Med	\$	252.96	RTF	RTF	7th Plan	
WA	Commercial	College	WA	Existing	Water Heating	Water Heater - Pipe Insul	Uninsulated Pipe	R-5 Insulation Installed	15	\$75.75	\$ -	\$ -	7,918	0.0002	0.0004	25.2%	75.0%	Retrol2Med	\$	3.87	Illinois TRM	Illinois TRM	AEG-BEST	
WA	Commercial	College	WA	Existing	Water Heating	Water Heater - Pre-Rinse S	1.3 GPM Kitchen Spray Valve	0.85-1.00 GPM Kitchen Spray Valve	4	\$1,361.68	\$ 897.43	\$ -	468	0.0002	0.0004	25.1%	65.0%	Retrol2Med	\$	187.62	RTF	RTF	7th Plan	
WA	Commercial	College	WA	Existing	Water Heating	Water Heater - Tempuratu	Water Set at 130F	Water Set at 120F	2	\$198.11	\$ -	\$ -	4,039	0.0002	0.0004	15.2%	75.0%	Retrol2Med	\$	23.39	Illinois TRM	Illinois TRM	Illinois TRM	
WA	Commercial	College	WA	Existing	Water Heating	Water Heater - Solar Syst	Standard Electric Unit	SEF 2.5 Solar Unit	20	\$20,091.85	\$ -	\$ -	27,332	0.0002	0.0004	1.0%	15.0%	Retrol2Med	\$	2.96	AEO 2015	AEO 2015	AEG-BEST	
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Lighting - Embedde	Standard Controls	Enhanced Controls	15	\$17,053.75	\$ -	\$ -	12,714	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L202Fast	\$	113.34	7th Plan	7th Plan	7th Plan
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$28,138.69	\$ -	\$ -	17,525	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L202Fast	\$	131.22	7th Plan	7th Plan	7th Plan
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Lighting - LED CE	Baseline LED Sign	Light Emitting Capacitor Sign	15	\$221.19	\$ -	\$ -	1,413	0.0002	0.0003	1.7%	5.0%	Retrol2Med	\$	13.01	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Fluorescent - Hi-L	Single Level Lighting Controls	Two Level Lighting Controls	16	\$91,851.92	\$ -	\$ -	7,632	0.0002	0.0003	6.7%	15.0%	Retrol2Med	\$	921.86	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Fluorescent - Dela	Proxerity Fixture	Proxerity Fixture	11	\$156.50	\$ -	\$ -	1,000	0.0002	0.0003	16.7%	25.0%	Retrol2Med	\$	1.39	7th Plan	7th Plan	Illinois TRM	
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls	8.6	\$3,278.78	\$ -	\$ -	7,308	0.0001	0.0001	15.1%	25.0%	Retrol2Med	\$	53.64	7th Plan	7th Plan	Michigan Energy Measures Datab	
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Lighting - Enhance	Standard Controls	Photozell and/or Motion Based Controls	8	\$7,282.73	\$ -	\$ -	4,069	0.0001	0.0001	60.0%	60.0%	Retrol2Med	\$	219.58	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper	
WA	Commercial	College	WA	Existing	Interior Lighting	Interior Lighting - Photozell	Standard Controls	Scan-Retarded Unit Installed	15	\$466,035.31	\$ -	\$ -	4,979	0.0001	0.0001	10.0%	10.0%	Retrol2Med	\$	12,020.01	AEG Research	AEG Research	AEG Research	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Anti-Sweat	Non Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$ -	\$ -	137	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	1,008.50	RTF	RTF	RTF	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Door Gask	Leaky Case Doors	Sealed Case Doors	4	\$21.26	\$ -	\$ -	279	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	20.24	RTF	RTF	DEER	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Evaporator	Load-Based Fan Controls	Load-Based Fan Controls	16	\$593.65	\$ -	\$ -	1,043	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	42.56	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Floating Hel	Standard Controls	Vertical Refrigeration Hel	15	\$14,471.14	\$ -	\$ -	1,097	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	119.65	RTF	RTF	7th Plan	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Strip Curtai	No Strip Curtains	Strip Curtains Installed	2	\$296.14	\$ -	\$ -	243	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	593.27	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - High Effic	Standard Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$ -	\$ -	54	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	1,005.25	AEO 2015	RTF	RTF	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Variable Sp	Standard Compressor Loading	Variable Speed Compressor Loading	15	\$3,946.43	\$ -	\$ -	2,113	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	1,333.02	DEER	DEER	AEO 2015	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Demand De	Time Based Defrost	Demand Defrost	10	\$1,399.94	\$ -	\$ -	1,710	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	109.32	Vermont TRM	Vermont TRM	AEO 2015	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	6	\$1,107.44	\$ -	\$ -	206	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	961.32	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Display Case - M	Manual Controls	Motion Based Controls	8	\$75.74	\$ -	\$ -	5	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	2,310.84	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - Open Display Ca	No Cover	Light Covers	12	\$338.37	\$ -	\$ -	2,002	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	242.88	DEER	DEER	Illinois TRM	
WA	Commercial	College	WA	Existing	Refrigeration	Refrigeration - ECMs for Dispa	Standard Motors	ECM Motors	16	\$335.77	\$ -	\$ -	11	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	2,657.28	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Refrigeration	Vending Machine - Occupa	None	Lighting and Compressor Controls	5	\$436.58	\$ -	\$ -	2,881	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	32.88	Illinois TRM	Illinois TRM	Illinois TRM	
WA	Commercial	College	WA	Existing	Ventilation	Cooling - Exhaust Hoods	Constant Speed Hoods	Demand-Controlled Hoods	18	\$17,241.81	\$ -	\$ -	6,627	0.0001	0.0002	25.1%	50.0%	Retrol2Med	\$	202.07	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Ventilation	Office Equipment - Smart	Standard Unit	Low Sensing Strip	4	\$1,676.29	\$ -	\$ -	1,076	0.0001	0.0002	10.0%	10.0%	Retrol2Med	\$	281.10	Illinois TRM	Illinois TRM	Illinois TRM	
WA	Commercial	College	WA	Existing	Cooling	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	9,354	0.0005	0.0001	0.0%	0.0%	Retrol2Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEG-BEST	
WA	Commercial	College	WA	Existing	Heating	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	24,891	0.0005	0.0004	0.0%	0.0%	Retrol2Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEG-BEST	
WA	Commercial	College	WA	Existing	Office Equipment	Office Practice Measures Installed	Standard Unit	Office Practice Measures Installed	5	\$57.52	\$ -	\$ -	701	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	16.17	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	385	0.0005	0.0001	0.0%	0.0%	Retrol2Med	\$	1.37	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	211	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	1.37	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	969	0.0002	0.0003	0.0%	0.0%	Retrol2Med	\$	1.37	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	168	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	1.37	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$2.95	\$ -	\$ -	1,775	0.0005	0.0001	0.0%	0.0%	Retrol2Med	\$	0.29	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$2.95	\$ -	\$ -	57	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	0.29	7th Plan	7th Plan	7th Plan	
WA	Commercial	College	WA	Existing	Ventilation	Demand-Controlled Ventila	Demand-Controlled Hoods	Demand-Controlled Hoods	15	\$4,159.24	\$ -	\$ -	2,000	0.0001	0.0001	0.0%	0.0%	Retrol2Med	\$	242.88	DEER	DEER	7th Plan	

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	College	WA	New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$ -	\$ -	106,300	-	0.0004	10.0%	10.0%	Retrolven20	\$	46.15	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$ -	\$ -	13,731	0.0001	0.0002	10.0%	10.0%	Retrolven20	\$	46.15	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - Faucet Aer	1.39 GPM Average Baseline	0.94 GPM Unit	10	\$102.01	\$ -	\$ -	767	0.0002	0.0004	25.1%	65.0%	Retrol20fast	\$	15.75	DEER	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - Faucet Aer	1.39 GPM Average Baseline	Motion Sensor-Controlled Faucet	10	\$76.51	\$ -	\$ -	676	0.0002	0.0004	25.1%	65.0%	Retrol20fast	\$	15.75	DEER	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - Low Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$79.29	\$ 96.18	\$ -	318	0.0002	0.0004	25.1%	65.0%	Retrol20fast	\$	(243.75)	RTF	Illinois TRM	7th Plan
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - High Efficiency	Standard Efficiency Pump	High Efficiency Pump	15	\$1,647.25	\$ -	\$ -	4,284	0.0002	0.0004	15.0%	25.0%	Retrolven20	\$	30.29	Hawaii TRM	Hawaii TRM	Hawaii TRM
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - Pipe Insulation	Uninsulated Pipe	R-1.5 Insulation Installed	15	\$75.75	\$ -	\$ -	8,197	0.0002	0.0004	25.2%	75.0%	Retrol2Med	\$	0.84	Illinois TRM	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - Pro-Rise 5	1.33 GPM Kitchens Spray Valve	0.85 1.00 GPM Kitchens Spray Valve	10	\$1,361.68	\$ 897.43	\$ -	148	0.0002	0.0004	25.1%	75.0%	Retrol2Med	\$	118.23	RTF	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - Temperature	Water Set at 120°F	Water Set at 135°F	2	\$198.15	\$ -	\$ -	1,135	0.0002	0.0004	15.0%	15.0%	Retrol2Med	\$	2.86	AEO 2015	AEO 2015	Illinois TRM
WA	WA	Commercial	College	WA	New	Water Heating	Water Heater - Solar System	Standard Electric Unit	SEF 2.5 Solar Unit	20	\$1,091.85	\$ -	\$ -	28,623	0.0002	0.0004	1.0%	15.0%	Retrol2Med	\$	2.86	AEO 2015	AEO 2015	Illinois TRM
WA	WA	Commercial	College	WA	New	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	\$12,053.75	\$ -	\$ -	11,603	0.0002	0.0003	13.1%	at Turnover	Retrol2Fast	\$	111.12	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$28,138.69	\$ -	\$ -	17,440	0.0002	0.0003	13.1%	at Turnover	Retrol2Fast	\$	130.96	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Interior Lighting	Interior Lighting - LED Exit	Baseline LED Sign	Light Emitting Capacitor Sign	15	\$221.19	\$ -	\$ -	1,988	0.0002	0.0003	1.7%	5.0%	Retrol2Fast	\$	13.00	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Interior Lighting	Interior Fluorescent - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls	16	\$91,851.92	\$ -	\$ -	7,504	0.0002	0.0003	6.7%	15.0%	Retrol2Med	\$	910.10	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Interior Lighting	Interior Fluorescent - Detail	Single Level Lighting Controls	Two Level Lighting Controls	13	\$156.50	\$ -	\$ -	11,694	0.0002	0.0003	16.7%	25.0%	Retrol2Med	\$	3.38	Illinois TRM	Illinois TRM	
WA	WA	Commercial	College	WA	New	Exterior Lighting	Exterior Lighting - Bi-Level	Standard Controls	Two Level Lighting Controls	8.6	\$3,278.78	\$ -	\$ -	7,313	0.0001	0.0001	15.4%	25.0%	Retrol2Med	\$	52.37	7th Plan	7th Plan	Michigan Energy Measures Datab
WA	WA	Commercial	College	WA	New	Exterior Lighting	Exterior Lighting - Entrance	Standard Controls	PhotoCell and/or Motion Based Controls	8	\$7,282.73	\$ -	\$ -	4,016	0.0001	0.0001	60.0%	60.0%	Retrol2Med	\$	214.35	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
WA	WA	Commercial	College	WA	New	Exterior Lighting	Exterior Lighting - Photovolt	None	Solar Powered Unit Installed	7	\$446,635.31	\$ -	\$ -	4,983	0.0001	0.0001	15.6%	30.0%	Retrol2Med	\$	11,723.90	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Anti-Sweat	Refrigeration Controls	Anti-Sweat Heater Controls	8	\$981.35	\$ -	\$ -	108	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	2,290.16	RTF	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Door Gasket	Standard Controls	Sealed Case Doors	4	\$21.26	\$ -	\$ -	231	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	24.31	RTF	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Evaporator	Standard Controls	Load-Based Fan Controls	16	\$503.65	\$ -	\$ -	870	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	50.72	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Floating Hel	Front Discharge Pressure Controls	Webtub Reset Controls	15	\$14,471.14	\$ -	\$ -	1,021	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	1,285.10	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Strip Curtai	Standard Controls	Strip Curtains Installed	2	\$296.14	\$ -	\$ -	215	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	673.38	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$ -	\$ -	51	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	1,080.45	AEO 2015	AEO 2015	Illinois TRM
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Variable Speed	Inefficient Compressor Loading	Variable Speed Compressor Loading	15	\$31,946.43	\$ -	\$ -	1,979	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	1,431.56	DEER	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Demand De	Standard Controls	Ton Demand Defrost	10	\$511.31	\$ 29.29	\$ -	1,556	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	3,916.53	Vermont TRM	Vermont TRM	Vermont TRM
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	6	\$1,107.44	\$ -	\$ -	188	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	1,061.24	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Display Case - Mo	Mainline Controls	Motion Based Controls	8	\$75.74	\$ -	\$ -	4	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	2,551.03	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Night Open Display Ca	Night Covers	Night Covers	8	\$333.37	\$ -	\$ -	4	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	23.05	DEER	Illinois TRM	Illinois TRM
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - ECMs for Displa	Standard Motors	ECM Motors	16	\$335.77	\$ -	\$ -	10	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	2,933.47	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Refrigeration	Refrigeration - Vending Machine - Occupa	Standard	Lighting and Compressor Controls	5	\$436.58	\$ -	\$ -	2,827	0.0002	0.0002	1.6%	25.0%	Retrol2Med	\$	33.44	Illinois TRM	Illinois TRM	
WA	WA	Commercial	College	WA	New	Ventilation	Cooling - Exhaust Hoods	Constant Speed Hoods	Demand-Controlled Hoods	18	\$17,441.81	\$ -	\$ -	6,361	0.0001	0.0002	35.1%	50.0%	Retrolven20	\$	197.87	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Ventilation	Office Equipment - Smart	Standard Unit	Load Sensing Strip	10	\$3,076.29	\$ -	\$ -	1,334	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	208.12	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Cooling	Lodging - Guest Room Con	Mainline Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	12,393	0.0005	0.0001	0.0%	0.0%	Retrol2Med	\$	9,999.00	Illinois TRM	Illinois TRM	
WA	WA	Commercial	College	WA	New	Heating	Lodging - Guest Room Con	Mainline Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	(22,711)	-	0.0004	0.0%	0.0%	Retrol2Med	\$	9,999.00	Illinois TRM	Illinois TRM	
WA	WA	Commercial	College	WA	New	Office Equipment	Office - Best Practices	Standard Unit	Office Practice Measures Installed	5	\$57.52	\$ -	\$ -	725	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	15.04	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$157.60	\$ -	\$ -	432	0.0005	0.0001	0.0%	0.0%	Retrol2Med	\$	1.33	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$157.60	\$ -	\$ -	207	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	1.33	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$157.60	\$ -	\$ -	938	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	1.33	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Interior Lighting	Office Equipment - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$157.60	\$ -	\$ -	938	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	1.33	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$324.25	\$ -	\$ -	1,966	0.0005	0.0002	0.0%	0.0%	Retrol2Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$324.25	\$ -	\$ -	58	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$	0.27	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Ventilation	Optimized Variable Volume	Constant Speed Hoods	Demand-Controlled Hoods	18	\$4,159.24	\$ -	\$ -	710	0.0001	0.0002	0.0%	5.0%	Retrol2Med	\$	419.05	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	College	WA	New	Cooling	Pool - Time	Scheduled Fans	On/Off Controls	10	\$86.76	\$ -	\$ -	80	0.0002	0.0002	0.0%	0.0%	Retrol2Med	\$	35.61	Illinois Power TRM	Illinois Power TRM	
WA	WA	Commercial	College	WA	New	Advanced New Constructi	Standard Building Practices	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	44,163	0.0001	0.0001	10.1%	50.0%	Retrol15low	\$	41.62	AEQ Research	AEQ Research	
WA	WA	Commercial	College	WA	New	Heating	Advanced New Constructi	Standard Building Practices	Standard Building Practices	25	\$208,668.13	\$ -	\$ -	178.78	0.0001	0.0001	10.1%	50.0%	Retrol15low	\$	41.62	AEQ Research	AEQ Research	
WA	WA	Commercial	College	WA	New	Advanced New Constructi	Standard Building Practices	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	21,203	0.0001	0.0002	10.1%	50.0%	Retrol15low	\$	41.62	AEQ Research	AEQ Research	
WA	WA	Commercial	College	WA	New	Water Heating	Advanced New Constructi	Standard Building Practices	Standard Building Practices	25	\$208,668.13	\$ -	\$ -	39,538	0.0002	0.0004	10.1%	50.0%	Retrol15low	\$	41.62	AEQ Research	AEQ Research	
WA	WA	Commercial	College	WA	New	Advanced New Constructi	Standard Building Practices	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	24,215	0.0002	0.0003	16.3%	50.0%	Retrol15low	\$	41.62	AEQ Research	AEQ Research	
WA	WA	Commercial	College	WA	New	Advanced New Constructi	Standard Building Practices	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	13,780	0.0001	0.0001	11.7%	50.0%	Retrol15low	\$	41.62	AEQ Research	AEQ Research	
WA	WA	Commercial	College	WA	New	Interior Lighting	Advanced New Constructi	Standard Building Practices	Standard Building Practices	25	\$208,668.13	\$ -	\$ -	6,511	0.0005	0.0001	3.1%	29.0%	Retrol2Med	\$	27.58	AEQ Research	AEQ Research	
WA	WA	Commercial	College	WA	New	Heating	Strategic Energy Managem	None	Implemented	3	\$4,455.96	\$ -	\$ -	26,480	-	0.0004	3.1%	29.0%	Retrol2Med	\$	27.58	AEQ Research	AEQ Research	

Measure										Assumptions in First Year (2015)										Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Summer	Winter	Base Year	Applicability	Replacement	7th Plan Measure	TRC Levelized	Lifetime Source	Costs Source	Savings Source						
									Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (\$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	528,136.69	\$	-	-	15,889	0.0000	0.0002	6.4%	at Turnover	Low Opportunity	L020Fast	\$	146.68	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Lighting - LECC ET	Baseline LED Sign	Light Emitting Capacitor Sign	15	5221.19	\$	-	-	1,279	0.0000	0.0002	1.7%	5.0%	Retrof	Retrof20Fast	\$	14.58	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Single Level Lighting Controls	Two Level Lighting Controls	16	591,851.92	\$	-	-	4,425	0.0000	0.0002	6.7%	15.0%	Retrof	Retrof2Med	\$	1,600.77	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Properly Labeled	Properly Labeled	11	5156.50	\$	-	-	6,814	0.0000	0.0002	16.3%	25.0%	Retrof	Retrof2Med	\$	2.41	7th Plan	Michigan Energy Measures Datab	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Single Level Lighting Controls	Two Level Lighting Controls	8.6	54,608.35	\$	-	-	9,700	0.0001	0.0001	15.4%	25.0%	Retrof	Retrof2Med	\$	55.97	7th Plan	Michigan Energy Measures Datab	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	8	56,964.47	\$	-	-	5,401	0.0001	0.0001	60.0%	60.0%	Retrof	Retrof2Med	\$	155.88	PG&E Workpaper	PG&E Workpaper	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	7	54,247.17	\$	-	-	6,615	0.0001	0.0001	15.4%	25.0%	Retrof	Retrof2Med	\$	8,532.18	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	8	59,813.35	\$	-	-	161	0.0000	0.0000	1.6%	25.0%	Retrof	Retrof2Med	\$	860.37	RTF	RTF	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	4	52,126.26	\$	-	-	327	0.0000	0.0000	0.0%	0.0%	Retrof	Retrof2Med	\$	17.27	RTF	RTF	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	16	55,003.65	\$	-	-	1,223	0.0001	0.0002	1.6%	25.0%	Retrof	Retrof2Med	\$	36.30	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	15	514,471.14	\$	-	-	1,277	0.0001	0.0002	1.6%	25.0%	Retrof	Retrof2Med	\$	1,019.92	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	2	52,964.14	\$	-	-	277	0.0000	0.0002	1.6%	25.0%	Retrof	Retrof2Med	\$	506.07	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	15	56,012.12	\$	-	-	63	0.0000	0.0002	1.6%	25.0%	Retrof	Retrof2Med	\$	87.50	AEO 2015	RTF	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	15	531,946.43	\$	-	-	2,483	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	1,136.16	DEER	DEER	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	10	51,539.94	\$	-	-	2,006	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	93.25	Vermont TRM	AEO 2015	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	6	51,107.44	\$	-	-	242	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	820.02	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	8	57,574.5	\$	-	-	5	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	1,971.20	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	5	52,337.37	\$	-	-	2,469	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	20.51	DEER	DEER	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	16	535,777.5	\$	-	-	163	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	2,266.72	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	5	55,111.8	\$	-	-	3,377	0.0001	0.0002	1.6%	25.0%	Retrof	Retrof2Med	\$	32.88	Illinois TRM	Illinois TRM	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	18	517,441.81	\$	-	-	3,523	0.0001	0.0002	25.1%	50.0%	Retrof	Retrof2Med	\$	380.33	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	4	53,676.29	\$	-	-	2,263	0.0000	0.0002	10.1%	50.0%	Retrof	Retrof2Med	\$	392.59	RTF	RTF	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	15	526,261.00	\$	-	-	5,163	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	9,999.00	Illinois TRM	Illinois TRM	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	15	526,261.00	\$	-	-	(18,784)	-	0.0004	0.0%	0.0%	Retrof	Retrof2Med	\$	9,999.00	Illinois TRM	Illinois TRM	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	5	580.39	\$	-	-	992	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	16.17	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	8	512.20	\$	-	-	112	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	1.17	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	8	512.20	\$	-	-	112	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	1.17	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	8	512.20	\$	-	-	859	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	1.17	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	8	512.20	\$	-	-	859	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	1.17	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	6	516.2	\$	-	-	947	-	-	0.0%	0.0%	Retrof	Retrof2Med	\$	0.28	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	6	516.2	\$	-	-	79	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	0.28	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	18	54,519.24	\$	-	-	390	0.0001	0.0002	0.0%	5.0%	Retrof	Retrof2Med	\$	805.48	7th Plan	7th Plan	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	25	596.76	\$	-	-	19	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	392.59	RTF	RTF	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	25	520,668.13	\$	-	-	20,965	-	-	0.0%	0.0%	Retrof	Retrof15low	\$	65.87	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	25	520,668.13	\$	-	-	106,542	-	-	0.0%	0.0%	Retrof	Retrof15low	\$	65.87	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	25	520,668.13	\$	-	-	41,699	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof15low	\$	65.87	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	25	520,668.13	\$	-	-	212,874	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof15low	\$	65.87	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	25	520,668.13	\$	-	-	20,795	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof15low	\$	65.87	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	25	520,668.13	\$	-	-	19,754	0.0001	0.0001	0.0%	0.0%	Retrof	Retrof15low	\$	65.87	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	1,149	0.0000	0.0002	2.1%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	15,163	-	-	0.0004	2.1%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	1,904	0.0001	0.0002	2.1%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	3,082	0.0000	0.0002	2.1%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	3,397	0.0000	0.0002	2.1%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	2,779	0.0001	0.0001	2.9%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	929	0.0001	0.0002	2.4%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	51,689.45	\$	-	-	1,313	0.0000	0.0002	2.1%	22.0%	Retrof	Retrof2Med	\$	17.09	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	52,206.81	\$	-	-	4,363	-	-	0.0%	0.0%	Retrof	Retrof2Med	\$	18.37	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	52,206.81	\$	-	-	21,269	-	-	0.0004	0.0%	0.0%	Retrof	Retrof2Med	\$	18.37	AE Research	AE Research
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	52,206.81	\$	-	-	2,637	0.0001	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	18.37	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	52,206.81	\$	-	-	1,422	0.0000	0.0002	0.0%	0.0%	Retrof	Retrof2Med	\$	18.37	AE Research	AE Research	
WA	Commercial	School	WA	Existing	Interior Lighting	Interior Fluorescent - Bi-LE	Standard Controls	Photocell and/or Motion Based Controls	3	52,206.81	\$	-	-												

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Benefits Annual \$/Unit	Incremental O&M Costs (\$/Unit)	Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	School	WA	New	Refrigeration - Strip Curtains	No Strip Curtains	Strip Curtains Installed		2	\$296.14	\$	\$	252	0.0001	0.0002	1.6%	25.0%	Retiro12Med	\$	574.43	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	School	WA	New	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor		15	\$601.12	\$	\$	58	0.0001	0.0002	1.6%	25.0%	Retiro12Med	\$	92.66	AEO 2015	DEER	RTF
WA	WA	Commercial	School	WA	New	Refrigeration - Variable Speed	Standard Compressor Loading	Variable Speed Compressor Loading		15	\$31,946.43	\$	\$	2,321	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	1,221.18	DEER	RTF	AEO 2015
WA	WA	Commercial	School	WA	New	Refrigeration - Demand Defrost	Standard Demand Defrost	Demand Defrost		10	\$53,313.29	\$	\$	1,203	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	3,340.00	Verstrom TRM	DEER	Verstrom TRM
WA	WA	Commercial	School	WA	New	Refrigeration - LED Case Lighting	Fluorescent Case Lighting	LED Case Lighting		6	\$1,107.44	\$	\$	220	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	905.28	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	School	WA	New	Refrigeration - Manual Controls	Manual Controls	Motion Based Controls		8	\$75.74	\$	\$	5	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	2,176.13	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	School	WA	New	Refrigeration - Night Covers	No Covers	Night Covers		5	\$233.37	\$	\$	2,300	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	21.96	DEER	DEER	Illinois TRM
WA	WA	Commercial	School	WA	New	Refrigeration - ECM Motors	ECM Motors																	

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit (Annual \$/Unit)	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Annual Average Savings (\$/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	Health - WA	Existing	Cooling	Lodging - Guest Room Cool	Manual Controls	Occupancy Controls	5	\$1,315,300.00	\$ -	\$ -	67,169	0.0002	0.0001	0.00%	0.0%	RetiroMed	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	Lodging - Guest Room Heat	Manual Controls	Occupancy Controls	5	\$1,313,300.00	\$ -	\$ -	(134,209)	0.0000	0.0003	0.0%	0.0%	RetiroMed	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Data Center - Best Practice	Baseline Data Center	Best Practice Measures Installed	5	\$641.55	\$ -	\$ -	7,904	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	16.17	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	Data Center - Commercial	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$430.70	\$ -	\$ -	3,231	0.0002	0.0002	0.0%	0.0%	RetiroMed	\$	3.34	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$430.70	\$ -	\$ -	2,435	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	3.34	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$430.70	\$ -	\$ -	9,464	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	3.34	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$430.70	\$ -	\$ -	1,876	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	3.34	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$28.24	\$ -	\$ -	16,365	0.0002	0.0001	0.0%	0.0%	RetiroMed	\$	6.28	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$28.24	\$ -	\$ -	633	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	6.28	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Ventilation	Optimized Variable Volume	Constant Speed Hoods	Demand-Controlled Hoods	18	\$4,159.24	\$ -	\$ -	8,774	0.0001	0.0002	0.0%	5.0%	RetiroMed	\$	37.38	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Scheduled Controls	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	554	0.0001	0.0002	0.0%	5.0%	RetiroMed	\$	19.32	Ontario Power TRM	Ontario Power TRM	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	Advanced New Construct	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	31,984	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	41.79	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Heating	Advanced New Construct	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	1,066,442	0.0000	0.0003	0.0%	0.0%	RetiroMed	\$	29.44	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Ventilation	Advanced New Construct	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	175,873	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	29.44	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Water Heating	Advanced New Construct	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	385,202	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	29.44	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	Advanced New Construct	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	222,585	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	29.44	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Exterior Lighting	Advanced New Construct	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	44,356	0.0001	0.0001	0.0%	0.0%	RetiroMed	\$	29.44	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Cooling	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	48,019	0.0002	0.0001	4.1%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Heating	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	48,019	0.0002	0.0001	4.1%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Ventilation	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	41,551	0.0001	0.0001	4.1%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Water Heating	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	53,426	0.0001	0.0002	4.1%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	37,478	0.0001	0.0002	8.1%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Exterior Lighting	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	7,276	0.0001	0.0001	5.1%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Refrigeration	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	7,705	0.0002	0.0002	4.5%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Office Equipment	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	10,455	0.0001	0.0002	4.1%	28.0%	RetiroMed	\$	41.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Cooling	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	66,487	0.0002	0.0001	0.0%	0.0%	RetiroMed	\$	46.32	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Heating	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	206,956	0.0000	0.0003	0.0%	0.0%	RetiroMed	\$	46.32	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Ventilation	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	57,532	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	46.32	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Water Heating	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	24,558	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	46.32	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	43,244	0.0001	0.0002	0.0%	0.0%	RetiroMed	\$	46.32	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	8,396	0.0001	0.0001	0.0%	0.0%	RetiroMed	\$	46.32	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Refrigeration	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	17,780	0.0002	0.0002	0.0%	0.0%	RetiroMed	\$	46.32	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Cooling	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	62,927	0.0002	0.0001	10.3%	50.0%	RetiroMed	\$	204.28	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Heating	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	205,258	0.0000	0.0003	10.1%	50.0%	RetiroMed	\$	204.28	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Ventilation	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	57,085	0.0001	0.0001	10.1%	50.0%	RetiroMed	\$	204.28	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Water Heating	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	26,456	0.0001	0.0002	10.6%	50.0%	RetiroMed	\$	204.28	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	42,963	0.0001	0.0002	10.6%	50.0%	RetiroMed	\$	204.28	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	8,333	0.0001	0.0001	11.7%	50.0%	RetiroMed	\$	204.28	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	Existing	Refrigeration	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	17,641	0.0002	0.0002	10.6%	50.0%	RetiroMed	\$	204.28	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Insulation - Ceiling	R-13	R-13	Insulation - Ceiling	45	\$83,940.24	\$ -	\$ -	128,139	0.0000	0.0000	75.2%	99.0%	RetiroMed	\$	7.82	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Ceiling	R-13	R-13	Insulation - Ceiling	45	\$83,940.24	\$ -	\$ -	346,018	0.0000	0.0003	75.2%	99.0%	RetiroMed	\$	7.82	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Ceiling	R-13	R-13	Insulation - Ceiling	45	\$83,940.24	\$ -	\$ -	77,939	0.0002	0.0002	75.2%	99.0%	RetiroMed	\$	7.82	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Ducting	R-8	R-8	Insulation - Ducting	20	\$53,227.46	\$ -	\$ -	56,487	0.0002	0.0001	15.2%	35.0%	RetiroMed	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Ducting	R-8	R-8	Insulation - Ducting	20	\$53,227.46	\$ -	\$ -	142,800	0.0000	0.0000	15.2%	35.0%	RetiroMed	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Ducting	R-8	R-8	Insulation - Ducting	20	\$53,227.46	\$ -	\$ -	15,316	0.0000	0.0000	15.3%	35.0%	RetiroMed	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$48,593.04	\$ -	\$ -	2,656	0.0000	0.0001	45.1%	50.0%	RetiroMed	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$48,593.04	\$ -	\$ -	(9,708)	0.0000	0.0003	45.1%	50.0%	RetiroMed	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Wall Cavity	R-9	R-9	Insulation - Wall Cavity	45	\$73,570.46	\$ -	\$ -	1,035	0.0000	0.0001	65.3%	99.0%	RetiroMed	\$	151.61	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Wall Cavity	R-9	R-9	Insulation - Wall Cavity	45	\$73,570.46	\$ -	\$ -	22,842	0.0002	0.0001	65.3%	99.0%	RetiroMed	\$	151.61	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Insulation - Wall Cavity	R-9	R-9	Insulation - Wall Cavity	45	\$73,570.46	\$ -	\$ -	1,211	0.0000	0.0002	65.4%	99.0%	RetiroMed	\$	151.61	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$526.27	\$ -	\$ -	23,216	0.0000	0.0000	99.0%	99.0%	RetiroMed	\$	9,999.00	DEER	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$526.27	\$ -	\$ -	(72,393)	0.0000	0.0003	99.0%	99.0%	RetiroMed	\$	9,999.00	DEER	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$526.27	\$ -	\$ -	20,526	0.0000	0.0000	99.0%	99.0%	RetiroMed	\$	9,999.00	DEER	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$84,686.63	\$ -	\$ -	70,920	0.0000	0.0001	66.4%							

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Year)	Annual Savings (\$/kW/Year)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
WA	WA	Commercial	Health - WA	New	Cooling	Advanced New Construction	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	355,183	0.0002	0.0001	10.1%	50.0%	Retrofit	Retro15Low	\$	29.39	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	New	Heating	Advanced New Construction	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	1,005,120	0.0000	0.0003	10.1%	50.0%	Retrofit	Retro15Low	\$	29.39	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	New	Ventilation	Advanced New Construction	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	225,569	0.0000	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	29.39	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	New	Water Heating	Advanced New Construction	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	30,212.3	0.0000	0.0002	10.1%	50.0%	Retrofit	Retro15Low	\$	29.39	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	New	Interior Lighting	Advanced New Construction	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	237,616	0.0001	0.0002	16.3%	50.0%	Retrofit	Retro15Low	\$	29.39	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	New	Exterior Lighting	Advanced New Construction	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	43,928	0.0001	0.0001	11.7%	50.0%	Retrofit	Retro15Low	\$	29.39	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Health - WA	New	Cooling	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	52,836	0.0002	0.0001	4.1%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Heating	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	147,050	0.0000	0.0003	4.1%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Ventilation	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	33,046	0.0001	0.0002	4.1%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Water Heating	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	54,538	0.0001	0.0001	4.1%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Interior Lighting	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	35,463	0.0001	0.0002	8.1%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Exterior Lighting	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	6,549	0.0001	0.0001	5.1%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Refrigeration	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	7,613	0.0002	0.0002	4.5%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Office Equipment	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	13,277	0.0001	0.0002	4.1%	28.0%	Retrofit	Retro12Med	\$	40.51	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Commissioning	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	73,407	0.0002	0.0001	10.2%	75.0%	Retrofit	Retro12Med	\$	43.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Heating	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	205,908	0.0000	0.0003	10.2%	75.0%	Retrofit	Retro12Med	\$	43.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Ventilation	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	46,087	0.0001	0.0002	10.2%	75.0%	Retrofit	Retro12Med	\$	43.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Water Heating	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	25,231	0.0001	0.0002	10.2%	75.0%	Retrofit	Retro12Med	\$	43.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Interior Lighting	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	41,127	0.0001	0.0002	10.2%	75.0%	Retrofit	Retro12Med	\$	43.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Exterior Lighting	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	7,600	0.0001	0.0001	12.8%	75.0%	Retrofit	Retro12Med	\$	43.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Refrigeration	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	17,778	0.0002	0.0002	10.3%	75.0%	Retrofit	Retro12Med	\$	43.79	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Cooling	Commissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	72,741	0.0002	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	193.12	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Heating	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	204,050	0.0000	0.0003	0.0%	0.0%	Retrofit	Retro12Med	\$	193.12	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Ventilation	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	45,669	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	193.12	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Water Heating	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	25,123	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	193.12	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	226,934.50	0.0000	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	193.12	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	7,542	0.0001	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	193.12	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Refrigeration	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	17,535	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	193.12	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Commissioning	Commissioning	None	Commissioned	3	\$161,850.22	\$ -	\$ -	38,349	0.0003	0.0002	15.4%	75.0%	Retrofit	Retro12Med	\$	161.85	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Health - WA	New	Commissioning	Commissioning	None	Commissioned	3	\$161,850.22	\$ -	\$ -	98,920	0.0000	0.0006	15.4%	50.0%	Retrofit	Retro12Med	\$	161.85	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	New	Commissioning	Commissioning	None	Commissioned	3	\$161,850.22	\$ -	\$ -	25,075	0.0002	0.0002	15.4%	50.0%	Retrofit	Retro12Med	\$	161.85	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	Insulation - Ceiling	R-13	Installed	18	\$256.60	\$ -	\$ -	-	-	-	15.2%	35.0%	Retrofit	Retro12Med	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	Insulation - Ducting	R-8	Installed	20	\$68,420.71	\$ -	\$ -	-	-	-	15.2%	35.0%	Retrofit	Retro12Med	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Ventilation	Insulation - Ducting	R-8	Installed	20	\$68,420.71	\$ -	\$ -	-	-	-	15.2%	35.0%	Retrofit	Retro12Med	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	28,768	0.0003	0.0001	45.1%	50.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	516,621	0.0000	0.0001	45.1%	50.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	543	0.0001	0.0002	45.1%	50.0%	Retrofit	Retro12Med	\$	9,999.00	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	Insulation - Wall Cavity	R-9	Installed	45	\$97,916.90	\$ -	\$ -	(1,810)	0.0003	0.0001	30.2%	50.0%	Retrofit	Retro12Med	\$	450.69	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	Insulation - Wall Cavity	R-9	Installed	45	\$97,916.90	\$ -	\$ -	13,477	0.0000	0.0006	30.2%	50.0%	Retrofit	Retro12Med	\$	450.69	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Ventilation	Insulation - Wall Cavity	R-9	Installed	45	\$97,916.90	\$ -	\$ -	49	0.0000	0.0002	30.2%	50.0%	Retrofit	Retro12Med	\$	450.69	RTF	RTF	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	30.1%	35.0%	Retrofit	Retro12Med	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	30.1%	35.0%	Retrofit	Retro12Med	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	30.1%	35.0%	Retrofit	Retro12Med	\$	-	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	HVAC - High Efficiency	High Efficiency Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	19,466	0.0003	0.0001	30.1%	35.0%	Retrofit	Retro12Med	\$	173.43	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	252,945	0.0000	0.0006	47.8%	47.8%	Retrofit	Retro12Med	\$	173.43	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	45,347	0.0001	0.0002	47.8%	47.8%	Retrofit	Retro12Med	\$	173.43	7th Plan	7th Plan	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Cooling	Chilled Water Plant	Constant Flow	High Efficiency Glaze	30	\$1,183.02	\$ -	\$ -	27,222	0.0003	0.0002	15.1%	45.0%	Retrofit	Retro12Med	\$	1,183.02	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Chiller - Chilled Water Plant	Constant Flow	Variable Flow	High Efficiency Glaze	15	\$12,168.02	\$ -	\$ -	59,303	0.0003	0.0001	15.1%	45.0%	Retrofit	Retro12Med	\$	166.96	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	High Efficiency Glaze	15	\$7,060.67	\$ -	\$ -	16,416	0.0003	0.0001	15.1%	50.0%	Retrofit	Retro12Med	\$	38.55	DEER	DEER	New Jersey TRM
WA	WA	Commercial	Health - WA	Existing	Cooling	Water-Cooled Chiller - Control Temperature	Standard Temperature	Variable Temperature	10	\$1,183.02	\$ -	\$ -	33,739	0.0003	0.0001	15.3%	75.0%	Retrofit	Retro12Med	\$	4.23	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	RTU - Economizer	Installed	Installed	10	\$57,069.29	\$ -	\$ -	22,807	0.0003	0.0001	60.0%	60.0%	Retrofit	Retro12Med	\$	293.22	DEER	DEER	AEQ-BEST
WA	WA	Commercial	Health - WA	Existing	Heating	Space Heating - HVAC Rec	Installed	Installed	14	\$16,342.30	\$ -	\$ -	77,199	0.0000	0.0006	2.7%	10.0%	Retrofit						

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Unit/Year)	Annual Average Savings (\$/Unit/Year)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kWh/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	Lodging - WA	Existing	Exterior Lighting	Strategic Energy Management	None	Implemented	3	\$9,929.72	\$ -	\$ -	6,554	0.0001	0.0001	0.0%	0.0%	Retiro12Med	\$	23.59	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Refrigeration	Strategic Energy Management	None	Implemented	3	\$9,929.72	\$ -	\$ -	6,657	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	23.59	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Office Equipment	Strategic Energy Management	None	Implemented	3	\$9,929.72	\$ -	\$ -	2,211	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	23.59	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Cooling	Commissioning	None	Commissioned	3	\$9,495.08	\$ -	\$ -	22,165	0.0003	0.0003	0.0%	0.0%	Retiro12Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Heating	Commissioning	None	Commissioned	3	\$9,495.08	\$ -	\$ -	60,608	-	0.0006	0.0%	0.0%	Retiro12Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Ventilation	Commissioning	None	Commissioned	3	\$9,495.08	\$ -	\$ -	14,987	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Water Heating	Commissioning	None	Commissioned	3	\$9,495.08	\$ -	\$ -	20,023	0.0001	0.0003	0.0%	0.0%	Retiro12Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$9,495.08	\$ -	\$ -	9,300	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$9,495.08	\$ -	\$ -	7,562	0.0001	0.0001	0.0%	0.0%	Retiro12Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Refrigeration	Commissioning	None	Commissioned	3	\$9,495.08	\$ -	\$ -	15,363	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Cooling	Retrocommissioning	None	Commissioned	3	\$41,877.86	\$ -	\$ -	24,327	0.0001	0.0001	10.1%	50.0%	Retiro12Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Heating	Retrocommissioning	None	Commissioned	3	\$41,877.86	\$ -	\$ -	68,770	-	0.0006	10.1%	50.0%	Retiro12Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Ventilation	Retrocommissioning	None	Commissioned	3	\$41,877.86	\$ -	\$ -	14,987	0.0001	0.0002	10.1%	50.0%	Retiro12Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Water Heating	Retrocommissioning	None	Commissioned	3	\$41,877.86	\$ -	\$ -	20,023	0.0001	0.0003	10.1%	50.0%	Retiro12Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$41,877.86	\$ -	\$ -	9,300	0.0002	0.0002	10.1%	50.0%	Retiro12Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$41,877.86	\$ -	\$ -	7,562	0.0001	0.0001	11.7%	50.0%	Retiro12Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	Existing	Refrigeration	Retrocommissioning	None	Commissioned	3	\$41,877.86	\$ -	\$ -	15,363	0.0002	0.0002	10.6%	50.0%	Retiro12Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
WA	WA	Commercial	Lodging - WA	New	Cooling	Insulation - Ceiling	R-13	R-38	45	\$161,850.22	\$ -	\$ -	42,707	0.0003	0.0001	75.2%	99.0%	Retiro12Med	\$	52.58	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Ventilation	Insulation - Ceiling	R-13	R-38	45	\$161,850.22	\$ -	\$ -	99,159	-	0.0006	75.2%	99.0%	Retiro12Med	\$	52.58	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Ventilation	Insulation - Ceiling	R-13	R-38	45	\$161,850.22	\$ -	\$ -	24,146	0.0001	0.0002	75.2%	99.0%	Retiro12Med	\$	52.58	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	Insulation - Ducting	R-4	R-8	20	\$68,420.71	\$ -	\$ -	-	-	-	15.2%	35.0%	Retiro12Med	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	Insulation - Ducting	R-4	R-8	20	\$68,420.71	\$ -	\$ -	-	-	-	15.3%	35.0%	Retiro12Med	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Ventilation	Insulation - Ducting	R-4	R-8	20	\$68,420.71	\$ -	\$ -	-	-	-	15.3%	35.0%	Retiro12Med	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	14,125	0.0003	0.0001	45.1%	50.0%	Retiro12Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	15,601	0.0001	0.0001	45.1%	50.0%	Retiro12Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	2,442	0.0001	0.0001	45.1%	50.0%	Retiro12Med	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	Insulation - Wall Cavity	R-9	R-23	45	\$97,916.90	\$ -	\$ -	(366)	(0.0003)	0.0001	65.3%	99.0%	Retiro12Med	\$	2,567.75	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	Insulation - Wall Cavity	R-9	R-23	45	\$97,916.90	\$ -	\$ -	2,297	-	0.0006	65.3%	99.0%	Retiro12Med	\$	2,567.75	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	Insulation - Wall Cavity	R-9	R-23	45	\$97,916.90	\$ -	\$ -	41	0.0001	0.0002	65.3%	99.0%	Retiro12Med	\$	2,567.75	RTF	RTF	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	99.0%	99.0%	Retiro12Med	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	99.0%	99.0%	Retiro12Med	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	99.0%	99.0%	Retiro12Med	\$	-	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	High Efficiency Glaze	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	22,326	0.0003	0.0001	66.0%	99.0%	Retiro12Med	\$	171.67	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	High Efficiency Glaze	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	24,781	-	0.0006	66.4%	66.4%	Retiro15Low	\$	171.67	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Ventilation	High Efficiency Glaze	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	42,929	0.0001	0.0002	66.4%	66.4%	Retiro15Low	\$	171.67	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Chiller - Chilled Water Reser	Variable Flow	Constant Flow	Variable Flow	15	\$1,118,882.02	\$ -	\$ -	25,475	0.0001	0.0001	65.4%	45.0%	Retiro12Med	\$	403.13	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Chiller - Chilled Water Reser	Variable Flow	Constant Flow	Variable Flow	15	\$1,118,882.02	\$ -	\$ -	64,951	0.0003	0.0001	65.4%	45.0%	Retiro12Med	\$	403.13	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	15	\$7,060.67	\$ -	\$ -	17,793	0.0003	0.0001	15.1%	50.0%	Retiro12Med	\$	35.42	DEER	DEER	New Jersey TRM
WA	WA	Commercial	Lodging - WA	New	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	\$1,183.02	\$ -	\$ -	40,080	0.0003	0.0001	15.3%	75.0%	Retiro12Med	\$	35.4	DEER	DEER	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	HVAC - Economizer	Standard	Installed	15	\$57,099.20	\$ -	\$ -	9,263	0.0003	0.0001	60.0%	50.0%	Retiro12Med	\$	60.16	DEER	DEER	AEQ - BEST	
WA	WA	Commercial	Lodging - WA	New	Heating	Space Heating - HVAC	None	Installed	14	\$166,342.30	\$ -	\$ -	75,401	-	0.0006	5.6%	10.0%	Retiro12Med	\$	204.48	DEER	DEER	7th Plan
WA	WA	Commercial	Lodging - WA	New	Ventilation - ECM on VAV	None	Installed	18	\$40,620.63	\$ -	\$ -	10,902	0.0001	0.0002	15.1%	50.0%	Retiro12Med	\$	278.34	7th Plan	7th Plan	AEQ - BEST	
WA	WA	Commercial	Lodging - WA	New	Ventilation - Variable Speed	None	Installed	15	\$460,307.53	\$ -	\$ -	54,516	0.0001	0.0002	15.2%	50.0%	Retiro12Med	\$	474.36	DEER	DEER	Illinois TRM	
WA	WA	Commercial	Lodging - WA	New	Cooling	Demand-Controlled Fans	Standard	Demand-Controlled Fans	15	\$100,708.85	\$ -	\$ -	1,208	0.0001	0.0001	25.0%	90.0%	Retiro12Med	\$	467.12	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	Desatratification Fans (DVS)	None	Installed	15	\$100,708.85	\$ -	\$ -	41,846	0.0003	0.0001	15.0%	15.0%	Retiro12Med	\$	39.89	AEQ Research	AEQ Research	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	Desatratification Fans (DVS)	None	Installed	15	\$100,708.85	\$ -	\$ -	188,251	0.0001	0.0006	15.0%	15.0%	Retiro12Med	\$	39.89	AEQ Research	AEQ Research	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	RTU - Advanced Controls	None	Turned Up Unit	3	\$16,186.31	\$ -	\$ -	21,203	0.0003	0.0001	15.0%	20.0%	Retiro12Med	\$	228.43	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	RTU - Advanced Controls	None	Advanced Rooftop Controller	15	\$11,184.17	\$ -	\$ -	18,826	0.0003	0.0001	15.0%	45.0%	Retiro12Med	\$	52.99	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Cooling	RTU - Evaporative Precool	None	Precooler Installed	15	\$315,226.17	\$ -	\$ -	46,142	0.0003	0.0001	15.2%	75.0%	Retiro15Low	\$	581.83	DEER	DEER	7th Plan
WA	WA	Commercial	Lodging - WA	New	Cooling	Ductless Mini Split Heat Pu	None	Installed	15	\$1,503,955.46	\$ -	\$ -	11,421	0.0003	0.0001	15.1%	50.0%	Retiro15Med	\$	407.13	RTF	RTF	7th Plan
WA	WA	Commercial	Lodging - WA	New	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$1,503,955.46	\$ -	\$ -	15,136	0.0002	0.0006	15.1%	50.0%	Retiro15Med	\$	407.13	RTF	RTF	7th Plan
WA	WA	Commercial	Lodging - WA	New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$107,292.14	\$ -	\$ -	73,475	0.0003	0.0001	5.0%	5.0%	Retiro12Med	\$	77.27	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$107,292.14	\$ -	\$ -	174,319	0.0001	0.0006	5.0%	5.0%	Retiro12Med	\$	77.27	7th Plan	7th Plan	AEQ - BEST
WA	WA	Commercial	Lodging - WA	New	Water Heating	Smart/WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$107,292.14	\$ -	\$ -	49,212	0.0001	0.0006	5.0%	5.0%</						

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (\$/Unit)	Incremental O&M Costs (\$)	Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	WA	Commercial	Lodging - WA	New	Heating	Retrocummissioning	None	Commissioned	3	543,624.71	\$	-	58,093	-	0.0006	0.00%	0.0%	0.0%	Retrol2Med	\$	91.15	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Lodging - WA	New	Ventilation	Retrocummissioning	None	Commissioned	3	543,624.71	\$	-	14,174	0.0001	0.0002	0.0%	0.0%	0.0%	Retrol2Med	\$	91.15	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Lodging - WA	New	Water Heating	Retrocummissioning	None	Commissioned	3	543,624.71	\$	-	20,775	0.0001	0.0002	0.0%	0.0%	0.0%	Retrol2Med	\$	91.15	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Lodging - WA	New	Interior Lighting	Commissioning	None	Commissioned	3	543,624.71	\$	-	8,705	0.0002	0.0002	0.0%	0.0%	0.0%	Retrol2Med	\$	91.15	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Lodging - WA	New	Exterior Lighting	Retrocummissioning	None	Commissioned	3	543,624.71	\$	-	6,566	0.0001	0.0001	0.0%	0.0%	0.0%	Retrol2Med	\$	91.15	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Lodging - WA	New	Refrigeration	Retrocummissioning	None	Commissioned	3	543,624.71	\$	-	18,836	0.0002	0.0002	0.0%	0.0%	0.0%	Retrol2Med	\$	91.15	AEQ Research	AEQ Research	AEQ Research
WA	WA	Commercial	Warehouse - W Existing		Cooling	Insulation - Ceiling	R-13	R-38	45	5100,728.29	\$	-	28,087	-	-	15.4%	50.0%	Retrol2Med	\$	46.33	RTF	AEQ - BEST	RTF	
WA	WA	Commercial	Warehouse - W Existing		Heating	Insulation - Ceiling	R-13	R-38	45	5100,728.29	\$	-	83,924	-	0.0005	15.4%	50.0%	Retrol2Med	\$	46.33	RTF	AEQ - BEST	RTF	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Insulation - Ceiling	R-13	R-38	45	5100,728.29	\$	-	47,186	0.0001	0.0002	0.0%	0.0%	50.0%	Retrol2Med	\$	46.33	RTF	AEQ - BEST	RTF
WA	WA	Commercial	Warehouse - W Existing		Cooling	Insulation - Ducting	R-4	R-8	20	542,581.97	\$	-	11,579	-	-	15.2%	35.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Heating	Insulation - Ducting	R-4	R-8	20	542,581.97	\$	-	44,068	-	0.0005	15.2%	35.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Insulation - Ducting	R-4	R-8	20	542,581.97	\$	-	15,376	0.0001	0.0002	0.0%	0.0%	50.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER
WA	WA	Commercial	Warehouse - W Existing		Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	539,674.43	\$	-	22,895	-	-	45.1%	50.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	539,674.43	\$	-	44,010	-	0.0005	45.1%	50.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	539,674.43	\$	-	109	0.0001	0.0002	0.0%	0.0%	50.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER
WA	WA	Commercial	Warehouse - W Existing		Cooling	Insulation - Wall Cavity	R-9	R-23	45	534,380.27	\$	-	9,322	-	-	30.2%	50.0%	Retrol2Med	\$	23.79	RTF	AEQ - BEST	RTF	
WA	WA	Commercial	Warehouse - W Existing		Heating	Insulation - Wall Cavity	R-9	R-23	45	534,380.27	\$	-	88,634	-	0.0005	30.2%	50.0%	Retrol2Med	\$	23.79	RTF	AEQ - BEST	RTF	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Insulation - Wall Cavity	R-9	R-23	45	534,380.27	\$	-	1,128	0.0001	0.0002	0.0%	0.0%	50.0%	Retrol2Med	\$	23.79	RTF	AEQ - BEST	RTF
WA	WA	Commercial	Warehouse - W Existing		Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	5115.78	\$	-	1700	-	-	30.1%	35.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	5115.78	\$	-	13,824	-	0.0005	30.1%	35.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	5115.78	\$	-	1,288	0.0001	0.0002	0.0%	0.0%	35.0%	Retrol2Med	\$	9,999.00	DEER	AEQ - BEST	DEER
WA	WA	Commercial	Warehouse - W Existing		Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	539,574.98	\$	-	15,630	-	-	47.8%	47.8%	Retrol2Med	\$	10.15	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	539,574.98	\$	-	221,642	-	0.0005	47.8%	47.8%	Retrol2Med	\$	10.15	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	539,574.98	\$	-	8,846	0.0001	0.0002	0.0%	0.0%	47.8%	Retrol2Med	\$	10.15	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Warehouse - W Existing		Cooling	Chiller - Chilled Water Res	None	Enabled	10	5333.79	\$	-	4,557	-	-	15.1%	45.0%	Retrol2Med	\$	13.76	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Heating	Chiller - Chilled Water Res	None	Variable Flow	10	5333.79	\$	-	81,460	-	0.0002	15.1%	45.0%	Retrol2Med	\$	13.76	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	15	53,185.83	\$	-	22,863	-	-	15.1%	50.0%	Retrol2Med	\$	12.30	DEER	AEQ - BEST	New Jersey TRM	
WA	WA	Commercial	Warehouse - W Existing		Heating	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	5333.79	\$	-	48,472	-	-	15.3%	75.0%	Retrol2Med	\$	1.31	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Cooling	Chiller - Economizer	None	Enabled	10	525,705.09	\$	-	45,108	-	-	15.0%	50.0%	Retrol2Med	\$	40.27	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Heating	Space Heating - Heat Reco	None	Installed	14	533,057.19	\$	-	65,482	-	0.0005	2.7%	10.0%	Retrol2Med	\$	45.01	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Ventilation - ECM on VAV	None	Installed	18	525,280.45	\$	-	2,189	0.0001	0.0002	15.1%	50.0%	Retrol2Med	\$	875.36	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Ventilation - Variable Speed	None	Installed	15	#####	\$	-	10,694	0.0001	0.0002	10.0%	50.0%	Retrol2Med	\$	149,128.40	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Cooling	Ventilation - Demand Cont	Standard	Smart-Controlled Fans	15	925,085.59	\$	-	1,420	0.0001	0.0002	15.2%	50.0%	Retrol2Med	\$	15.2%	75.0%	Retrol2Med	AEQ Research	
WA	WA	Commercial	Warehouse - W Existing		Heating	Desatirification Fans (NLS)	None	Installed	15	562,677.28	\$	-	26,977	-	0.0005	15.2%	75.0%	Retrol2Med	\$	30.40	AEQ Research	AEQ Research	AEQ Research	
WA	WA	Commercial	Warehouse - W Existing		Heating	Desatirification Fans (NLS)	None	Installed	15	562,677.28	\$	-	156,940	-	-	15.2%	75.0%	Retrol2Med	\$	30.40	AEQ Research	AEQ Research	AEQ Research	
WA	WA	Commercial	Warehouse - W Existing		Cooling	RTU - Advanced Controls	None	Turned Up Unit	15	57,303.28	\$	-	11,011	0.0001	0.0002	25.0%	Retrol2Med	\$	165.09	RTF	AEQ - BEST	RTF		
WA	WA	Commercial	Warehouse - W Existing		Cooling	RTU - Advanced Controls	None	RTU with Constant Speed Fan	15	56,960.52	\$	-	11,400	-	-	15.4%	45.0%	Retrol2Med	\$	53.72	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Cooling	RTU - Evaporative Precool	No Precool	Precooler Installed	15	5142,232.37	\$	-	26,421	-	-	15.2%	75.0%	Retrol2Med	\$	427.63	DEER	AEQ - BEST	DEER	
WA	WA	Commercial	Warehouse - W Existing		Cooling	Ductless Split Heat Pu	None	Installed	15	5678,595.79	\$	-	54,756	-	-	15.0%	25.0%	Retrol2Med	\$	235.76	RTF	AEQ - BEST	RTF	
WA	WA	Commercial	Warehouse - W Existing		Cooling	Ductless Split Heat Pu	None	Installed	15	5678,595.79	\$	-	179,718	-	0.0005	15.0%	25.0%	Retrol2Med	\$	235.76	RTF	AEQ - BEST	RTF	
WA	WA	Commercial	Warehouse - W Existing		Cooling	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	566,773.80	\$	-	14,065	-	-	10.0%	10.0%	Retrol2Med	\$	68.08	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Heating	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	566,773.80	\$	-	140,036	-	0.0005	10.0%	10.0%	Retrol2Med	\$	68.08	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Ventilation	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	566,773.80	\$	-	8,363	0.0001	0.0002	10.0%	10.0%	Retrol2Med	\$	68.08	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Thermostat - Water Faucet	None	0.5% GPM Unit	10	5102.01	\$	-	286	0.0001	0.0002	25.1%	65.0%	Retrol2Med	\$	30.97	AEQ Research	AEQ - BEST	AEQ Research	
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Water Heater - Faucet Mo	Standard Faucet	Motion Sensor-Controlled Faucet	1	576.51	\$	-	-	-	-	25.0%	65.0%	Retrol2Med	\$	-	AEQ Research	AEQ - BEST	AEQ Research	
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Water Heater - Low-Flow	1.5 GPM Showerhead	1.5 GPM Showerhead	10	579.29	\$	96.18	-	123	0.0001	0.0003	25.1%	65.0%	Retrol2Med	\$	616.49	RTF	AEQ - BEST	RTF
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Water Heater - High Effici	High Efficiency Pump	High Efficiency Pump	10	5617.98	\$	-	1,665	0.0001	0.0003	15.0%	25.0%	Retrol2Med	\$	31.27	7th Plan	7th Plan	7th Plan	
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Water Heater - Pipe Insula	R-3.5 Insulation Installed	Uninsulated Pipe	15	575.75	\$	-	3,251	0.0001	0.0003	25.1%	75.0%	Retrol2Med	\$	2.12	Illinois TRM	Illinois TRM	Illinois TRM	
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Water Heater - Pre-Rinse	1.3:1.00 GPM Kitchen Spray Valve	1.3:1.00 GPM Kitchen Spray Valve	4	51,361.68	\$	897.43	-	205	0.0001	0.0003	25.1%	65.0%	Retrol2Med	\$	126.12	RTF	AEQ - BEST	RTF
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Water Heater - Temperature	Water Set at 120°F	Water Set at 120°F	2	583.44	\$	-	1,663	0.0001	0.0003	15.2%	75.0%	Retrol2Med	\$	24.01	RTF	AEQ - BEST	RTF	
WA	WA	Commercial	Warehouse - W Existing		Water Heating	Water Heater - Solar Syst	SEI 2.5 Solar Unit	SEI 2.5 Solar Unit	20	1,091.85	\$	-	11,233	0.0001	0.0003	1.2%	0.0%	Retrol2Med	\$	4.02	2015	AEQ 2015	AEQ 2015	
WA	WA	Commercial	Warehouse - W Existing		Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	534,107.50	\$	-	26,871	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L020Fast	\$	107.18	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Warehouse - W Existing		Interior Lighting	Interior Lighting - Networks	Standard Controls	Enhanced Controls	15	534,107.50	\$	-	37,035	0.0002	0.0003	6.4%	at Turnover	Lost Opportunity	L020Fast	\$	126.31	7th Plan	7th Plan	7th Plan
WA	WA	Commercial	Warehouse - W Existing		Interior Lighting	Light Emitting Diode Sign	Baseline LED Sign	Enhanced LED Sign	10	5223.19	\$	-	2,221	0.0002	0.0003	5.0%	Retrol2Med	\$	3.75	7th Plan	7th Plan	7		

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Unit)	Annual Average Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Commercial	Warehouse - W New	Ventilation	Insulation - Ducting	R-4	Standard Roof	R-8	Standard Roof	20	542,581.97	\$	-	1,578	0.0001	0.0002	15.3%	35.0%	RetrofEn20	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Standard Roof	20	539,674.43	\$	-	-	10,526	-	-	45.1%	50.0%	RetrofEn20	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	Commercial	Warehouse - W New	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Standard Roof	20	539,674.43	\$	-	-	(44,303)	-	0.0005	45.1%	50.0%	RetrofEn20	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Standard Roof	20	539,674.43	\$	-	-	453	0.0001	0.0002	45.1%	50.0%	RetrofEn20	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	Insulation - Wall Cavity	R-9	R-23	R-23	R-23	45	534,380.27	\$	-	(406)	-	-	65.3%	99.0%	RetrofEn20	\$	21.42	RTF	RTF	AEQ - BEST
WA	Commercial	Warehouse - W New	Heating	Insulation - Wall Cavity	R-9	R-23	R-23	R-23	45	534,380.27	\$	-	89,005	-	0.0005	65.3%	99.0%	RetrofEn20	\$	21.42	RTF	RTF	AEQ - BEST
WA	Commercial	Warehouse - W New	Ventilation	Insulation - Wall Cavity	R-9	R-23	R-23	R-23	45	534,380.27	\$	-	(72)	0.0001	0.0002	65.4%	99.0%	RetrofEn20	\$	21.42	RTF	RTF	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	515.78	\$	-	2,217	-	-	-	99.0%	99.0%	RetrofEn20	\$	9,999.00	DEER	DEER	AEQ - BEST
WA	Commercial	Warehouse - W New	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	515.78	\$	-	(21,230)	-	0.0005	99.0%	99.0%	RetrofEn20	\$	9,999.00	DEER	DEER	AEQ - BEST	
WA	Commercial	Warehouse - W New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	515.78	\$	-	1,279	0.0001	0.0002	99.0%	99.0%	RetrofEn20	\$	9,999.00	DEER	DEER	AEQ - BEST	
WA	Commercial	Warehouse - W New	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	539,574.98	\$	-	-	17,244	-	-	66.4%	66.4%	RetrofEn20	\$	10.01	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	539,574.98	\$	-	-	(222,569)	-	0.0005	66.4%	66.4%	RetrofEn20	\$	10.01	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	539,574.98	\$	-	-	8,889	0.0001	0.0002	66.4%	66.4%	RetrofEn20	\$	10.01	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	Chiller - Chilled Water Res	None	Enabled	Enabled	10	553.79	\$	-	4,820	-	-	15.1%	45.0%	RetrofEn20	\$	12.89	DEER	DEER	AEQ - BEST	
WA	Commercial	Warehouse - W New	Cooling	Chiller - Chilled Water Res	Constant Flow	Variable Flow	Variable Flow	15	553,945.66	\$	-	-	85,414	-	-	15.1%	45.0%	RetrofEn20	\$	51.23	DEER	DEER	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	Part-Load Operation	15	53,185.83	\$	-	-	24,118	-	-	15.1%	50.0%	RetrofEn20	\$	11.51	DEER	DEER	New Jersey TRM
WA	Commercial	Warehouse - W New	Cooling	Water-Cooled Chiller - Con	Standard Temperature	Variable Temperature	Variable Temperature	10	553.79	\$	-	57,013	-	-	15.3%	75.0%	RetrofEn20	\$	1.10	DEER	DEER	AEQ - BEST	
WA	Commercial	Warehouse - W New	Cooling	HVAC - Economizer	None	Installed	Installed	10	525,703.09	\$	-	-	66,893	-	-	50.0%	60.0%	RetrofEn20	\$	45.34	DEER	DEER	AEQ - BEST
WA	Commercial	Warehouse - W New	Heating	Space Heating - Heat Recov	None	Installed	Installed	14	51,027.19	\$	-	-	66,421	-	0.0005	10.0%	RetrofEn20	\$	44.69	DEER	DEER	AEQ - BEST	
WA	Commercial	Warehouse - W New	Ventilation	Ventilation - ECM on VAV	None	Installed	Installed	18	525,280.45	\$	-	-	2,009	0.0001	0.0002	15.1%	50.0%	RetrofEn20	\$	886.85	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Ventilation	Ventilation - Variable Speed	None	Installed	Installed	15	#####	\$	-	-	10,044	0.0001	0.0002	15.2%	50.0%	RetrofEn20	\$	152,789.10	DEER	DEER	Illinois TRM
WA	Commercial	Warehouse - W New	Ventilation	Ventilation - Demand Control	Standard	Installed	Installed	15	525,085.59	\$	-	-	1,318	0.0001	0.0002	15.2%	75.0%	RetrofEn20	\$	1,505.14	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	Destraffication Fans (HVL5)	None	Installed	Installed	15	562,677.28	\$	-	-	10,044	0.0001	0.0002	15.2%	75.0%	RetrofEn20	\$	29.66	AEQ Research	AEQ Research	AEQ - BEST
WA	Commercial	Warehouse - W New	Heating	Destraffication Fans (HVL5)	None	Installed	Installed	15	562,677.28	\$	-	-	15,671	-	0.0005	15.2%	75.0%	RetrofEn20	\$	29.66	AEQ Research	AEQ Research	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	RTU - Maintenance	Standard Unit	Turned Up Unit	Turned Up Unit	3	57,303.38	\$	-	-	16,115	-	-	15.0%	25.0%	RetrofEn20	\$	135.17	Illinois TRM	Illinois TRM	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	RTU - Advanced Controls	Standard Unit	RTU with Constant Speed Fan	RTU with Constant Speed Fan	18	56,960.52	\$	-	-	4,267	-	-	45.0%	99.0%	RetrofEn20	\$	43.79	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Cooling	RTU - Evaporative Precool	No Precooler	Precooler Installed	Precooler Installed	15	514,232.37	\$	-	-	32,625	-	-	15.2%	75.0%	RetrofEn20	\$	348.62	DEER	DEER	7th Plan
WA	Commercial	Warehouse - W New	Cooling	Ductless Mini Split Heat Pu	None	Installed	Installed	15	567,955.79	\$	-	-	77,264	-	-	15.0%	25.0%	RetrofEn20	\$	228.50	RTF	RTF	7th Plan
WA	Commercial	Warehouse - W New	Heating	Ductless Mini Split Heat Pu	None	Installed	Installed	15	567,955.79	\$	-	-	(77,264)	-	0.0005	15.0%	25.0%	RetrofEn20	\$	228.50	RTF	RTF	7th Plan
WA	Commercial	Warehouse - W New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	5	566,773.80	\$	-	-	52,062	-	-	10.0%	10.0%	RetrofEn20	\$	65.80	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	5	566,773.80	\$	-	-	138,196	-	0.0005	10.0%	10.0%	RetrofEn20	\$	65.80	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	5	566,773.80	\$	-	-	7,766	0.0001	0.0002	10.0%	10.0%	RetrofEn20	\$	65.80	7th Plan	7th Plan	AEQ - BEST
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - Gas	0.8 GPM Average Baseline	0.8 GPM Average Baseline	0.8 GPM Average Baseline	1	510.01	\$	-	-	323	-	-	25.1%	25.1%	RetrofEn20	\$	3.82	FEED	Illinois TRM	AEQ - BEST
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - Faucet Mo	Standard Faucet	Motion Sensor-Controlled Faucet	Motion Sensor-Controlled Faucet	1	576.51	\$	-	-	-	-	-	20.0%	65.0%	RetrofEn20	\$	-	AEQ Research	AEQ Research	AEQ - BEST
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - Low-Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	1.5 GPM Showerhead	10	579.29	\$	961.8	-	134	0.0001	0.0003	25.1%	65.0%	RetrofEn20	\$	(578.72)	RTF	RTF	7th Plan
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - High Efficiency	Standard Efficiency Pump	High Efficiency Pump	High Efficiency Pump	15	567.98	\$	-	-	1,266	0.0001	0.0003	25.0%	25.0%	RetrofEn20	\$	30.28	Illinois TRM	Illinois TRM	AEQ - BEST
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - Pipe Insul	Uninsulated Pipe	R-3.5 Insulation Installed	R-3.5 Insulation Installed	15	575.75	\$	-	-	3,452	0.0001	0.0003	25.3%	75.0%	RetrofEn20	\$	1.99	Illinois TRM	Illinois TRM	AEQ - BEST
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - Pre-Insta	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve	4	51,361.68	\$	897.43	-	218	0.0001	0.0003	25.1%	65.0%	RetrofEn20	\$	(2,030.71)	RTF	RTF	7th Plan
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - Tempera	Water Set at 135°F	Water Set at 120°F	Water Set at 120°F	2	583.44	\$	-	-	1,806	0.0001	0.0003	15.2%	75.0%	RetrofEn20	\$	22.54	Illinois TRM	Illinois TRM	AEQ - BEST
WA	Commercial	Warehouse - W New	Water Heating	Water Heater - Solar Heati	Standard Electric Unit																		

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Annual Savings (\$/Unit)	Summer Coincident Peak (kW/Unit)	Winter Coincident Peak (kW/Unit)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Commercial	Miscellaneous - Existing	Heating	Windows - High Efficiency	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$39,962.34	\$ -	\$ -	22,613	-	0.0005	47.8%	47.8%	Retiro15low	\$	93.56	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Ventilation	Windows - High Efficiency	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$39,962.34	\$ -	\$ -	2,041	0.0001	0.0002	47.8%	47.8%	Retiro15low	\$	93.56	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Cooling	Chiller - Chilled Water Res	Chiller - Chilled Water Res	None	Enabled	Enabled	10	\$122.01	\$ -	\$ -	444	0.0007	-	15.1%	45.0%	Retiro12Med	\$	32.11	DEER	DEER	AEGBEST
WA	Commercial	Miscellaneous - Existing	Cooling	Chiller - Chilled Water Res	Chiller - Chilled Water Res	None	Variable Flow	Variable Flow	15	\$1,621.87	\$ -	\$ -	7,045	0.0007	-	15.1%	45.0%	Retiro12Med	\$	127.64	DEER	DEER	AEGBEST
WA	Commercial	Miscellaneous - Existing	Cooling	Chiller - Variable Speed Fan	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	Part-Load Operation	15	\$728.19	\$ -	\$ -	2,265	0.0007	-	15.1%	50.0%	Retiro12Med	\$	28.69	DEER	DEER	New Jersey TRM
WA	Commercial	Miscellaneous - Existing	Cooling	Water-Cooled Chiller - Con	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	Variable Temperature	10	\$122.01	\$ -	\$ -	4,878	0.0007	-	15.3%	75.0%	Retiro12Med	\$	3.00	DEER	DEER	AEGBEST
WA	Commercial	Miscellaneous - Existing	Cooling	HVAC - Economizer	HVAC - Economizer	None	Installed	Installed	10	\$5,885.73	\$ -	\$ -	4,157	0.0007	-	45.1%	60.0%	Retiro12Med	\$	163.36	DEER	DEER	AEGBEST
WA	Commercial	Miscellaneous - Existing	Heating	Space Heaters - Heat Rec	Space Heaters - Heat Rec	None	Installed	Installed	15	\$3,756.86	\$ -	\$ -	6,903	0.0005	0.0005	50.0%	50.0%	Retiro12Med	\$	50.93	DEER	DEER	AEGBEST
WA	Commercial	Miscellaneous - Existing	Ventilation	Ventilation - ECM on VAV	Ventilation - ECM on VAV	None	Installed	Installed	18	\$2,022.44	\$ -	\$ -	515	0.0001	0.0002	15.1%	50.0%	Retiro12Med	\$	301.89	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Ventilation	Ventilation - Variable Speed	Ventilation - Variable Speed	None	Installed	Installed	15	\$1,663.04	\$ -	\$ -	2,539	0.0001	0.0002	10.3%	50.0%	Retiro12Med	\$	51,430.47	DEER	DEER	Illinois TRM
WA	Commercial	Miscellaneous - Existing	Ventilation	Ventilation - Demand Control	Ventilation - Demand Control	Standard	Standard	Standard	15	\$2,006.85	\$ -	\$ -	339	0.0001	0.0002	15.0%	25.0%	Retiro12Med	\$	506.65	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Ventilation	Deaerification Fans (HVLS)	Deaerification Fans (HVLS)	None	Installed	Installed	15	\$5,014.18	\$ -	\$ -	2,406	0.0007	-	15.0%	15.0%	Retiro12Med	\$	23.64	AEGBEST	AEGBEST	
WA	Commercial	Miscellaneous - Existing	Heating	Deaerification Fans (HVLS)	Deaerification Fans (HVLS)	None	Installed	Installed	15	\$5,014.18	\$ -	\$ -	16,616	-	0.0005	15.0%	15.0%	Retiro12Med	\$	23.64	AEGBEST	AEGBEST	
WA	Commercial	Miscellaneous - Existing	Cooling	RTU - Maintenance	RTU - Maintenance	Standard Unit	Turned Up Unit	Turned Up Unit	3	\$1,669.35	\$ -	\$ -	1,175	0.0007	-	15.0%	25.0%	Retiro20fast	\$	445.25	Illinois TRM	Illinois TRM	
WA	Commercial	Miscellaneous - Existing	Cooling	RTU - Advanced Controls	RTU - Advanced Controls	Standard Unit	RTU with Constant Speed Fan	RTU with Constant Speed Fan	15	\$556.84	\$ -	\$ -	966	0.0007	-	15.1%	45.0%	Retiro15low	\$	50.52	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Cooling	RTU - Evaporative Precool	RTU - Evaporative Precool	No Precooler	Precooler Installed	Precooler Installed	15	\$32,510.26	\$ -	\$ -	2,399	0.0007	-	15.2%	75.0%	Retiro15low	\$	1,149.17	DEER	DEER	AEGBEST
WA	Commercial	Miscellaneous - Existing	Cooling	Ductless Mini Split Heat Pu	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$155,107.61	\$ -	\$ -	4,943	0.0007	-	15.0%	25.0%	Retiro5Med	\$	516.25	RTF	RTF	7th Plan
WA	Commercial	Miscellaneous - Existing	Heating	Ductless Mini Split Heat Pu	Ductless Mini Split Heat Pu	None	Installed	Installed	15	\$155,107.61	\$ -	\$ -	21,520	0.0007	-	15.0%	25.0%	Retiro5Med	\$	516.25	RTF	RTF	7th Plan
WA	Commercial	Miscellaneous - Existing	Heating	Thermostat - WiFi/Interact	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$ -	\$ -	1,496	0.0001	0.0002	10.0%	10.0%	Retiro20fast	\$	51.27	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Heating	Thermostat - WiFi/Interact	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$ -	\$ -	1,946	0.0001	0.0002	10.0%	10.0%	Retiro20fast	\$	51.27	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Water Heating	Water Heating - Faucet Aer	Water Heating - Faucet Aer	1.3 GPM Average Baseline	Standard Faucet	Standard Faucet	1	\$76.51	\$ -	\$ -	137	0.0002	0.0004	25.0%	65.0%	Retiro20fast	\$	86.59	DEER	DEER	Illinois TRM
WA	Commercial	Miscellaneous - Existing	Water Heating	Water Heater - Low Flow 52.2	Water Heater - Low Flow 52.2	5.2 GPM Showhead	1.5 GPM Showhead	1.5 GPM Showhead	10	\$79.29	\$96.18	\$ -	56	0.0002	0.0004	25.1%	65.0%	Retiro20fast	\$	(1,339.72)	RTF	RTF	7th Plan
WA	Commercial	Miscellaneous - Existing	Water Heating	Water Heater - High Effici	Water Heater - High Effici	Standard Efficiency Pump	High Efficiency Pump	High Efficiency Pump	15	\$273.37	\$ -	\$ -	764	0.0002	0.0004	15.0%	25.0%	Retiro12Med	\$	31.02	Hawaii TRM	Hawaii TRM	
WA	Commercial	Miscellaneous - Existing	Water Heating	Water Heater - Pipe Insulat	Water Heater - Pipe Insulat	R-5 Insulation Installed	R-5 Insulation Installed	R-5 Insulation Installed	15	\$75.75	\$ -	\$ -	175	0.0002	0.0004	75.0%	75.0%	Retiro12Med	\$	4.61	Illinois TRM	Illinois TRM	
WA	Commercial	Miscellaneous - Existing	Water Heating	Water Heater - Pre-Rinse	Water Heater - Pre-Rinse	1.31 GPM Kitchen Spray Valve	1.31 GPM Kitchen Spray Valve	1.31 GPM Kitchen Spray Valve	4	\$1,361.68	\$897.43	\$ -	94	0.0002	0.0004	25.1%	65.0%	Retiro12Med	\$	(4,701.06)	RTF	RTF	7th Plan
WA	Commercial	Miscellaneous - Existing	Water Heating	Water Heater - Temperature	Water Heater - Temperature	Water Set at 120°F	Water Set at 120°F	Water Set at 120°F	2	\$36.91	\$ -	\$ -	763	0.0002	0.0004	15.2%	75.0%	Retiro12Med	\$	21.08	Illinois TRM	Illinois TRM	
WA	Commercial	Miscellaneous - Existing	Water Heating	Water Heater - Solar Water	Water Heater - Solar Water	SEF 2.5 Solar Unit	SEF 2.5 Solar Unit	SEF 2.5 Solar Unit	8	\$1,091.85	\$ -	\$ -	515	0.0002	0.0004	25.0%	25.0%	Retiro12Med	\$	157.70	Illinois TRM	Illinois TRM	
WA	Commercial	Miscellaneous - Existing	Interior Lighting	Interior Lighting - Embedded	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	Enhanced Controls	15	\$2,728.60	\$ -	\$ -	2,129	0.0002	0.0002	6.4%	at Turnover	LO20fast	\$	107.17	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Interior Lighting	Interior Lighting - Network	Interior Lighting - Network	Standard Controls	Enhanced Controls	Enhanced Controls	15	\$4,502.19	\$ -	\$ -	2,936	0.0002	0.0002	6.4%	at Turnover	LO20fast	\$	126.31	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Interior Lighting	Interior Lighting - LED Exit	Interior Lighting - LED Exit	Baseline LED Sign	Light Emitting Capacitor Sign	Light Emitting Capacitor Sign	15	\$221.19	\$ -	\$ -	252	0.0002	0.0002	1.7%	5.0%	Retiro20fast	\$	73.54	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Interior Lighting	Interior Level Lighting - Dela	Interior Level Lighting - Dela	Standard Unit	Low Level Lighting Controls	Low Level Lighting Controls	11	\$1,696.31	\$ -	\$ -	1,002	0.0002	0.0002	6.3%	10.0%	Retiro12Med	\$	100.00	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Interior Lighting	Interior Fluorescent - Delta	Interior Fluorescent - Delta	Property LR Fixture	Property LR Fixture	Property LR Fixture	11	\$25.04	\$ -	\$ -	1,807	0.0002	0.0002	1.6%	25.0%	Retiro12Med	\$	1.45	7th Plan	7th Plan	Illinois TRM
WA	Commercial	Miscellaneous - Existing	Exterior Lighting	Exterior Lighting - BI-Level	Exterior Lighting - BI-Level	Single Level Lighting Controls	Two Level Lighting Controls	Two Level Lighting Controls	8.6	\$431,200.24	\$ -	\$ -	690	0.0001	0.0001	15.4%	25.0%	Retiro12Med	\$	60.51	7th Plan	7th Plan	Michigan Energy Measures Data
WA	Commercial	Miscellaneous - Existing	Exterior Lighting	Exterior Lighting - Photocon	Exterior Lighting - Photocon	Standard Controls	Photocell Based Controls	Photocell Based Controls	8	\$705.55	\$ -	\$ -	806	0.0002	0.0001	60.0%	60.0%	Retiro12Med	\$	248.00	AEGBEST	AEGBEST	
WA	Commercial	Miscellaneous - Existing	Exterior Lighting	Exterior Lighting - Photove	Exterior Lighting - Photove	Standard Unit	Exterior Powered Unit Installed	Exterior Powered Unit Installed	7	\$43,270.05	\$ -	\$ -	472	0.0001	0.0001	15.4%	25.0%	Retiro12Med	\$	12,615.27	AEGBEST	AEGBEST	
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Anti-Sweat	Refrigeration - Anti-Sweat	No Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$ -	\$ -	67	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	2,097.39	RTF	RTF	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Door Gasket	Refrigeration - Door Gasket	Leaky Case Doors	Sealed Case Doors	Sealed Case Doors	4	\$1,216.26	\$ -	\$ -	131	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	42.43	RTF	RTF	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Evaporator	Refrigeration - Evaporator	Refrigerant Based Fan Controls	Refrigerant Based Fan Controls	Refrigerant Based Fan Controls	15	\$503.65	\$ -	\$ -	796	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	239.49	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Floating He	Refrigeration - Floating He	Fixed Discharge Pressure Controls	Webb's Rest Controls	Webb's Rest Controls	15	\$14,471.14	\$ -	\$ -	339	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	3,843.28	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Strip Curtai	Refrigeration - Strip Curtai	No Strip Curtains Installed	Strip Curtains Installed	Strip Curtains Installed	2	\$296.14	\$ -	\$ -	116	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	1,233.83	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - High Effici	Refrigeration - High Effici	Standard Efficiency Compressor	High Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$ -	\$ -	17	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	3,231.25	AEGBEST	AEGBEST	
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Variable Sp	Refrigeration - Variable Sp	Variable Speed Compressor Loading	Variable Speed Compressor Loading	Variable Speed Compressor Loading	15	\$13,946.43	\$ -	\$ -	672	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	1,263.12	DEER	DEER	AEGBEST
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Demand Def	Refrigeration - Demand Def	Standard Unit	Demand Defrost	Demand Defrost	10	\$1,539.94	\$ -	\$ -	530	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	351.39	Vermont TRM	Vermont TRM	
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Display Case	Refrigeration - Display Case	Fluorescent Case Lighting	LED Case Lighting	LED Case Lighting	6	\$1,107.44	\$ -	\$ -	29	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	6,790.51	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Display Case	Refrigeration - Display Case	Standard Controls	Motion Based Controls	Motion Based Controls	6	\$75.74	\$ -	\$ -	3	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	16,323.12	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Groceries - LE	Refrigeration - Groceries - LE	No Covers	Night Covers	Night Covers	5	\$233.37	\$ -	\$ -	-	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	-	DEER	DEER	Illinois TRM
WA	Commercial	Miscellaneous - Existing	Refrigeration	Refrigeration - Groceries - ECMs for Occup	Refrigeration - Groceries - ECMs for Occup	Standard Motors	ECM Motors	ECM Motors	16	\$335.77	\$ -	\$ -	2	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	18,770.36	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Refrigeration	Vending Machine - Display	Vending Machine - Display	Lighting and Compressor Controls	Lighting and Compressor Controls	Lighting and Compressor Controls	5	\$209.92	\$ -	\$ -	1,367	0.0002	0.0002	0.3%	5.0%	Retiro12Med	\$	33.12	Illinois TRM	Illinois TRM	
WA	Commercial	Miscellaneous - Existing	Ventilation	Ventilation - Demand Control	Ventilation - Demand Control	Standard Unit	Demand Controlled Hoods	Demand Controlled Hoods	18	\$2,790.69	\$ -	\$ -	27,451	0.0002	0.0002	5.0%	10.0%	Retiro12Med	\$	239.49	7th Plan	7th Plan	7th Plan
WA	Commercial	Miscellaneous - Existing	Office Equipment	Office Equipment - Smart	Office Equipment - Smart	Standard Unit	Load Sensing Strip	Load Sensing Strip	4	\$588.21	\$ -	\$ -	446	0.0002	0.0003	10.1%	50.0%	Retiro12Med	\$	320.71	RTF	RTF	7th Plan
WA	Commercial	Miscellaneous - Existing	Cooling	Occupancy Controls - Room	Occupancy Controls - Room	Manual Controls	Occupancy Controls	Occupancy Controls	15	\$4,201.76	\$ -	\$ -	2,026	0.0007	0.0003	0.0%	0.0%	Retiro12Med	\$	9,999.00	Illinois TRM	Illinois TRM	
WA	Commercial	Miscellaneous - Existing	Office Equipment	Best Practice - Best Practi	Best Practice - Best Practi	Baseline Data Center	Best Practice Measures Installed	Best Practice Measures Installed	5	\$33.50	\$												

Measure										Assumptions in First Year (2015)										Sources									
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source						
WA	WA	Commercial	Miscellaneous - New	Cooling	Destratification Fans (N/LS)	None	Installed	15	\$5,014.18	\$	\$	-2,993	0.0007	-	-	15.0%	15.0%	Retrol2Med	\$	22.73	AEQ Research	AEQ Research	AEQ Research						
WA	WA	Commercial	Miscellaneous - New	Heating	Destratification Fans (N/LS)	None	Installed	15	\$5,014.18	\$	\$	-16,887	-	-	-	15.0%	15.0%	Retrol2Med	\$	22.73	AEQ Research	AEQ Research	AEQ Research						
WA	WA	Commercial	Miscellaneous - New	Cooling	RTU - Maintenance	Standard Unit	Turned Up Unit	3	\$1,669.35	\$	\$	-1,624	0.0007	-	-	15.0%	25.0%	Retrol20Fast	\$	35.78	Illinois TRM	Illinois TRM	AEQ Research						
WA	WA	Commercial	Miscellaneous - New	Cooling	Advanced Rooftop Controls	Advanced Rooftop Controls	Advanced Rooftop Controller	1	\$556.84	\$	\$	-1,372	0.0007	-	-	15.0%	45.0%	Retrol20Fast	\$	35.78	Illinois TRM	Illinois TRM	AEQ Research						
WA	WA	Commercial	Miscellaneous - New	Cooling	RTU - Evaporative Precool	No Precooler	Precooler Installed	15	\$32,510.26	\$	\$	-3,315	0.0007	-	-	15.2%	75.0%	Retrol15Low	\$	81.01	DEER	DEER	7th Plan						
WA	WA	Commercial	Miscellaneous - New	Cooling	Ductless Mini Split Heat P/	None	Installed	15	\$155,107.61	\$	\$	-6,771	0.0007	-	-	15.0%	25.0%	Retrol5Med	\$	511.16	RTF	7th Plan	7th Plan						
WA	WA	Commercial	Miscellaneous - New	Heating	Ductless Mini Split Heat P/	None	Installed	15	\$155,107.61	\$	\$	-19,100	0.0007	-	-	15.0%	25.0%	Retrol5Med	\$	511.16	RTF	7th Plan	7th Plan						
WA	WA	Commercial	Miscellaneous - New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$	\$	-5,209	0.0007	-	-	10.0%	10.0%	Retrolven20	\$	48.64	7th Plan	7th Plan	7th Plan						
WA	WA	Commercial	Miscellaneous - New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$	\$	-15,382	-	-	-	0.0005	10.0%	10.0%	Retrolven20	\$	48.64	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$	\$	-1,819	0.0001	-	-	0.0002	10.0%	10.0%	Retrol20Fast	\$	48.64	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - Faucet Aeri	1.39 GPM Average Baseline	Water Heater - Faucet Aeri	10	\$102.01	\$	\$	-143	0.0002	-	-	25.1%	65.0%	Retrol20Fast	\$	84.56	DEER	Illinois TRM	Illinois TRM						
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - Faucet Moll	Standard Faucet	Motion Sensor - Controlled Faucet	1	\$76.51	\$	\$	-	0.0002	-	-	25.0%	65.0%	Retrol20Fast	\$	108.49	AEQ Research	AEQ Research	AEQ Research						
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - Low Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$79.29	\$	\$	96.18	0.0002	-	-	0.0004	25.1%	65.0%	Retrol20Fast	\$	(1,308.32)	RTF	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - High Effici	Standard Efficiency Pump	High Efficiency Pump	15	\$273.37	\$	\$	-799	0.0002	-	-	0.0004	15.0%	25.0%	Retrolven20	\$	30.29	Hawaii TRM	Hawaii TRM	Hawaii TRM					
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - Pipe Insulat	Uninsulated Pipe	Insulated Pipe	15	\$75.75	\$	\$	-1,225	0.0002	-	-	0.0004	25.2%	75.0%	Retrol12Med	\$	41.50	Illinois TRM	Illinois TRM	AEQ-BEST					
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - Pre-Rinse S	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve	4	\$1,361.68	\$	\$	897.43	0.0002	-	-	0.0004	25.1%	65.0%	Retrol12Med	\$	(4,590.87)	RTF	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - Temperatu	Water Set at 120°F	Water Set at 135°F	2	\$36.91	\$	\$	-771	0.0002	-	-	0.0004	15.2%	75.0%	Retrol12Med	\$	22.54	Illinois TRM	Illinois TRM	AEQ-BEST					
WA	WA	Commercial	Miscellaneous - New	Water Heating	Water Heater - Solar Syst	Standard Electric Unit	SEF 2.5 Solar Unit	10	\$2,091.85	\$	\$	-5,229	0.0002	-	-	0.0004	1.0%	15.0%	Retrol12Med	\$	15.34	AEQ 2015	AEQ 2015	AEQ-BEST					
WA	WA	Commercial	Miscellaneous - New	Interior Lighting	Interior Lighting - Embedde	Standard Controls	Enhanced Controls	15	\$4,502.19	\$	\$	-2,878	0.0002	-	-	0.0002	13.1%	at Turnover	Lost Opportunity L020Fast	\$	127.86	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$4,502.19	\$	\$	-2,878	0.0002	-	-	0.0002	13.1%	at Turnover	Lost Opportunity L020Fast	\$	127.86	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Interior Lighting	Interior Lighting - LED Ect	Baseline LED Sign	Light Emitting Capacitor Sign	15	\$221.19	\$	\$	-245	0.0002	-	-	0.0002	1.7%	5.0%	Retrol20Fast	\$	74.66	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Interior Lighting	Interior Fluorescent - 4ft	Two Level Lighting Controls	Two Level Lighting Controls	16	\$14,696.71	\$	\$	-1,155	0.0002	-	-	0.0002	6.7%	15.0%	Retrol12Med	\$	195.27	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Interior Lighting	Interior Fluorescent - 8ft	Properly Ld Fixture	Properly Ld Fixture	11	\$25.04	\$	\$	-1,297	0.0002	-	-	0.0002	16.7%	25.0%	Retrol12Med	\$	1.44	Illinois TRM	Illinois TRM	AEQ-BEST					
WA	WA	Commercial	Miscellaneous - New	Exterior Lighting	Exterior Lighting - Hi-Level	Single Level Lighting Controls	Two Level Lighting Controls	8.6	\$341.28	\$	\$	-673	0.0001	-	-	0.0001	15.4%	25.0%	Retrol12Med	\$	60.50	7th Plan	Michigan Energy Measures Datab	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Exterior Lighting	Exterior Lighting - Enhanc	Standard Controls	PhotoCell and/or Motion Based Controls	8	\$705.55	\$	\$	-370	0.0001	-	-	0.0001	60.0%	60.0%	Retrol12Med	\$	230.51	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Photovol	Solar Powered Unit Installed	Solar Powered Unit Installed	5	\$43,270.05	\$	\$	-1,000	0.0001	-	-	0.0001	10.0%	10.0%	Retrol12Med	\$	12,453.17	AEQ Research	AEQ Research	AEQ Research					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Anti-Sweat	No Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$	\$	-52	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	2,683.18	RTF	RTF	RTF					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Door Gask	Leaky Case Doors	Leaky Case Doors	4	\$21.26	\$	\$	-112	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	49.60	RTF	DEER	RTF					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Evaporator	Load-Based Fan Controls	Load-Based Fan Controls	10	\$503.65	\$	\$	-98	0.0002	-	-	0.0002	8.0%	15.0%	Retrol12Med	\$	245.90	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Floating He	Fixed Discharge Pressure Controls	Webb's Reset Controls	15	\$14,471.14	\$	\$	-317	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	4,064.67	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Strip Curtai	No Strip Curtains Installed	No Strip Curtains Installed	2	\$296.14	\$	\$	-104	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	1,400.45	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - High Effici	Standard Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$	\$	-16	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	3,417.39	AEQ 2015	RTF	RTF					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Variable Sp	Variable Speed Compressor Loading	Variable Speed Compressor Loading	15	\$13,946.43	\$	\$	-495	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	4,527.91	DEER	DEER	AEQ 2015					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Demand De	Timer Based Defrost	Timer Based Defrost	15	\$51,331.29	\$	\$	-495	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	12,387.70	Vermont TRM	Vermont TRM	AEQ 2015					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Grocery - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	6	\$1,407.44	\$	\$	-23	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	8,687.05	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Grocery - Display Case - Me	Manual Based Case	Manual Based Case	8	\$75.74	\$	\$	-1	0.0002	-	-	0.0002	1.0%	20.82	Retrol12Med	\$	20,882.18	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Grocery - Operation - Capi	No Covers	No Covers	5	\$233.37	\$	\$	-1	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	DEER	DEER	Illinois TRM						
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Grocery - ECMs for Display	Standard Motors	ECM Motors	16	\$335.77	\$	\$	-1	0.0002	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	24,012.79	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Vending Machine - Occupa	Lighting and Compressor Controls	Lighting and Compressor Controls	5	\$209.92	\$	\$	-1,349	0.0002	-	-	0.0002	0.3%	5.0%	Retrol12Med	\$	33.44	Illinois TRM	Illinois TRM	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Demand Cont	Controlled Hoods	Controlled Hoods	10	\$2,790.69	\$	\$	-830	0.0002	-	-	0.0002	8.0%	10.0%	Retrol12Med	\$	245.90	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Office Equipment	Office Equipment - Smart C	Standard Unit	Load Sensing Strip	4	\$588.21	\$	\$	-560	0.0002	-	-	0.0003	10.1%	50.0%	Retrol12Med	\$	257.28	RTF	RTF	RTF					
WA	WA	Commercial	Miscellaneous - New	Cooling	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	15	\$4,201.76	\$	\$	-2,557	0.0007	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST					
WA	WA	Commercial	Miscellaneous - New	Heating	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	15	\$4,201.76	\$	\$	(3,048)	0.0007	-	-	0.0002	0.0%	0.0%	Retrol12Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST					
WA	WA	Commercial	Miscellaneous - New	Cooling	Best Practice Measures - New	Best Practice Measures Installed	Best Practice Measures Installed	8	\$33.50	\$	\$	-42	0.0007	-	-	0.0002	0.0%	0.0%	Retrol5Med	\$	15.84	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$5.15	\$	\$	-85	0.0007	-	-	0.0002	-	0.0%	0.0%	Retrol5Med	\$	1.84	7th Plan	7th Plan	7th Plan				
WA	WA	Commercial	Miscellaneous - New	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$5.15	\$	\$	-27	0.0001	-	-	0.0002	0.0%	0.0%	Retrol5Med	\$	1.84	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Interior Lighting	Interior Lighting - Data Ce	Baseline Data Center	Commercially Available Measures Installed	8	\$5.15	\$	\$	-20	0.0002	-	-	0.0002	0.0%	0.0%	Retrol5Med	\$	1.84	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$5.15	\$	\$	-101	0.0002	-	-	0.0003	0.0%	0.0%	Retrol5Med	\$	1.84	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$0.64	\$	\$	-385	0.0002	-	-	0.0003	0.0%	0.0%	Retrol5Med	\$	0.27	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$0.64	\$	\$	-34	0.0002	-	-	0.0003	0.0%	0.0%	Retrol5Med	\$	0.27	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Ventilation	Demand Controlled Volum	Demand Controlled Hoods	Demand Controlled Hoods	18	\$4,159.24	\$	\$	-209	0.0001	-	-	0.0001	0.0%	0.0%	Retrolven20	\$	3,254.86	7th Plan	7th Plan	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$	\$	-129	0.0002	-	-	0.0003	0.0%	0.0%	Retrolven20	\$	83.18	Ontario Power TRM	Ontario Power TRM	7th Plan					
WA	WA	Commercial	Miscellaneous - New	Cooling	Advanced New Constructio																								

Measure										Assumptions in First Year (2015)										Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Annual Savings (kWh/Unit/Year)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Commercial	Small Office	IC	Existing	Water Heating	Water Heater - Faucet Mo	Standard Faucet	Motion Sensor-Controlled Faucet		1	\$76.51	\$	\$	-	-	-	-	25.0%	65.0%	Retiro	Retiro20Fast	\$	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Water Heating	Water Heater - Low-Flow	2.2 GPM Showerhead	1.5 GPM Showerhead		10	\$79.29	\$96.18	\$	0	0.0001	0.0002	25.6%	65.0%	Retiro	Retiro20Fast	\$	(5,565,672.03)	RTF	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Water Heating	Water Heater - High Efficiency	Standard Efficiency Pump	High Efficiency Pump		15	\$89.98	\$	\$	0	0.0001	0.0002	15.1%	25.0%	Retiro	RetiroEvo20	\$	105,794.20	Hawaii TRM	Hawaii TRM	Hawaii TRM
ID	Commercial	Small Office	IC	Existing	Water Heating	Water Heater - Insulated Pipe	R-5.5 Insulation	Insulated Pipe		15	\$75.75	\$	\$	0	0.0001	0.0002	25.7%	75.0%	Retiro	RetiroEvo20	\$	21,865.12	Illinois TRM	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC	Existing	Water Heating	Water Heater - Pre-Rinse	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve		4	\$1361.68	\$897.43	\$	0	0.0001	0.0002	25.6%	65.0%	Retiro	Retiro12Med	\$	(9,764,932.16)	RTF	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Water Heating	Water Heater - Temperature	Water Set at 135°F	Water Set at 120°F		2	\$12.15	\$	\$	0	0.0001	0.0002	15.8%	75.0%	Retiro	Retiro12Med	\$	78,704.82	Illinois TRM	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC	Existing	Water Heating	Water Heater - Solar System	Standard Electric Unit	SEF 2.5 Solar Unit		20	\$1,091.85	\$	\$	1	0.0001	0.0002	1.2%	15.0%	Retiro	Retiro12Med	\$	78,285.38	AEQ 2015	AEQ 2015	AEQ-BEST
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls		15	\$2,728.00	\$	\$	2,357	0.0001	0.0003	8.3%	14.1%	at Turnover	LO20Fast	\$	103.08	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls		15	\$4,502.19	\$	\$	3,255	0.0002	0.0003	1.2%	15.0%	at Turnover	LO20Fast	\$	122.10	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Interior Lighting - LEC Exit	Baseline LED Sign	Light Emitting Capacitor Sign		15	\$221.19	\$	\$	0	0.0002	0.0003	2.1%	5.0%	Retiro	Retiro20Fast	\$	142,399.08	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Interior Fluorescent - Bi-Le	Single Level Lighting Controls	Two Level Lighting Controls		16	\$14,696.31	\$	\$	1	0.0002	0.0003	7.0%	15.0%	Retiro	Retiro12Med	\$	795,870.90	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Interior Fluorescent - Dela	Single Level Lighting Controls	Property L& Fixture		13	\$25.04	\$	\$	0	0.0002	0.0003	17.6%	25.0%	Retiro	Retiro12Med	\$	1,029.41	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Exterior Lighting	Exterior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls		8.6	\$446.85	\$	\$	77	0.0001	0.0001	15.5%	25.0%	Retiro	Retiro12Med	\$	696.64	7th Plan	7th Plan	Michigan Energy Measures Datab
ID	Commercial	Small Office	IC	Existing	Exterior Lighting	Exterior Lighting - Enhance	Standard Controls	PhotoCell and/or Motion Based Controls		8	\$489.70	\$	\$	1	0.0001	0.0001	60.0%	60.0%	Retiro	Retiro12Med	\$	112,756.99	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
ID	Commercial	Small Office	IC	Existing	Exterior Lighting	Exterior Lighting - Photovol	None	Solar Powered Unit Installed		7	\$29,664.65	\$	\$	0	0.0001	0.0001	15.5%	25.0%	Retiro	Retiro12Med	\$	61,71,854.85	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Anti-Sweat	None	Anti-Sweat Heater Controls		8	\$981.35	\$	\$	0	0.0001	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	361,135.91	RTF	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Door Gasket	Leaky Case Doors	Sealed Case Doors		4	\$21.26	\$	\$	0	0.0001	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	181,074.44	RTF	DEER	RTF
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Evaporator	Standard Controls	Load-Based Fan Controls		16	\$503.65	\$	\$	0	0.0001	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	312,334.96	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Floating He	Fixed Discharge Pressure Controls	Weather Boot Controls		15	\$14,471.14	\$	\$	0	0.0001	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	329,795.12	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Strip Curtains	None	No Strip Curtains Installed		2	\$296.14	\$	\$	-	0.0001	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	-	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor		15	\$601.12	\$	\$	0	0.0001	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	8,876,285.89	AEQ 2015	RTF	RTF
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Variable Sp	Inefficient Compressor Loading	Variable Speed Compressor Loading		15	\$3,946.43	\$	\$	18	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	155,770.60	DEER	AEQ 2015	AEQ 2015
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Demand Def	Timer Based Defrost	Demand Defrost		10	\$1,539.94	\$	\$	0	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	426,162.85	Vermont TRM	Vermont TRM	AEQ 2015
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting		6	\$1,107.44	\$	\$	1	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	232,772.35	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Display Case - ME	Manual Controls	Manual Based Controls		8	\$75.74	\$	\$	0	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	671,454.16	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - Open Display Ca	No Covers	Night Covers		10	\$238.37	\$	\$	0	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	34,439.42	DEER	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC	Existing	Refrigeration	Refrigeration - ECMs for Display	None	ECM Motors		16	\$335.77	\$	\$	0	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	7,721,169.65	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Refrigeration	Vending Machine - Occupa	None	Lighting and Compressor Controls		5	\$243.84	\$	\$	0	0.0001	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	206,305.07	Illinois TRM	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC	Existing	Ventilation	Variable Speed Hoods	Demand Controlled Hoods	Demand Controlled Hoods		15	\$2,790.69	\$	\$	0	0.0001	0.0002	5.1%	10.0%	Retiro	Retiro12Med	\$	15,730.60	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Office Equipment	Office Equipment - Smart C	Standard Unit	Load Sensing Strip		4	\$588.21	\$	\$	3	0.0001	0.0002	10.6%	50.0%	Retiro	Retiro12Med	\$	55,002.88	RTF	RTF	RTF
ID	Commercial	Small Office	IC	Existing	Cooling	Lodging - Guest Room Con	Manual Controls	Occupancy Controls		15	\$4,201.76	\$	\$	4	0.0008	0.0008	0.0%	0.0%	Retiro	Retiro12Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
ID	Commercial	Small Office	IC	Existing	Heating	Lodging - Guest Room Con	Manual Controls	Occupancy Controls		15	\$4,201.76	\$	\$	4	0.0008	0.0006	0.0%	0.0%	Retiro	Retiro5Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
ID	Commercial	Small Office	IC	Existing	Office Equipment	Data Center - Best Practi	Baseline Data Center	Commercially Available Measures Installed		8	\$51.28	\$	\$	0	0.0001	0.0001	0.0%	0.0%	Retiro	Retiro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	\$6.24	\$	\$	65	0.0008	0.0008	0.0%	0.0%	Retiro	Retiro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	\$6.24	\$	\$	24	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	\$6.24	\$	\$	151	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	\$6.24	\$	\$	151	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed		6	\$0.53	\$	\$	297	0.0008	0.0008	0.0%	0.0%	Retiro	Retiro5Med	\$	0.28	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed		6	\$0.53	\$	\$	51	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	0.28	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Ventilation	Variable Speed Hoods	Demand Controlled Hoods	Demand Controlled Hoods		15	\$4,159.24	\$	\$	0	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	30,618,737.89	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC	Existing	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls		10	\$86.76	\$	\$	0	0.0001	0.0002	0.0%	0.0%	Retiro	RetiroEvo20	\$	-	Ontario Power TRM	Ontario Power TRM	7th Plan
ID	Commercial	Small Office	IC	Existing	Cooling	Advanced New Constructi	Standard Building Practices	LED Average Design		25	\$33,386.90	\$	\$	6,776	0.0008	0.0008	0.0%	0.0%	Retiro	Retiro15Low	\$	62.68	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Heating	Advanced New Constructi	Standard Building Practices	LED Average Design		25	\$33,386.90	\$	\$	16,843	0.0008	0.0006	0.0%	0.0%	Retiro	Retiro15Low	\$	62.68	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Heating	Advanced New Constructi	Standard Building Practices	LED Average Design		25	\$33,386.90	\$	\$	2,486	0.0001	0.0001	0.0%	0.0%	Retiro	Retiro15Low	\$	62.68	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Water Heating	Advanced New Constructi	Standard Building Practices	LED Average Design		25	\$33,386.90	\$	\$	2,375	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro15Low	\$	62.68	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Interior Lighting	Advanced New Constructi	Standard Building Practices	LED Average Design		25	\$33,386.90	\$	\$	4,759	0.0002	0.0003	0.0%	0.0%	Retiro	Retiro15Low	\$	62.68	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Exterior Lighting	Advanced New Constructi	Standard Building Practices	LED Average Design		25	\$33,386.90	\$	\$	1,676	0.0001	0.0001	0.0%	0.0%	Retiro	Retiro15Low	\$	62.68	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Cooling	Strategic Energy Managem	None	Implemented		3	\$375.64	\$	\$	1,049	0.0008	0.0001	3.2%	14.0%	Retiro	Retiro12Med	\$	20.20	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Heating	Strategic Energy Managem	None	Implemented		3	\$375.64	\$	\$	2,607	0.0002	0.0006	3.2%	14.0%	Retiro	Retiro12Med	\$	20.20	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Ventilation	Strategic Energy Managem	None	Implemented		3	\$375.64	\$	\$	411	0.0001	0.0002	3.2%	14.0%	Retiro	Retiro12Med	\$	20.20	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC	Existing	Water Heating	Strategic Energy Managem	None	Implemented		3	\$375.64	\$	\$	368	0.0001	0.0002	3.2%	14.0%	Retiro	Retiro12Med	\$	20.20	AEQ Research	AEQ Research	

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Year)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Commercial	Small Office	IC New	Interior Lighting	Interior Fluorescent - Delta	Overlit Fixture	Property Lit Fixture	Property Lit Fixture	13	\$25.04	\$ -	\$ -	0	0.0002	0.0003	17.6%	25.0%	Retrofit	Retro12Med	\$	11,945.63	Illinois TRM	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC New	Exterior Lighting	Exterior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls	Two Level Lighting Controls	8.6	\$446.85	\$ -	\$ -	69	0.0001	0.0001	15.5%	25.0%	Retrofit	Retro12Med	\$	712.19	7th Plan	Michigan Energy Measures Datab	7th Plan
ID	Commercial	Small Office	IC New	Exterior Lighting	Exterior Lighting - Enhance	Standard Controls	Photocontrol and/or Motion Based Controls	Photocontrol and/or Motion Based Controls	8.6	\$483.70	\$ -	\$ -	0	0.0001	0.0001	60.0%	60.0%	Retrofit	Retro12Med	\$	115,274.88	FG&E Workpaper	FG&E Workpaper	FG&E Workpaper
ID	Commercial	Small Office	IC New	Interior Lighting	Interior Lighting - Photovolt	Standard Controls	Solar Return Unit Installed	Solar Return Unit Installed	7	\$296,65.65	\$ -	\$ -	0	0.0001	0.0001	15.7%	30.0%	Retrofit	Retro12Med	\$	309,877.07	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - Anti-Sweat	None	Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$ -	\$ -	0	0.0001	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$	462,030.00	RTF	RTF	RTF
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - Door Gasket	Leaky Case Doors	Leaky Case Doors	Leaky Case Doors	4	\$21.26	\$ -	\$ -	0	0.0001	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$	232,201.50	RTF	DEER	RTF
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - Evaporator	Load-Based Fan Controls	Load-Based Fan Controls	Load-Based Fan Controls	16	\$503.65	\$ -	\$ -	0	0.0001	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$	400,796.16	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - Floating Hel	Web/Bu-Reet Controls	Web/Bu-Reet Controls	Web/Bu-Reet Controls	15	\$14,471.14	\$ -	\$ -	0	0.0001	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$	369,750.81	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - Strip Curtains	None	Strip Curtains Installed	Strip Curtains Installed	2	\$296.14	\$ -	\$ -	-	0.0002	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$	-	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor	High Efficiency Compressor	15	\$601.13	\$ -	\$ -	0	0.0001	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$	6,590,435.69	AEO 2015	RTF	AEO 2015
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - Variable Sp	Inefficient Compressor Loading	Variable Speed Compressor Loading	Variable Speed Compressor Loading	10	\$1,546.40	\$ -	\$ -	17	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	174,642.69	DEER	DEER	AEO 2015
ID	Commercial	Small Office	IC New	Refrigeration	Refrigeration - Demand Def	Timer Based Defrost	Timer Based Defrost	Timer Based Defrost	15	\$5,131.29	\$ -	\$ -	13	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	477,793.78	Vermont TRM	Vermont TRM	RTF
ID	Commercial	Small Office	IC New	Refrigeration	Grocery - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	LED Case Lighting	6	\$1,107.44	\$ -	\$ -	1	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	254,228.79	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Refrigeration	Grocery - Display Case M	Manual Controls	Manual Controls	Manual Controls	8	\$75.74	\$ -	\$ -	0	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	733,347.32	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Refrigeration	Grocery - Open Display Ca	No Covers	Night Covers	Night Covers	5	\$233.37	\$ -	\$ -	1	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	36,883.88	DEER	DEER	Illinois TRM
ID	Commercial	Small Office	IC New	Refrigeration	Grocery - ECMs for Display	Standard Motors	ECM Motors	ECM Motors	16	\$335.77	\$ -	\$ -	0	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	8,432,888.96	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Refrigeration	Vending Machine - Occup	None	Lighting and Compressor Controls	Lighting and Compressor Controls	5	\$243.84	\$ -	\$ -	0	0.0001	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$	209,812.37	Illinois TRM	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC New	Ventilation	Cooking - Exhaust Hoods	Constant Speed Hoods	Demand Controlled Hoods	Demand Controlled Hoods	18	\$2,790.69	\$ -	\$ -	0	0.0001	0.0002	8.0%	10.0%	Retrofit	Retro12Med	\$	2,576,783.18	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Ventilation	Office Equipment - Smart	Load Sensing Strip	Load Sensing Strip	Load Sensing Strip	4	\$588.21	\$ -	\$ -	4	0.0001	0.0002	10.6%	50.0%	Retrofit	Retro12Med	\$	35,943.22	RTF	RTF	RTF
ID	Commercial	Small Office	IC New	Cooling	Lighting - Guest Room Con	Manual Controls	Occupancy Controls	Occupancy Controls	15	\$4,201.76	\$ -	\$ -	6	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	271,181.91	Illinois TRM	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC New	Heating	Lighting - Guest Room Con	Manual Controls	Occupancy Controls	Occupancy Controls	15	\$4,201.76	\$ -	\$ -	6	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	271,181.91	Illinois TRM	Illinois TRM	Illinois TRM
ID	Commercial	Small Office	IC New	Office Equipment	Data Center - Best Practice	Baseline Data Center	Best Practice Measures Installed	Best Practice Measures Installed	5	\$51.28	\$ -	\$ -	53	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	15.84	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$ -	\$ -	83	0.0008	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$ -	\$ -	22	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$ -	\$ -	182	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro12Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$6.50	\$ -	\$ -	154	0.0001	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	2.05	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Cutting Edge Measures Installed	6	\$0.63	\$ -	\$ -	3.4	0.0008	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$	0.27	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Cutting Edge Measures Installed	6	\$0.63	\$ -	\$ -	52	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	0.27	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Ventilation	Demand Controlled Hoods	Demand Controlled Hoods	Demand Controlled Hoods	Demand Controlled Hoods	18	\$4,159.24	\$ -	\$ -	0	0.0001	0.0002	10.6%	50.0%	Retrofit	Retro12Med	\$	3,312,037.49	7th Plan	7th Plan	7th Plan
ID	Commercial	Small Office	IC New	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	0	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$	-	Ontario Power TRM	Ontario Power TRM	7th Plan
ID	Commercial	Small Office	IC New	Cooling	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$33,386.90	\$ -	\$ -	8,629	0.0008	0.0006	10.6%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC New	Heating	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$33,386.90	\$ -	\$ -	16,988	0.0006	0.0006	10.6%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC New	Cooling	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$33,386.90	\$ -	\$ -	2,536	0.0001	0.0002	10.6%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC New	Heating	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$33,386.90	\$ -	\$ -	2,487	0.0001	0.0002	10.6%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC New	Interior Lighting	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$33,386.90	\$ -	\$ -	4,726	0.0002	0.0003	19.9%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC New	Exterior Lighting	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$33,386.90	\$ -	\$ -	11,561	0.0001	0.0001	11.3%	50.0%	Retrofit	Retro15Low	\$	59.75	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Small Office	IC New	Cooling	Strategic Energy Managem	Implemented	Implemented	Implemented	3	\$458.04	\$ -	\$ -	1,279	0.0008	0.0003	3.2%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Heating	Strategic Energy Managem	Implemented	Implemented	Implemented	3	\$458.04	\$ -	\$ -	2,518	-	0.0006	3.2%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Ventilation	Strategic Energy Managem	None	Implemented	Implemented	3	\$458.04	\$ -	\$ -	374	0.0001	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Water Heating	Strategic Energy Managem	None	Implemented	Implemented	3	\$458.04	\$ -	\$ -	709	0.0002	0.0003	5.9%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Interior Lighting	Strategic Energy Managem	None	Implemented	Implemented	3	\$458.04	\$ -	\$ -	233	0.0001	0.0001	3.6%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Exterior Lighting	Strategic Energy Managem	None	Implemented	Implemented	3	\$458.04	\$ -	\$ -	11	0.0001	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Refrigeration	Strategic Energy Managem	None	Implemented	Implemented	3	\$458.04	\$ -	\$ -	11	0.0001	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Office Equipment	Strategic Energy Managem	None	Implemented	Implemented	3	\$458.04	\$ -	\$ -	11	0.0001	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$	22.55	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Cooling	Commissioning	None	Commissioned	Commissioned	3	\$524.41	\$ -	\$ -	1,784	0.0008	0.0001	10.9%	75.0%	Retrofit	Retro12Med	\$	-	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Heating	Commissioning	None	Commissioned	Commissioned	3	\$524.41	\$ -	\$ -	3,512	0.0001	0.0006	10.9%	75.0%	Retrofit	Retro12Med	\$	-	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Commissioning	Commissioning	None	Commissioned	Commissioned	3	\$524.41	\$ -	\$ -	523	0.0001	0.0002	10.9%	75.0%	Retrofit	Retro12Med	\$	-	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Water Heating	Commissioning	None	Commissioned	Commissioned	3	\$524.41	\$ -	\$ -	171	0.0001	0.0002	10.9%	75.0%	Retrofit	Retro12Med	\$	-	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Interior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$524.41	\$ -	\$ -	822	0.0002	0.0003	26.1%	75.0%	Retrofit	Retro12Med	\$	-	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Exterior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$524.41	\$ -	\$ -	270	0.0001	0.0001	13.7%	75.0%	Retrofit	Retro12Med	\$	-	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Refrigeration	Commissioning	None	Commissioned	Commissioned	3	\$524.41	\$ -	\$ -	270	0.0001	0.0001	13.7%	75.0%	Retrofit	Retro12Med	\$	-	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Small Office	IC New	Cooling	Retrocommissioning	None	Commissioned	Commissioned	3	\$2,312.90	\$ -	\$ -	1,7											

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Year)	Average Annual Savings (\$/kW/Year)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
1	ID	Commercial	Large Office - IE Existing	Refrigeration	Refrigeration - Demand Defrost	Timer Based Defrost	Demand Defrost	Demand Defrost	5	\$1,539.94	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 698,147.36	Vermont TRM	Vermont TRM	ACO 2015
2	ID	Commercial	Large Office - IE Existing	Refrigeration	Grocery - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	LED Case Lighting	6	\$1,107.44	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 417,235.05	7th Plan	7th Plan	7th Plan
3	ID	Commercial	Large Office - IE Existing	Refrigeration	Grocery - Display Case Mo	Manual Controls	Motion Based Controls	Motion Based Controls	8	\$75.74	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 1,203,554.51	7th Plan	7th Plan	7th Plan
4	ID	Commercial	Large Office - IE Existing	Refrigeration	Night Open Display Ca	No Covers	No Covers	No Covers	6	\$333.37	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retrofit	DEER	\$ 61,733.02	DEER	DEER	Illinois TRM
5	ID	Commercial	Large Office - IE Existing	Refrigeration	Grocery - ECMs for Displa	Standard Motors	ECM Motors	ECM Motors	16	\$335.77	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 118,839,885.26	7th Plan	7th Plan	7th Plan
6	ID	Commercial	Large Office - IE Existing	Refrigeration	Vending Machine - Occup	Vending Machine - Occup	Vending Machine - Occup	Vending Machine - Occup	5	\$5,951.52	\$ -	\$ -	3	0.0002	0.0002	0.4%	25.0%	Retrofit	Retro12Med	\$ 373,774.15	Illinois TRM	Illinois TRM	Illinois TRM
7	ID	Commercial	Large Office - IE Existing	Ventilation	Cooking - Exhaust Hoods	Constant Speed Hoods	Demand-Controlled Hoods	Demand-Controlled Hoods	18	\$122,092.70	\$ -	\$ -	2	0.0001	0.0002	25.4%	50.0%	Retrofit	Retro12Med	\$ 3,805,221.29	7th Plan	7th Plan	7th Plan
8	ID	Commercial	Large Office - IE Existing	Office Equipment	Smart Office Equipment	Standard Unit	Load Sensitive Equip	Load Sensitive Equip	3	\$25,734.02	\$ -	\$ -	148	0.0002	0.0002	10.0%	0.0%	Retrofit	Retro12Med	\$ 42,372.34	RTF	RTF	RTF
9	ID	Commercial	Large Office - IE Existing	Ventilation	Cooling - Guest Room Con	Manual Controls	Occupancy Controls	Occupancy Controls	15	\$183,827.00	\$ -	\$ -	127	0.0002	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$ 2,480,824.77	Illinois TRM	Illinois TRM	Illinois TRM
10	ID	Commercial	Large Office - IE Existing	Heating	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	Occupancy Controls	15	\$183,827.00	\$ -	\$ -	131	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro12Med	\$ 2,480,824.77	Illinois TRM	Illinois TRM	Illinois TRM
11	ID	Commercial	Large Office - IE Existing	Office Equipment	Printer - Best Practice	Baseline Data Center	Best Practice Measures Installed	Best Practice Measures Installed	5	\$5,125.89	\$ -	\$ -	6	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 16.37	7th Plan	7th Plan	7th Plan
12	ID	Commercial	Large Office - IE Existing	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$719.52	\$ -	\$ -	2,022	0.0002	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$ 3.31	7th Plan	7th Plan	7th Plan
13	ID	Commercial	Large Office - IE Existing	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$719.52	\$ -	\$ -	2,005	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 3.31	7th Plan	7th Plan	7th Plan
14	ID	Commercial	Large Office - IE Existing	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$719.52	\$ -	\$ -	10,985	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro12Med	\$ 3.31	7th Plan	7th Plan	7th Plan
15	ID	Commercial	Large Office - IE Existing	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$719.52	\$ -	\$ -	15,114	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 3.31	7th Plan	7th Plan	7th Plan
16	ID	Commercial	Large Office - IE Existing	Cooling	Data Center - Commercial	Baseline Data Center	Cutting Edge Measures Installed	Cutting Edge Measures Installed	6	\$21.49	\$ -	\$ -	5,104	0.0002	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$ 0.27	7th Plan	7th Plan	7th Plan
17	ID	Commercial	Large Office - IE Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Cutting Edge Measures Installed	6	\$21.49	\$ -	\$ -	5,104	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 0.27	7th Plan	7th Plan	7th Plan
18	ID	Commercial	Large Office - IE Existing	Ventilation	Optimized Variable Volum	Constant Speed Hoods	Demand-Controlled Hoods	Demand-Controlled Hoods	10	\$4,159.24	\$ -	\$ -	0	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 16,221,372.38	7th Plan	7th Plan	7th Plan
19	ID	Commercial	Large Office - IE Existing	Ventilation	Manual Controls	Scheduled Controls	Scheduled Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 16,221,372.38	7th Plan	7th Plan	Ontario Power TRM
20	ID	Commercial	Large Office - IE Existing	Cooling	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	212,522	0.0002	0.0001	0.0%	0.0%	Retrofit	Retro15Low	\$ 67.56	AEQ Research	AEQ Research	AEQ Research
21	ID	Commercial	Large Office - IE Existing	Heating	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	503,701	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro15Low	\$ 67.56	AEQ Research	AEQ Research	AEQ Research
22	ID	Commercial	Large Office - IE Existing	Ventilation	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	228,023	0.0001	0.0002	0.0%	0.0%	Retrofit	Retro15Low	\$ 67.56	AEQ Research	AEQ Research	AEQ Research
23	ID	Commercial	Large Office - IE Existing	Water Heating	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	93,184	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro15Low	\$ 67.56	AEQ Research	AEQ Research	AEQ Research
24	ID	Commercial	Large Office - IE Existing	Interior Lighting	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	282,501	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro15Low	\$ 67.56	AEQ Research	AEQ Research	AEQ Research
25	ID	Commercial	Large Office - IE Existing	Interior Lighting	Advanced New Construct	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	108,494	0.0001	0.0001	0.0%	0.0%	Retrofit	Retro15Low	\$ 67.56	AEQ Research	AEQ Research	AEQ Research
26	ID	Commercial	Large Office - IE Existing	Cooling	Strategic Energy Managem	Implemented	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	32,901	0.0002	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
27	ID	Commercial	Large Office - IE Existing	Heating	Strategic Energy Managem	None	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	77,793	0.0001	0.0003	3.2%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
28	ID	Commercial	Large Office - IE Existing	Ventilation	Strategic Energy Managem	None	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	34,905	0.0001	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
29	ID	Commercial	Large Office - IE Existing	Water Heating	Strategic Energy Managem	None	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	14,423	0.0002	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
30	ID	Commercial	Large Office - IE Existing	Interior Lighting	Strategic Energy Managem	None	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	43,720	0.0002	0.0003	5.9%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
31	ID	Commercial	Large Office - IE Existing	Interior Lighting	Strategic Energy Managem	None	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	16,719	0.0001	0.0001	3.6%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
32	ID	Commercial	Large Office - IE Existing	Refrigeration	Strategic Energy Managem	None	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	2,535	0.0002	0.0002	3.2%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
33	ID	Commercial	Large Office - IE Existing	Office Equipment	Strategic Energy Managem	None	Implemented	Implemented	3	\$17,070.88	\$ -	\$ -	42,880	0.0002	0.0002	14.0%	14.0%	Retrofit	Retro12Med	\$ 21.37	AEQ Research	7th Plan	7th Plan
34	ID	Commercial	Large Office - IE Existing	Cooling	Commissioning	None	Commissioned	Commissioned	3	\$18,327.00	\$ -	\$ -	45,556	0.0002	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$ 21.69	AEQ Research	7th Plan	7th Plan
35	ID	Commercial	Large Office - IE Existing	Heating	Commissioning	None	Commissioned	Commissioned	3	\$18,327.00	\$ -	\$ -	107,714	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro12Med	\$ 21.69	AEQ Research	7th Plan	7th Plan
36	ID	Commercial	Large Office - IE Existing	Ventilation	Commissioning	None	Commissioned	Commissioned	3	\$18,327.00	\$ -	\$ -	48,328	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 21.69	AEQ Research	7th Plan	7th Plan
37	ID	Commercial	Large Office - IE Existing	Water Heating	Commissioning	None	Commissioned	Commissioned	3	\$18,327.00	\$ -	\$ -	6,656	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro12Med	\$ 21.69	AEQ Research	7th Plan	7th Plan
38	ID	Commercial	Large Office - IE Existing	Interior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$18,327.00	\$ -	\$ -	50,447	0.0002	0.0003	0.0%	0.0%	Retrofit	Retro12Med	\$ 21.69	AEQ Research	7th Plan	7th Plan
39	ID	Commercial	Large Office - IE Existing	Exterior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$18,327.00	\$ -	\$ -	19,291	0.0001	0.0001	0.0%	0.0%	Retrofit	Retro12Med	\$ 21.69	AEQ Research	7th Plan	7th Plan
40	ID	Commercial	Large Office - IE Existing	Refrigeration	Commissioning	None	Commissioned	Commissioned	3	\$18,327.00	\$ -	\$ -	5,851	0.0002	0.0002	0.0%	0.0%	Retrofit	Retro12Med	\$ 21.69	AEQ Research	7th Plan	7th Plan
41	ID	Commercial	Large Office - IE Existing	Cooling	Retrocommissioning	None	Commissioned	Commissioned	3	\$80,830.89	\$ -	\$ -	45,282	0.0002	0.0001	10.6%	50.0%	Retrofit	Retro12Med	\$ 95.66	AEQ Research	AEQ Research	AEQ Research
42	ID	Commercial	Large Office - IE Existing	Heating	Retrocommissioning	None	Commissioned	Commissioned	3	\$80,830.89	\$ -	\$ -	107,062	0.0002	0.0003	10.6%	50.0%	Retrofit	Retro12Med	\$ 95.66	AEQ Research	AEQ Research	AEQ Research
43	ID	Commercial	Large Office - IE Existing	Ventilation	Retrocommissioning	None	Commissioned	Commissioned	3	\$80,830.89	\$ -	\$ -	48,086	0.0001	0.0002	10.6%	50.0%	Retrofit	Retro12Med	\$ 95.66	AEQ Research	AEQ Research	AEQ Research
44	ID	Commercial	Large Office - IE Existing	Water Heating	Retrocommissioning	None	Commissioned	Commissioned	3	\$80,830.89	\$ -	\$ -	6,431	0.0002	0.0002	10.6%	50.0%	Retrofit	Retro12Med	\$ 95.66	AEQ Research	AEQ Research	AEQ Research
45	ID	Commercial	Large Office - IE Existing	Interior Lighting	Retrocommissioning	None	Commissioned	Commissioned	3	\$80,830.89	\$ -	\$ -	50,311	0.0002	0.0003	20.2%	50.0%	Retrofit	Retro12Med	\$ 95.66	AEQ Research	AEQ Research	AEQ Research
46	ID	Commercial	Large Office - IE Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	Commissioned	3	\$80,830.89	\$ -	\$ -	19,226	0.0001	0.0001	11.9%	50.0%	Retrofit	Retro12Med	\$ 95.66	AEQ Research	AEQ Research	AEQ Research
47	ID	Commercial	Large Office - IE Existing	Refrigeration	Retrocommissioning	None	Commissioned	Commissioned	3	\$80,830.89	\$ -	\$ -	8,430	0.0002	0.0002	10.6%	50.0%	Retrofit	Retro12Med	\$ 95.66	AEQ Research	AEQ Research	AEQ Research
48	ID	Commercial	Large Office - IE Existing	Cooling	Insulation - Ceiling	R-13	R-13	R-13	45	\$35,254.90	\$ -	\$ -	8,639	0.0002	0.0001	75.4%	99.0%	Retrofit	Retro12Med	\$ 57.18	RTF	RTF	AEQ - BEST
49	ID	Commercial	Large Office - IE Existing	Heating	Insulation - Ceiling	R-13	R-13	R-13	45	\$35,254.90	\$ -	\$ -	17,241	0.0001	0.0003	75.4%	99.0%	Retrofit	Retro12Med	\$ 57.18	RTF	RTF	AEQ - BEST
50	ID	Commercial	Large Office - IE Existing	Ventilation	Insulation - Ceiling	R-13	R-13	R-13	45	\$35,254.90	\$ -	\$ -	7,243	0.0001	0.0002	75.4%	99.0%	Retrofit	Retro12Med	\$ 57.18	RTF	RTF	AEQ - BEST
51	ID	Commercial	Large Office - IE Existing	Heating	Insulation - Ducting	R-8	R-8	R-8	20	\$149,036.89	\$ -	\$ -	34,028	0.0002	0.0001	15.3%	35.0%	Retrofit	Retro12Med	\$ 99.90	DEER	DEER	AEQ - BEST
52	ID	Commercial	Large Office - IE Existing	Heating	Insulation - Ducting	R-8	R-8	R-8	20	\$149,036.89	\$ -	\$ -	44,973	0.0001	0.0002	15.3%	35.0%	Retrofit	Retro12Med	\$ 99.90	DEER	DEER	AEQ - BEST
53	ID	Commercial	Large Office - IE Existing	Ventilation	Insulation - Ducting	R-8</																	

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/Unit	Incremental O&M Costs (\$/Unit)	Annual Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
ID	Commercial	Large Office - IC	New	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$704.28	\$ -	\$ -	2,398	0.0002	0.0001	0.0%	0.0%	Retro5Med	\$	3.19	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$704.28	\$ -	\$ -	1,862	0.0001	0.0002	0.0%	0.0%	Retro5Med	\$	3.19	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$704.28	\$ -	\$ -	10,808	0.0002	0.0003	0.0%	0.0%	Retro5Med	\$	3.19	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$704.28	\$ -	\$ -	15,472	0.0001	0.0002	0.0%	0.0%	Retro5Med	\$	3.19	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Cutting Edge Measures Installed	6	\$24.20	\$ -	\$ -	10,863	0.0002	0.0001	0.0%	0.0%	Retro5Med	\$	0.27	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	Cutting Edge Measures Installed	6	\$24.20	\$ -	\$ -	5,225	0.0001	0.0002	0.0%	0.0%	Retro5Med	\$	0.27	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Ventilation	Optimized Variable Volume	Constant Speed Hoods	Demand-Controlled Hoods	Demand-Controlled Hoods	18	\$4,159.24	\$ -	\$ -	0	0.0001	0.0002	0.0%	0.0%	Retro5Med	\$	17,311.191.31	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Office Equipment	Pool Pump - Times	Manual Controls	Scheduled Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	0	0.0001	0.0002	0.0%	0.0%	Retro5Med	\$	16,385.306.04	7th Plan	7th Plan	7th Plan
ID	Commercial	Large Office - IC	New	Cooling	Advanced New Constructs	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	252,607	0.0002	0.0003	10.6%	50.0%	Retro15Low	\$	66.38	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Heating	Advanced New Constructs	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	503,074	0.0000	0.0003	10.6%	50.0%	Retro15Low	\$	66.38	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Ventilation	Advanced New Constructs	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	210,749	0.0001	0.0002	10.6%	50.0%	Retro15Low	\$	66.38	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Water Heating	Advanced New Constructs	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	86,684	0.0000	0.0003	10.6%	50.0%	Retro15Low	\$	66.38	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Interior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	280,188	0.0002	0.0003	19.9%	50.0%	Retro15Low	\$	66.38	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Exterior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design	LED Average Design	25	\$1,460,676.91	\$ -	\$ -	97,714	0.0001	0.0001	11.9%	50.0%	Retro15Low	\$	66.38	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Heating	Strategic Energy Management	None	Implemented	Implemented	3	\$19,344.16	\$ -	\$ -	37,460	0.0002	0.0001	3.2%	14.0%	Retro12Med	\$	22.37	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Ventilation	Strategic Energy Management	None	Implemented	Implemented	3	\$19,344.16	\$ -	\$ -	74,564	0.0000	0.0003	3.2%	14.0%	Retro12Med	\$	22.37	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Water Heating	Strategic Energy Management	None	Implemented	Implemented	3	\$19,344.16	\$ -	\$ -	31,218	0.0001	0.0002	3.2%	14.0%	Retro12Med	\$	22.37	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Interior Lighting	Strategic Energy Management	None	Implemented	Implemented	3	\$19,344.16	\$ -	\$ -	14,402	0.0002	0.0003	3.2%	14.0%	Retro12Med	\$	22.37	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Exterior Lighting	Strategic Energy Management	None	Implemented	Implemented	3	\$19,344.16	\$ -	\$ -	42,051	0.0002	0.0003	3.2%	14.0%	Retro12Med	\$	22.37	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Refrigeration	Strategic Energy Management	None	Implemented	Implemented	3	\$19,344.16	\$ -	\$ -	14,541	0.0001	0.0001	3.6%	14.0%	Retro12Med	\$	22.37	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Office Equipment	Commissioning	None	Commissioned	Commissioned	3	\$19,344.16	\$ -	\$ -	2,676	0.0002	0.0002	3.2%	14.0%	Retro12Med	\$	22.37	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Cooling	Commissioning	None	Commissioned	Commissioned	3	\$18,375.12	\$ -	\$ -	52,237	0.0002	0.0001	10.9%	75.0%	Retro12Med	\$	21.34	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Heating	Commissioning	None	Commissioned	Commissioned	3	\$18,375.12	\$ -	\$ -	103,977	0.0000	0.0003	10.9%	75.0%	Retro12Med	\$	21.34	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Ventilation	Commissioning	None	Commissioned	Commissioned	3	\$18,375.12	\$ -	\$ -	43,531	0.0001	0.0002	10.9%	75.0%	Retro12Med	\$	21.34	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Water Heating	Commissioning	None	Commissioned	Commissioned	3	\$18,375.12	\$ -	\$ -	6,163	0.0002	0.0003	10.9%	75.0%	Retro12Med	\$	21.34	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Interior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$18,375.12	\$ -	\$ -	48,740	0.0000	0.0003	26.1%	75.0%	Retro12Med	\$	21.34	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Exterior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$18,375.12	\$ -	\$ -	16,909	0.0001	0.0001	13.2%	75.0%	Retro12Med	\$	21.34	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Refrigeration	Commissioning	None	Commissioned	Commissioned	3	\$18,375.12	\$ -	\$ -	6,250	0.0002	0.0003	10.9%	75.0%	Retro12Med	\$	21.34	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Cooling	Retrocommissioning	None	Commissioned	Commissioned	3	\$81,043.09	\$ -	\$ -	5,810	0.0002	0.0001	0.0%	0.0%	Retro12Med	\$	94.10	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Heating	Retrocommissioning	None	Commissioned	Commissioned	3	\$81,043.09	\$ -	\$ -	102,986	0.0000	0.0003	0.0%	0.0%	Retro12Med	\$	94.10	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Ventilation	Retrocommissioning	None	Commissioned	Commissioned	3	\$81,043.09	\$ -	\$ -	43,169	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	94.10	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Water Heating	Retrocommissioning	None	Commissioned	Commissioned	3	\$81,043.09	\$ -	\$ -	6,141	0.0002	0.0003	0.0%	0.0%	Retro12Med	\$	94.10	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Exterior Lighting	Retrocommissioning	None	Commissioned	Commissioned	3	\$81,043.09	\$ -	\$ -	48,489	0.0002	0.0003	0.0%	0.0%	Retro12Med	\$	94.10	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Large Office - IC	New	Refrigeration	Retrocommissioning	None	Commissioned	Commissioned	3	\$81,043.09	\$ -	\$ -	16,764	0.0001	0.0001	0.0%	0.0%	Retro12Med	\$	94.10	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Cooling	Insulation - Ceiling	R-13	Insulation - Ceiling	Insulation - Ceiling	45	\$3,021.85	\$ -	\$ -	0.0002	0.0001	0.0%	0.0%	Retro5Med	\$	46.67	RTF	RTF	AEQ Research	
ID	Commercial	Restaurant - ID	Existing	Heating	Insulation - Ceiling	R-13	Insulation - Ceiling	Insulation - Ceiling	45	\$3,021.85	\$ -	\$ -	1,800	-	0.0007	15.5%	50.0%	Retro5Med	\$	46.67	RTF	RTF	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Ventilation	Insulation - Ducting	R-8	Insulation - Ducting	Insulation - Ducting	20	\$1,277.46	\$ -	\$ -	663	0.0001	0.0002	15.5%	50.0%	Retro5Med	\$	46.67	RTF	RTF	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Heating	Insulation - Ducting	R-8	Insulation - Ducting	Insulation - Ducting	20	\$1,277.46	\$ -	\$ -	1,179	-	0.0007	15.3%	35.0%	Retro5Med	\$	9,999.00	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Ventilation	Insulation - Ducting	R-8	Insulation - Ducting	Insulation - Ducting	20	\$1,277.46	\$ -	\$ -	0	0.0001	0.0002	15.3%	35.0%	Retro5Med	\$	9,999.00	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Cool Roof	20	\$1,190.23	\$ -	\$ -	139	0.0003	0.0001	45.1%	50.0%	Retro5Med	\$	-	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Cool Roof	20	\$1,190.23	\$ -	\$ -	139	0.0003	0.0001	45.1%	50.0%	Retro5Med	\$	-	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Cooling	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	Insulation - Wall Cavity	45	\$3,907.62	\$ -	\$ -	1447	0.0003	0.0001	30.3%	50.0%	Retro5Med	\$	206.35	RTF	RTF	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Heating	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	Insulation - Wall Cavity	45	\$3,907.62	\$ -	\$ -	1,518	0.0002	0.0007	30.3%	50.0%	Retro5Med	\$	206.35	RTF	RTF	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Ventilation	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	Insulation - Wall Cavity	45	\$3,907.62	\$ -	\$ -	(42)	0.0003	0.0002	30.3%	50.0%	Retro5Med	\$	206.35	RTF	RTF	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Cooling	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	Sealed	18	\$9.92	\$ -	\$ -	(0)	0.0003	0.0001	30.1%	35.0%	Retro5Med	\$	9,999.00	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Heating	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	Sealed	18	\$9.92	\$ -	\$ -	(1)	0.0003	0.0007	30.1%	35.0%	Retro5Med	\$	9,999.00	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Ventilation	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	Sealed	18	\$9.92	\$ -	\$ -	1	0.0001	0.0002	30.1%	35.0%	Retro5Med	\$	9,999.00	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$26,988.27	\$ -	\$ -	141	0.0003	0.0001	47.8%	47.8%	Retro15Low	\$	1,052.57	7th Plan	7th Plan	7th Plan
ID	Commercial	Restaurant - ID	Existing	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$26,988.27	\$ -	\$ -	1,126	0.0001	0.0007	47.8%	47.8%	Retro15Low	\$	1,052.57	7th Plan	7th Plan	7th Plan
ID	Commercial	Restaurant - ID	Existing	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$26,988.27	\$ -	\$ -	298	0.0001	0.0002	47.8%	47.8%	Retro15Low	\$	1,052.57	7th Plan	7th Plan	7th Plan
ID	Commercial	Restaurant - ID	Existing	Cooling	Chiller - Chilled Water Res	Constant Flow	Enabled	Enabled	10	\$4,575.76	\$ -	\$ -	0	0.0003	0.0001	15.4%	45.0%	Retro12Med	\$	15,925,980.86	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Heating	Chiller - Chilled Water Res	Constant Flow	Enabled	Enabled	15	\$4,358.20	\$ -	\$ -	9	0.0003	0.0001	15.4%	45.0%	Retro12Med	\$	42,317.75	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Ventilation	Chiller - Variable Speed Fan	On/Off Operation	Part Load Temperature	Part Load Temperature	10	\$273.07	\$ -	\$ -	0	0.0003	0.0001	15.5%	50.0%	Retro12Med	\$	91,728.00	DEER	DEER	AEQ Research
ID	Commercial	Restaurant - ID	Existing	Cooling	Variable Chiller - Control	Constant Temperature	Variable Temperature	Variable Temperature	10	\$45.75	\$ -												

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$)	Annual Savings (kWh/Unit) (Grosser)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate (%)	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Commercial	Restaurant	ID Existing	Water Heating	Advanced New Construction	Standard Building Practices	LED Average Design	LED Average Design	25	\$12,520.09	\$	\$	8,122	0.0001	0.0002	0.0%	0.0%	Retiro15Low	\$	35.09	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Interior Lighting	Advanced New Construction	Standard Building Practices	LED Average Design	LED Average Design	25	\$12,520.09	\$	\$	3,599	0.0002	0.0002	0.0%	0.0%	Retiro15Low	\$	35.09	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Exterior Lighting	Advanced New Construction	Standard Building Practices	LED Average Design	LED Average Design	25	\$12,520.09	\$	\$	1,706	0.0001	0.0001	0.0%	0.0%	Retiro15Low	\$	35.09	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Commissioning	Commissioning	Strategic Energy Management	Implemented	Implemented	3	\$721.41	\$	\$	474	0.0003	0.0002	0.0%	0.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Heating	Strategic Energy Management	None	Implemented	Implemented	3	\$721.41	\$	\$	792	-	0.0007	0.0%	0.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Ventilation	Strategic Energy Management	None	Implemented	Implemented	3	\$721.41	\$	\$	292	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Water Heating	Strategic Energy Management	None	Implemented	Implemented	3	\$721.41	\$	\$	1,257	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Interior Lighting	Strategic Energy Management	None	Implemented	Implemented	3	\$721.41	\$	\$	557	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Exterior Lighting	Strategic Energy Management	None	Implemented	Implemented	3	\$721.41	\$	\$	262	0.0001	0.0001	0.0%	0.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Refrigeration	Strategic Energy Management	None	Implemented	Implemented	3	\$721.41	\$	\$	1,165	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Office Equipment	Strategic Energy Management	None	Implemented	Implemented	3	\$721.41	\$	\$	98	0.0001	0.0002	15.0%	15.0%	Retiro12Med	\$	49.81	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Cooling	Commissioning	None	Commissioned	Commissioned	3	\$409.11	\$	\$	656	0.0003	0.0001	0.0%	0.0%	Retiro12Med	\$	21.78	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Heating	Commissioning	None	Commissioned	Commissioned	3	\$409.11	\$	\$	1,100	-	0.0007	0.0%	0.0%	Retiro12Med	\$	21.78	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Ventilation	Commissioning	None	Commissioned	Commissioned	3	\$409.11	\$	\$	405	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	21.78	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Water Heating	Commissioning	None	Commissioned	Commissioned	3	\$409.11	\$	\$	580	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	21.78	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Interior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$409.11	\$	\$	643	0.0002	0.0002	0.0%	0.0%	Retiro12Med	\$	21.78	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Exterior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$409.11	\$	\$	302	0.0001	0.0001	0.0%	0.0%	Retiro12Med	\$	21.78	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Refrigeration	Commissioning	None	Commissioned	Commissioned	3	\$409.11	\$	\$	2,688	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	21.78	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Cooling	Commissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	880	0.0001	0.0002	10.6%	10.6%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Heating	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	1,097	-	0.0007	10.6%	50.0%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Ventilation	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	405	0.0001	0.0002	10.6%	10.6%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Water Heating	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	580	0.0001	0.0002	10.6%	10.6%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Interior Lighting	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	643	0.0002	0.0002	20.2%	50.0%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	302	0.0001	0.0001	11.9%	50.0%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Refrigeration	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	2,688	0.0001	0.0002	10.6%	50.0%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Cooling	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	2,688	0.0001	0.0002	10.6%	50.0%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Refrigeration	Retrocommissioning	None	Commissioned	Commissioned	3	\$1,804.36	\$	\$	1,366	0.0003	0.0002	99.0%	79.4%	Retiro12Med	\$	96.05	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Heating	Insulation - Ceiling	R-13	Insulation - Ceiling	Insulation - Ceiling	R-13	45	\$3,021.85	\$	\$	1,866	-	0.0007	75.4%	99.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Ventilation	Insulation - Ceiling	R-13	Insulation - Ceiling	Insulation - Ceiling	R-13	45	\$3,021.85	\$	\$	582	0.0001	0.0002	75.4%	99.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Water Heating	Insulation - Ducting	R-8	Insulation - Ducting	Insulation - Ducting	R-8	20	\$1,277.46	\$	\$	397	0.0003	0.0002	15.3%	35.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Heating	Insulation - Ducting	R-8	Insulation - Ducting	Insulation - Ducting	R-8	20	\$1,277.46	\$	\$	2,095	-	0.0007	15.3%	35.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Ventilation	Insulation - Ducting	R-8	Insulation - Ducting	Insulation - Ducting	R-8	20	\$1,277.46	\$	\$	-	-	0.0007	15.3%	35.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Cool Roof	20	\$1,190.23	\$	\$	42	0.0003	0.0001	45.1%	50.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Water Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Cool Roof	20	\$1,190.23	\$	\$	169	0.0001	0.0001	45.1%	50.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	Cool Roof	20	\$1,190.23	\$	\$	-	-	0.0007	45.1%	50.0%	Retiro12Med	\$	42.84	RTF	RTF	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Cooling	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	Insulation - Wall Cavity	R-9	45	\$3,907.62	\$	\$	1,793	0.0003	0.0001	65.5%	99.0%	Retiro12Med	\$	1,215.55	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Water Heating	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	Insulation - Wall Cavity	R-9	45	\$3,907.62	\$	\$	354	0.0001	0.0002	15.3%	35.0%	Retiro12Med	\$	1,215.55	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Ventilation	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	Insulation - Wall Cavity	R-9	45	\$3,907.62	\$	\$	8	0.0001	0.0002	65.5%	99.0%	Retiro12Med	\$	1,215.55	RTF	RTF	AEQ - BEST
ID	Commercial	Restaurant	ID Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$9.92	\$	\$	0	0.0003	0.0001	99.0%	99.0%	Retiro12Med	\$	9,999.00	RTF	RTF	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$9.92	\$	\$	11	0.0001	0.0007	99.0%	99.0%	Retiro12Med	\$	9,999.00	DEER	RTF	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$9.92	\$	\$	0	0.0001	0.0007	99.0%	99.0%	Retiro12Med	\$	9,999.00	DEER	RTF	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$26,988.27	\$	\$	175	0.0003	0.0001	66.4%	66.4%	Retiro15Low	\$	1,016.16	7th Plan	7th Plan	7th Plan	
ID	Commercial	Restaurant	ID Existing	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$26,988.27	\$	\$	1,142	-	0.0007	66.4%	66.4%	Retiro15Low	\$	1,016.16	7th Plan	7th Plan	7th Plan	
ID	Commercial	Restaurant	ID Existing	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$26,988.27	\$	\$	254	0.0001	0.0002	66.4%	66.4%	Retiro15Low	\$	1,016.16	7th Plan	7th Plan	7th Plan	
ID	Commercial	Restaurant	ID Existing	Cooling	Chiller - Chilled Water Vari	Constant Flow	Variable Flow	Variable Flow	15	\$4,358.20	\$	\$	9	0.0003	0.0001	45.0%	45.0%	Retiro12Med	\$	15,484.03	DEER	DEER	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Water Heating	Chiller - Chilled Water Vari	Constant Flow	Variable Flow	Variable Flow	15	\$4,358.20	\$	\$	9	0.0003	0.0001	45.0%	45.0%	Retiro12Med	\$	15,484.03	DEER	DEER	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Temperature	Part-Load Temperature	15	\$273.07	\$	\$	0	0.0003	0.0001	15.5%	50.0%	Retiro12Med	\$	89,179.99	DEER	DEER	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Water Heating	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Temperature	Part-Load Temperature	15	\$273.07	\$	\$	0	0.0003	0.0001	15.5%	50.0%	Retiro12Med	\$	89,179.99	DEER	DEER	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Cooling	HVAC - Economizer	Constant Temperature	Installed	Installed	10	\$2,207.15	\$	\$	12	0.0003	0.0001	50.0%	60.0%	Retiro12Med	\$	21,297.45	DEER	DEER	AEQ - BEST	
ID	Commercial	Restaurant	ID Existing	Heating	Space Heating - Heat Recn	None	Installed	Installed	14	\$10,870.02	\$	\$	967	-	0.0007	5.7%	10.0%	Retiro12Med	\$	1,008.63	DEER	DEER	7th Plan	
ID	Commercial	Restaurant	ID Existing	Ventilation	Ventilation - ECM on VAV	None	Installed	Installed	18	\$598.47	\$	\$	283	0.0001	0.0002	15.5%	50.0%	Retiro12Med	\$	219.61	7th Plan	7th Plan	7th Plan	
ID	Commercial	Restaurant	ID Existing	Cooling	Ventilation - Variable Speed	Standard	Installed	Installed	15	\$586,237.59	\$	\$	1,324	0.0001	0.0002	16.3%	10.0%	Retiro12Med	\$	37,412.93	DEER	DEER	Illinois TRM	
ID	Commercial	Restaurant	ID Existing	Ventilation	Ventilation - Demand Cont	Standard	Standard	Standard	15	\$752.57	\$	\$	174	0.0001	0.0002	15.1%	25.0%	Retiro12Med	\$	368.56	7th Plan	7th Plan	7th Plan	
ID	Commercial	Restaurant	ID Existing	Cooling	Destraffication Fans (HVLS)	None	Installed	Installed	15	\$1,880.32	\$	\$	0	0.0003	0.0001	15.0%	15.0%	Retiro12Med	\$	406,290.07	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Restaurant	ID Existing	Heating	Destraffication Fans (HVLS)	None	Installed	Installed	15	\$1,880.32	\$	\$	0	0.0003	0.0001	15.0%	15.0%	Retiro12Med	\$					

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Unit)	Annual Average Savings (kWh/Unit)	Summer Coincident Peak (kW/MW)	Winter Coincident Peak (kW/MW)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Commercial	Restaurant	ID New	Cooling	Commissioning	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	819	0.0003	0.0001	10.9%	75.0%	Retirof	Retirof2Med	\$	23.17	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Heating	Commissioning	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	1,122	-	0.0007	10.9%	75.0%	Retirof	Retirof2Med	\$	23.17	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Ventilation	Commissioning	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	347	0.0001	0.0002	10.9%	75.0%	Retirof	Retirof2Med	\$	23.17	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Water Heating	Commissioning	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	572	0.0001	0.0002	10.9%	75.0%	Retirof	Retirof2Med	\$	23.17	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Interior Lighting	Commissioning	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	607	0.0002	0.0002	26.1%	75.0%	Retirof	Retirof2Med	\$	23.17	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Exterior Lighting	Commissioning	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	267	0.0001	0.0001	13.2%	75.0%	Retirof	Retirof2Med	\$	23.17	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Refrigeration	Commissioning	Commissioning	None	Commissioned	3	\$433.03	\$ -	\$ -	2,481	0.0001	0.0002	10.9%	75.0%	Retirof	Retirof2Med	\$	23.17	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Cooling	Commissioning	Commissioning	None	Commissioned	3	\$1,909.85	\$ -	\$ -	\$1,909.85	0.0003	0.0001	0.0%	0.0%	Retirof	Retirof2Med	\$	102.20	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Heating	Retirofcommissioning	Retirofcommissioning	None	Retirofcommissioned	3	\$1,909.85	\$ -	\$ -	1,110	-	0.0007	0.0%	0.0%	Retirof	Retirof2Med	\$	102.20	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Ventilation	Retirofcommissioning	Retirofcommissioning	None	Retirofcommissioned	3	\$1,909.85	\$ -	\$ -	345	0.0001	0.0002	0.0%	0.0%	Retirof	Retirof2Med	\$	102.20	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Water Heating	Retirofcommissioning	Retirofcommissioning	None	Retirofcommissioned	3	\$1,909.85	\$ -	\$ -	570	0.0001	0.0002	0.0%	0.0%	Retirof	Retirof2Med	\$	102.20	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Interior Lighting	Retirofcommissioning	Retirofcommissioning	None	Retirofcommissioned	3	\$1,909.85	\$ -	\$ -	604	0.0002	0.0002	0.0%	0.0%	Retirof	Retirof2Med	\$	102.20	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Exterior Lighting	Retirofcommissioning	Retirofcommissioning	None	Retirofcommissioned	3	\$1,909.85	\$ -	\$ -	266	0.0001	0.0001	0.0%	0.0%	Retirof	Retirof2Med	\$	102.20	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Restaurant	ID New	Refrigeration	Retirofcommissioning	Retirofcommissioning	None	Retirofcommissioned	3	\$1,909.85	\$ -	\$ -	2,452	0.0001	0.0002	0.0%	0.0%	Retirof	Retirof2Med	\$	102.20	AEQ Research	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Heating	Insulation - Ceiling	Insulation - Ceiling	R-13	Insulated	45	\$131,450.42	\$ -	\$ -	22,806	0.0007	-	15.5%	50.0%	Retirof	Retirofven20	\$	60.61	RTF	RTF	AEQ-BEST
ID	Commercial	Retail	ID Existing	Ventilation	Insulation - Ceiling	Insulation - Ceiling	R-13	Insulated	45	\$131,450.42	\$ -	\$ -	12,743	0.0001	0.0002	15.5%	50.0%	Retirof	Retirofven20	\$	60.61	RTF	RTF	AEQ-BEST
ID	Commercial	Retail	ID Existing	Cooling	Insulation - Ducting	Insulation - Ducting	R-4	Insulated	20	\$27,784.74	\$ -	\$ -	2,778	0.0007	-	15.3%	35.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Heating	Insulation - Ducting	Insulation - Ducting	R-4	Insulated	20	\$27,784.74	\$ -	\$ -	10,117	-	0.0007	15.3%	35.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Ventilation	Insulation - Ducting	Insulation - Ducting	R-4	Insulated	20	\$27,784.74	\$ -	\$ -	57	0.0001	0.0002	15.3%	35.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Standard Roof	Cool Roof	20	\$25,887.56	\$ -	\$ -	5,499	0.0007	-	45.4%	75.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Standard Roof	Cool Roof	20	\$25,887.56	\$ -	\$ -	10,097	-	0.0002	45.4%	75.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Standard Roof	Cool Roof	20	\$25,887.56	\$ -	\$ -	69	0.0001	0.0002	45.5%	75.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Cooling	Insulation - Wall Cavity	Insulation - Wall Cavity	R-9	Insulated	45	\$34,380.27	\$ -	\$ -	(1,096)	0.0007	-	30.3%	50.0%	Retirof	Retirofven20	\$	149.51	RTF	RTF	AEQ-BEST
ID	Commercial	Retail	ID Existing	Heating	Insulation - Wall Cavity	Insulation - Wall Cavity	R-9	Insulated	45	\$34,380.27	\$ -	\$ -	13,227	-	0.0007	30.3%	50.0%	Retirof	Retirofven20	\$	149.51	RTF	RTF	AEQ-BEST
ID	Commercial	Retail	ID Existing	Ventilation	Insulation - Wall Cavity	Insulation - Wall Cavity	R-9	Insulated	45	\$34,380.27	\$ -	\$ -	324	0.0001	0.0001	30.3%	50.0%	Retirof	Retirofven20	\$	149.51	RTF	RTF	AEQ-BEST
ID	Commercial	Retail	ID Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$302.18	\$ -	\$ -	(3)	0.0007	-	30.1%	35.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$302.18	\$ -	\$ -	(51)	0.0007	0.0001	30.1%	35.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$302.18	\$ -	\$ -	14	0.0001	0.0002	30.1%	35.0%	Retirof	Retirofven20	\$	9,999.00	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$39,574.98	\$ -	\$ -	124	0.0007	-	48.2%	75.0%	Retirof	Retirof15w	\$	1,238.82	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$39,574.98	\$ -	\$ -	1,648	-	0.0007	48.2%	75.0%	Retirof	Retirof15w	\$	1,238.82	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	High Efficiency Glaze	30	\$39,574.98	\$ -	\$ -	193	0.0001	0.0002	48.2%	75.0%	Retirof	Retirof15w	\$	1,238.82	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Cooling	Chilled Water Return	Chilled	Chilled	Chilled	15	\$1,393.19	\$ -	\$ -	15	0.0001	0.0001	45.0%	45.0%	Retirof	Retirof15w	\$	2,691.85	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Chiller - Chilled Water Vari	Constant Flow	Constant Flow	Variable Flow	Variable Flow	15	\$132,107.18	\$ -	\$ -	275	0.0007	-	15.4%	45.0%	Retirof	Retirof15w	\$	42,205.69	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Chiller - Variable Speed Fan	On/Off Operation	On/Off Operation	Part-Load Operation	Part-Load Operation	15	\$8,315.01	\$ -	\$ -	8	0.0007	-	15.5%	50.0%	Retirof	Retirof12Med	\$	94,868.92	DEER	DEER	New Jersey TRM
ID	Commercial	Retail	ID Existing	Controlled Chiller - Con	Constant Temperature	Constant Temperature	Variable Temperature	Variable Temperature	15	\$1,393.19	\$ -	\$ -	15	0.0001	-	45.0%	45.0%	Retirof	Retirof12Med	\$	253,263.20	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Chiller - HVAC Economizer	None	None	Installed	Installed	10	\$607,207.73	\$ -	\$ -	171	0.0007	-	45.2%	60.0%	Retirof	Retirof12Med	\$	46,078.27	DEER	DEER	AEQ-BEST
ID	Commercial	Retail	ID Existing	Heating	Space Heating - Heat Reco	None	None	Installed	14	\$155,363.58	\$ -	\$ -	13,881	-	0.0007	2.8%	10.0%	Retirof	Retirof12Med	\$	1,066.14	DEER	DEER	7th Plan
ID	Commercial	Retail	ID Existing	Ventilation	ECM on HVAC	None	None	Installed	15	\$23,990.99	\$ -	\$ -	5,926	0.0001	0.0002	15.5%	50.0%	Retirof	Retirof12Med	\$	430.89	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Ventilation - Variable Sove	None	None	Installed	15	\$29,344.24	\$ -	\$ -	29,344	0.0001	0.0002	11.5%	25.0%	Retirof	Retirof12Med	\$	73,403.01	DEER	DEER	Illinois TRM	
ID	Commercial	Retail	ID Existing	Ventilation - Demand Con	Standard	Standard	Demand-Controlled Fans	Demand-Controlled Fans	15	\$32,736.70	\$ -	\$ -	3,907	0.0001	0.0002	15.1%	25.0%	Retirof	Retirof12Med	\$	723.15	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Cooling	Desatirification Fans (DVs)	None	None	Installed	15	\$81,793.85	\$ -	\$ -	2	0.0007	-	15.2%	30.0%	Retirof	Retirof12Med	\$	499,112.30	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Retail	ID Existing	Heating	Desatirification Fans (DVs)	None	None	Installed	15	\$81,793.85	\$ -	\$ -	12	0.0007	-	15.2%	30.0%	Retirof	Retirof12Med	\$	499,112.30	AEQ Research	AEQ Research	AEQ Research
ID	Commercial	Retail	ID Existing	Cooling	RTU - Advanced Controls	Standard Unit	Advanced Unit	Advanced Unit	15	\$19,043.83	\$ -	\$ -	15	0.0001	0.0001	15.1%	15.1%	Retirof	Retirof15w	\$	113,312.51	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Cooling	RTU - Advanced Controls	Standard Unit	Advanced Unit	Advanced Rooftop Controller	15	\$9,083.48	\$ -	\$ -	11,460	0.0007	-	15.4%	45.0%	Retirof	Retirof15w	\$	72.17	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Cooling	RTU - Evaporative Precool	None	None	Precooler Installed	15	\$371,226.49	\$ -	\$ -	113	0.0007	-	15.8%	75.0%	Retirof	Retirof15w	\$	287,295.28	DEER	DEER	AEQ Research
ID	Commercial	Retail	ID Existing	Heating	Ductless Mini Split Heat Pu	None	None	Installed	15	\$1,771,135.00	\$ -	\$ -	253	0.0001	0.0001	15.0%	25.0%	Retirof	Retirof15w	\$	169,539.03	RTF	RTF	7th Plan
ID	Commercial	Retail	ID Existing	Heating	Ductless Mini Split Heat Pu	None	None	Installed	15	\$1,771,135.00	\$ -	\$ -	758	-	0.0007	15.5%	50.0%	Retirof	Retirof15w	\$	155,530.92	RTF	RTF	7th Plan
ID	Commercial	Retail	ID Existing	Cooling	Thermostat - WiFi/Interact	Standard Unit	Standard Unit	Smart/WiFi Enabled Unit	5	\$87,139.81	\$ -	\$ -	49,352	0.0007	0.0007	10.0%	10.0%	Retirof	Retirofven20	\$	89.08	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Standard Unit	Smart/WiFi Enabled Unit	5	\$87,139.81	\$ -	\$ -	137,315	0.0001	0.0001	10.0%	10.0%	Retirof	Retirofven20	\$	89.08	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Ventilation	Smart/WiFi Enabled Unit	Standard Unit	Standard Unit	Smart/WiFi Enabled Unit	5	\$87,139.81	\$ -	\$ -	22,388	0.0001	0.0002	10.0%	10.0%	Retirof	Retirofven20	\$	89.08	7th Plan	7th Plan	AEQ Research
ID	Commercial	Retail	ID Existing	Water Heating	Water Heater - Faucet Auct	1.3 GPM Average Baseline	0.94 GPM Unit	0.94 GPM Unit	10	\$102.01	\$ -	\$ -	0	0.0001	0.0002	25.6%	65.0%	Retirof	Retirof20Fast	\$	194,772.86	DEER	DEER	Illinois TRM
ID	Commercial	Retail	ID Existing	Water Heating	Water Heater - Faucet Auct	Standard Faucet	Standard Faucet	Motion Sensor-Controlled Faucet	1	\$76.51	\$ -	\$ -	-	-	-	25.6%	65.0%							

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/Unit	Incremental O&M Costs (\$/Unit)	Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	7th Plan Measure Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
1	ID	Commercial	Retail-ID	Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$34,185.30	\$	\$	-24,305	0.0002	0.0002	20.2%	50.0%	Retrofit	Retrol2Med	\$	98.47	AEQ Research	AEQ Research	AEQ Research
1	ID	Commercial	Retail-ID	Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$34,185.30	\$	\$	-8,031	0.0001	0.0001	11.9%	50.0%	Retrofit	Retrol2Med	\$	98.47	AEQ Research	AEQ Research	AEQ Research
1	ID	Commercial	Retail-ID	Existing	Refrigeration	Retrocommissioning	None	Commissioned	3	\$34,185.30	\$	\$	-8,735	0.0001	0.0002	10.6%	50.0%	Retrofit	Retrol2Med	\$	98.47	AEQ Research	AEQ Research	AEQ Research
1	ID	Commercial	Retail-ID	New	Refrigeration	High Efficiency	R-13	Commissioned	45	\$13,450.42	\$	\$	-31,507	0.0007	0.0007	75.4%	99.0%	Retrofit	Retrol2Med	\$	59.74	RTF	RTF	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Insulation - Ceiling	R-13	Commissioned	45	\$13,450.42	\$	\$	-76,206	0.0007	0.0007	75.4%	99.0%	Retrofit	Retrol2Med	\$	59.74	RTF	RTF	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Ventilation	Insulation - Ceiling	R-13	Commissioned	45	\$13,450.42	\$	\$	-11,582	0.0001	0.0002	11.4%	99.0%	Retrofit	Retrol2Med	\$	59.74	RTF	RTF	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	Insulation - Ducting	R-4	Commissioned	20	\$27,784.74	\$	\$	-3,570	0.0007	0.0007	15.3%	35.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Insulation - Ducting	R-4	Commissioned	20	\$27,784.74	\$	\$	-9,939	0.0001	0.0002	15.3%	35.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Ventilation	Insulation - Ducting	R-4	Commissioned	20	\$27,784.74	\$	\$	-1,018	0.0001	0.0002	15.3%	35.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$25,887.56	\$	\$	-2,605	0.0007	0.0007	45.4%	75.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$25,887.56	\$	\$	-9,966	0.0001	0.0002	45.4%	75.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$25,887.56	\$	\$	-293	0.0001	0.0002	45.4%	75.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	Insulation - Wall Cavity	R-9	Commissioned	45	\$34,380.27	\$	\$	-781	0.0007	0.0007	65.5%	99.0%	Retrofit	Retrol2Med	\$	144.09	RTF	RTF	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Insulation - Wall Cavity	R-9	Commissioned	45	\$34,380.27	\$	\$	-13,131	0.0001	0.0007	65.5%	99.0%	Retrofit	Retrol2Med	\$	144.09	RTF	RTF	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Ventilation	Insulation - Wall Cavity	R-9	Commissioned	45	\$34,380.27	\$	\$	-123	0.0001	0.0002	65.5%	99.0%	Retrofit	Retrol2Med	\$	144.09	RTF	RTF	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$302.18	\$	\$	-9	0.0007	0.0007	99.0%	99.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$302.18	\$	\$	-761	0.0007	0.0007	99.0%	99.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$302.18	\$	\$	-13	0.0001	0.0002	99.0%	99.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$38,574.98	\$	\$	-136	0.0007	0.0007	66.5%	75.0%	Retrofit	Retrol2Med	\$	1,252.83	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$38,574.98	\$	\$	-1,569	0.0007	0.0007	66.5%	75.0%	Retrofit	Retrol2Med	\$	1,252.83	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$38,574.98	\$	\$	-170	0.0001	0.0002	66.5%	75.0%	Retrofit	Retrol2Med	\$	1,252.83	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	Chiller - Chilled Water Vari	Constant Flow	Variable Flow	15	\$132,707.18	\$	\$	-286	0.0007	0.0007	15.4%	45.0%	Retrofit	Retrol2Med	\$	39,857.35	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	15	\$8,315.01	\$	\$	-8	0.0007	0.0007	15.5%	50.0%	Retrofit	Retrol2Med	\$	89,590.39	DEER	DEER	New Jersey TRM
1	ID	Commercial	Retail-ID	New	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	\$1,393.19	\$	\$	-3	0.0007	0.0007	15.8%	75.0%	Retrofit	Retrol2Med	\$	211,803.29	DEER	DEER	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	HVAC - Economizer	None	Installed	10	\$207,737.19	\$	\$	-189	0.0001	0.0002	60.0%	100.0%	Retrofit	Retrol2Med	\$	49,900.17	AEQ Research	AEQ Research	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Space Heating - Heat Recov	None	Installed	14	\$15,363.58	\$	\$	-13,207	0.0007	0.0007	5.7%	10.0%	Retrofit	Retrol2Med	\$	1,082.67	DEER	DEER	7th Plan
1	ID	Commercial	Retail-ID	New	Ventilation	Ventilation - ECM on VAV	None	Installed	18	\$32,990.99	\$	\$	-5,236	0.0001	0.0002	15.3%	50.0%	Retrofit	Retrol2Med	\$	463.56	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Ventilation	Ventilation - Variable Speed	None	Installed	10	\$1,393.19	\$	\$	-26,341	0.0001	0.0002	15.3%	50.0%	Retrofit	Retrol2Med	\$	78,992.00	DEER	DEER	7th Plan
1	ID	Commercial	Retail-ID	New	Ventilation	Ventilation - Demand Cont	Standard	Demand-Controlled Fans	15	\$32,736.70	\$	\$	-3,438	0.0001	0.0002	15.1%	25.0%	Retrofit	Retrol2Med	\$	777.97	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	Deaerification Fans (HVLS)	None	Installed	15	\$81,793.85	\$	\$	-3	0.0007	0.0007	15.2%	30.0%	Retrofit	Retrol2Med	\$	494,802.19	AEQ Research	AEQ Research	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Deaerification Fans (HVLS)	None	Installed	15	\$81,793.85	\$	\$	-12	0.0007	0.0007	15.2%	30.0%	Retrofit	Retrol2Med	\$	494,802.19	AEQ Research	AEQ Research	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	RTU - Maintenance Unit	None	Turned Up Unit	15	\$19,019.83	\$	\$	-15	0.0001	0.0002	15.1%	15.0%	Retrofit	Retrol2Med	\$	90,745.45	AEQ Research	AEQ Research	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Rooftop Controller	15	\$9,083.48	\$	\$	-14,013	0.0007	0.0007	15.4%	45.0%	Retrofit	Retrol2Med	\$	58.84	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	RTU - Evaporative Precool	No Precooler	Precooler Installed	15	\$371,226.49	\$	\$	-136	0.0007	0.0007	15.8%	75.0%	Retrofit	Retrol2Med	\$	234,212.14	DEER	DEER	7th Plan
1	ID	Commercial	Retail-ID	New	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$7,171,135.00	\$	\$	-1	0.0001	0.0002	15.5%	50.0%	Retrofit	Retrol2Med	\$	149,983.51	RTF	RTF	7th Plan
1	ID	Commercial	Retail-ID	New	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$7,171,135.00	\$	\$	-682	0.0007	0.0007	15.5%	50.0%	Retrofit	Retrol2Med	\$	149,983.51	RTF	RTF	7th Plan
1	ID	Commercial	Retail-ID	New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$87,139.81	\$	\$	-54,131	0.0007	0.0007	10.0%	10.0%	Retrofit	Retrol2Med	\$	87.80	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$87,139.81	\$	\$	-130,648	0.0007	0.0007	10.0%	10.0%	Retrofit	Retrol2Med	\$	87.80	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$87,139.81	\$	\$	-19,803	0.0001	0.0002	10.0%	10.0%	Retrofit	Retrol2Med	\$	87.80	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Faucet Aer	1.39 GPM Average Baseline	0.94 GPM Unit	10	\$102.01	\$	\$	-0	0.0001	0.0002	25.6%	65.0%	Retrofit	Retrol2Med	\$	189,824.39	AEQ Research	AEQ Research	Illinois TRM
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Faucet Mol	Standard Faucet	Smart Sensor-Controlled Faucet	1	\$76.51	\$	\$	-	0.0001	0.0002	25.6%	65.0%	Retrofit	Retrol2Med	\$	189,824.39	AEQ Research	AEQ Research	Illinois TRM
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Low Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$79.29	\$	\$	96.18	0.0001	0.0002	25.6%	65.0%	Retrofit	Retrol2Med	\$	189,824.39	AEQ Research	AEQ Research	Illinois TRM
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Pipe Insul	High Efficiency Pump	High Efficiency Pump	10	\$1,350.39	\$	\$	-	0.0001	0.0002	15.3%	15.0%	Retrofit	Retrol2Med	\$	15,658.66	Illinois TRM	Illinois TRM	
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Pre-Insul	Uninsulated Pipe	R-3.5 Insulation Installed	15	\$75.75	\$	\$	-	0.0001	0.0002	25.7%	75.0%	Retrofit	Retrol2Med	\$	24,215.71	Illinois TRM	Illinois TRM	
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Pre-Rinse S	1.33 GPM Kitchen Spray Valve	0.87-1.00 GPM Kitchen Spray Valve	4	\$1,361.66	\$	\$	897.43	0.0001	0.0002	25.6%	65.0%	Retrofit	Retrol2Med	\$	110,306,229.09	RTF	RTF	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Temp Limit	Set at 125°F	Set at 120°F	1	\$182.33	\$	\$	-	0.0001	0.0002	15.8%	15.0%	Retrofit	Retrol2Med	\$	83,067.13	Illinois TRM	Illinois TRM	
1	ID	Commercial	Retail-ID	New	Water Heating	Water Heater - Solar System	Standard Electric Unit	SEF 2.5 Solar Unit	20	\$1,091.85	\$	\$	-3	0.0001	0.0002	15.2%	15.0%	Retrofit	Retrol2Med	\$	82,561.32	AEO 2015	AEO 2015	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	\$44,510.29	\$	\$	-58,673	0.0002	0.0002	14.1%	at Turnover	Lost Opportunity	L020Fast	\$	67.01	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$73,441.98	\$	\$	-81,369	0.0002	0.0002	14.1%	at Turnover	Lost Opportunity	L020Fast	\$	78.98	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Interior Lighting	Interior Lighting - LED Can	Standard LED Sign	Light Emitting Diode Sign	15	\$221.19	\$	\$	-2	0.0001	0.0002	2.3%	5.0%	Retrofit	Retrol2Med	\$	83,067.13	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Interior Lighting	Interior Fluorescent - 8-ft	Single Level Lighting Controls	Two Level Lighting Controls	16	\$239,733.50	\$	\$	-29	0.0001	0.0002	7.6%	15.0%	Retrofit	Retrol2Med	\$	812,371.50	7th Plan	7th Plan	AEQ-BEST
1	ID	Commercial	Retail-ID	New	Interior Lighting	Interior Fluorescent - Delta	Overlfit Fixture	Properly Lit Fixture	11	\$408.47	\$	\$	-3	0.0002	0.0002									

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak (kW/Unit)	Winter Coincident Peak (kW/Unit)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Commercial	Grocery-ID	Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof		20	\$9,918.61	\$	\$	-	-	-	45.1%	50.0%	Retrolen20	\$	-	DEER	DEER	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Insulation - Wall Cavity	R-9	R-23		45	\$28,282.80	\$	\$	(2,111)	0.0001	0.0001	30.3%	50.0%	Retrolen20	\$	1,095.41	RTF	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Heating	Insulation - Wall Cavity	R-9	R-23		45	\$28,282.80	\$	\$	2,159	0.0001	0.0001	30.3%	50.0%	Retrolen20	\$	1,095.41	RTF	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof		10	\$444.92	\$	\$	-	0	0.0003	15.4%	45.0%	Retrolen20	\$	1,134.47	DEER	DEER	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Insulation - Wall Cavity	R-9	R-23		45	\$28,282.80	\$	\$	(2,111)	0.0003	0.0001	30.1%	35.0%	Retrolen20	\$	23,232.53	DEER	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Heating	Insulation - Wall Cavity	R-9	R-23		45	\$28,282.80	\$	\$	2,159	0.0001	0.0001	30.1%	35.0%	Retrolen20	\$	23,232.53	DEER	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed		18	\$96.48	\$	\$	(0)	0.0003	0.0001	30.1%	35.0%	Retrolen20	\$	23,232.53	DEER	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed		18	\$96.48	\$	\$	(0)	0.0003	0.0001	30.1%	35.0%	Retrolen20	\$	23,232.53	DEER	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed		18	\$96.48	\$	\$	(0)	0.0001	0.0002	30.1%	35.0%	Retrolen20	\$	23,232.53	DEER	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	High Efficiency Glaze	High Efficiency Glaze	High Efficiency Glaze		30	\$216,824.33	\$	\$	1,000	0.0003	0.0001	47.8%	47.8%	Retrolen20	\$	1,134.47	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Heating	High Efficiency Glaze	High Efficiency Glaze	High Efficiency Glaze		30	\$216,824.33	\$	\$	8,671	-	-	47.8%	47.8%	Retrolen20	\$	1,134.47	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Ventilation	High Efficiency Glaze	High Efficiency Glaze	High Efficiency Glaze		30	\$216,824.33	\$	\$	1,839	0.0001	0.0002	47.8%	47.8%	Retrolen20	\$	1,134.47	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Chiller - Chilled Water Res	Constant Flow	Variable Flow		10	\$444.92	\$	\$	-	0	0.0003	15.4%	45.0%	Retrolen20	\$	1,134.47	DEER	DEER	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Chiller - Chilled Water Res	Constant Flow	Constant Flow		15	\$423,371.39	\$	\$	126	0.0003	0.0001	15.4%	45.0%	Retrolen20	\$	29,339.76	DEER	DEER	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Variable Speed Fan		15	\$2,654.86	\$	\$	4	0.0003	0.0001	15.5%	50.0%	Retrolen20	\$	63,597.03	DEER	DEER	New Jersey TRM	
ID	Commercial	Grocery-ID	Existing	Cooling	Water-Cooled Chiller - Con	Standard Temperature	Variable Temperature		10	\$444.92	\$	\$	-	0	0.0003	0.0001	15.8%	75.0%	Retrolen20	\$	169,846.62	DEER	DEER	AEQ - BEST
ID	Commercial	Grocery-ID	Existing	Cooling	HVAC - Economizer	None	Installed		10	\$21,458.41	\$	\$	83	0.0003	0.0001	45.2%	60.0%	Retrolen20	\$	30,983.86	DEER	DEER	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Heating	Space Heating - Heat Reco	None	Installed		14	\$13,057.19	\$	\$	2,714	-	-	2.8%	10.0%	Retrolen20	\$	1,089.67	DEER	DEER	7th Plan	
ID	Commercial	Grocery-ID	Existing	Ventilation	Ventilation - ECM on VAV	None	Installed		18	\$12,640.23	\$	\$	4,075	0.0001	0.0002	15.5%	50.0%	Retrolen20	\$	244.7	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Ventilation	Ventilation - Variable Speed	None	Installed		15	\$9,770,626.52	\$	\$	19,775	0.0001	0.0002	11.5%	50.0%	Retrolen20	\$	414,645.1	DEER	DEER	Illinois TRM	
ID	Commercial	Grocery-ID	Existing	Cooling	Ventilation - Demand Cont	Standard	Demand-Controlled Fans		15	\$12,542.80	\$	\$	2,686	0.0001	0.0002	15.6%	75.0%	Retrolen20	\$	410.28	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Destratification Fans (HVLS)	None	Installed		15	\$31,338.64	\$	\$	1	0.0003	0.0001	15.0%	15.0%	Retrolen20	\$	470,637.31	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Grocery-ID	Existing	Heating	Destratification Fans (HVLS)	None	Installed		15	\$31,338.64	\$	\$	5	-	-	15.0%	15.0%	Retrolen20	\$	470,637.31	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Grocery-ID	Existing	Cooling	RTU - Maintenance Free	Standard Unit	Tuned Up Unit		3	\$6,086.18	\$	\$	27	0.0003	0.0001	15.1%	25.0%	Retrolen20	\$	74,522.98	Illinois TRM	Illinois TRM	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Rooftop Controller		15	\$3,480.26	\$	\$	6,582	0.0003	0.0001	15.4%	45.0%	Retrolen20	\$	48.38	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	RTU - Evaporative Precool	No Precooler	Precooler Installed		15	\$118,526.98	\$	\$	54	0.0003	0.0001	15.8%	75.0%	Retrolen20	\$	192,597.80	DEER	DEER	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Ductless Mini Split Heat Pu	None	Installed		15	\$566,496.49	\$	\$	113	0.0003	0.0001	15.1%	25.0%	Retrolen20	\$	142,077.22	RTF	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Heating	Ductless Mini Split Heat Pu	None	Installed		15	\$566,496.49	\$	\$	238	0.0003	0.0001	25.0%	15.0%	Retrolen20	\$	142,077.22	RTF	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit		5	\$33,386.90	\$	\$	28,372	0.0001	0.0001	10.0%	10.0%	Retrolen20	\$	74.92	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit		5	\$33,386.90	\$	\$	51,456	0.0001	0.0001	10.0%	10.0%	Retrolen20	\$	74.92	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit		5	\$33,386.90	\$	\$	19,279	0.0001	0.0002	10.0%	10.0%	Retrolen20	\$	74.92	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Water Heating	Water Heater - Faucet Aeri	1.39 GPM Average Baseline	0.94 GPM Unit		10	\$102.01	\$	\$	-	0	0.0002	25.0%	65.0%	Retrolen20	\$	84,766.76	DEER	Illinois TRM	Illinois TRM	
ID	Commercial	Grocery-ID	Existing	Water Heating	Water Heater - Faucet Mot	Standard Faucet	Motion Sensor-Controlled Faucet		1	\$76.51	\$	\$	-	-	-	25.0%	65.0%	Retrolen20	\$	-	AEQ Research	AEQ Research	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Water Heating	Water Heater - Low-Flow	2.2 GPM Showerhead	1.5 GPM Showerhead		10	\$79.29	\$96.18	\$	-	0	0.0002	0.0003	25.0%	65.0%	Retrolen20	\$	(62,613.62)	RTF	7th Plan	AEQ - BEST
ID	Commercial	Grocery-ID	Existing	Water Heating	High Efficiency Water Heat	Standard Unit	High Efficiency Water Heat		10	\$1,163.44	\$	\$	-	0	0.0002	15.0%	25.0%	Retrolen20	\$	49,861.17	Hawaii TRM	Hawaii TRM	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Water Heating	Water Heater - Pipe Insulat	Uninsulated Pipe	R-3.5 Insulation Installed		15	\$75.75	\$	\$	-	1	0.0002	0.0003	25.7%	75.0%	Retrolen20	\$	10,813.10	Illinois TRM	Illinois TRM	AEQ - BEST
ID	Commercial	Grocery-ID	Existing	Water Heating	Water Heater - Pre-Rinse S	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve		4	\$1,361.68	\$897.43	\$	-	0	0.0002	0.0003	25.6%	65.0%	Retrolen20	\$	(6,602,283.38)	RTF	RTF	AEQ - BEST
ID	Commercial	Grocery-ID	Existing	Water Heating	Water Heater - Temp Limit	Water Set at 125°F	Water Set at 120°F		15	\$157.09	\$	\$	-	2	0.0002	2.1%	75.0%	Retrolen20	\$	33.08	Illinois TRM	Illinois TRM	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Water Heating	Water Heater - Solar Unit	Standard Electric Unit	SEF 2.5 Solar Unit		20	\$1,091.85	\$	\$	-	2	0.0002	13.3%	15.0%	Retrolen20	\$	36,869.87	AEO 2015	AEQ 2015	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Lighting - Networks	Standard Controls	Enhanced Controls		15	\$17,053.75	\$	\$	53,845	0.0002	0.0002	8.1%	at Turnover	Lost Opportunity	L020Fst	\$	28.17	7th Plan	7th Plan	AEQ - BEST
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls		15	\$28,138.69	\$	\$	74,354	0.0002	0.0002	8.2%	at Turnover	Lost Opportunity	L020Fst	\$	33.21	7th Plan	7th Plan	AEQ - BEST
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Lighting - LED Can	LED Light Sign	Interior Emitting Capacitor Sign		15	\$221.19	\$	\$	-	5.0%	0.0002	2.1%	50.0%	Retrolen20	\$	49.07	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Fluorescent - Bi-Le	Standard Controls	Two Level Lighting Controls		16	\$91,851.92	\$	\$	26	0.0002	0.0002	7.6%	15.0%	Retrolen20	\$	281,341.79	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Fluorescent - Dela	Overlfit Fixture	Property LR Fixture		11	\$156.50	\$	\$	4	0.0002	0.0002	17.6%	25.0%	Retrolen20	\$	4,282.65	7th Plan	7th Plan	Illinois TRM	
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Fluorescent - Dela	Standard Controls	Two Level Lighting Controls		8.6	\$7,904.39	\$	\$	3,513	0.0001	0.0001	15.5%	25.0%	Retrolen20	\$	27.42	7th Plan	7th Plan	Michigan Energy Measures Datab	
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Fluorescent - Dela	Standard Controls	Photocell and/or Motion Based Controls		10	\$9,141.36	\$	\$	32	0.0001	0.0001	15.0%	25.0%	Retrolen20	\$	27.42	7th Plan	7th Plan	Illinois TRM	
ID	Commercial	Grocery-ID	Existing	Interior Lighting	Interior Fluorescent - Dela	Standard Controls	Solar-Powered Unit Installed		7	\$560,621.85	\$	\$	32	0.0001	0.0001	15.5%	25.0%	Retrolen20	\$	2,422,393.24	Workpaper	Workpaper	AEQ Research	
ID	Commercial	Grocery-ID	Existing	Refrigeration	Refrigeration - Anti-Sweat	No Anti-Sweat Heater Controls	Anti-Sweat Heater Controls		8	\$981.35	\$	\$	2	0.0002	0.0002	20.8%	75.0%	Retrolen20	\$	67,967.15	RTF	RTF	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Refrigeration	Refrigeration - Door Gasket	Sealed Case Doors	Sealed Case Doors		16	\$3,367.65	\$	\$	2	0.0002	0.0002	20.8%	75.0%	Retrolen20	\$	49,823.87	RTF	DEER	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Refrigeration	Refrigeration - Evaporator	Low-Base Fan Controls	Low-Base Fan Controls		16	\$3,367.65	\$	\$	2	0.0002	0.0002	20.8%	75.0%	Retrolen20	\$	161,870.13	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Refrigeration	Refrigeration - Floating He	Web/Duct Breat Pressure Controls	Web/Duct Breat Pressure Controls		15	\$14,471.14	\$	\$	22	0.0002	0.0002	14.9%	75.0%	Retrolen20	\$	58,612.12	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Refrigeration	Refrigeration - Strip Curtai	No Strip Curtains	Strip Curtains Installed		2	\$296.14	\$	\$	2	0.0002	0.0002	20.8%	75.0%	Retrolen20	\$	81,597.94	7th Plan	7th Plan	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Refrigeration	Refrigeration - High Effici	High Efficiency Compressor	High Efficiency Compressor		15	\$262,261.52	\$	\$	25	0.0002	0.0002	25.1%	10.0%	Retrolen20	\$	1,044,701.95	AEO 2015	AEQ 2015	AEQ - BEST	
ID	Commercial	Grocery-ID	Existing	Refrigeration	Refrigeration - Variable Sp	Inefficient Compressor Loading	Variable Speed Compressor Loading		15	\$31,9														

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
1	ID	Commercial	Grocery-ID	New	Cooling	Chiller - Chilled Water Variable	Constant Flow	Variable Flow	15	\$42,371.39	\$	\$	132	0.0003	0.0001	15.4%	45.0%	Retiro12Med	\$	27,707.29	DEER	DEER	AEGBEST
2	ID	Commercial	Grocery-ID	New	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	15	\$2,654.86	\$	\$	4	0.0003	0.0001	15.5%	50.0%	Retiro12Med	\$	60,054.88	DEER	DEER	New Jersey TRM
3	ID	Commercial	Grocery-ID	New	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	\$444.82	\$	\$	0	0.0003	0.0001	15.8%	75.0%	Retiro12Med	\$	141,984.68	DEER	DEER	AEGBEST
4	ID	Commercial	Grocery-ID	New	Cooling	HVAC - Economizer	None	Installed	10	\$1,458.41	\$	\$	103	0.0003	0.0001	50.1%	24.0%	Retiro12Med	\$	24,430.03	DEER	DEER	AEGBEST
5	ID	Commercial	Grocery-ID	New	Heating	Space Heating - Heat Recor	None	Installed	14	\$13,057.19	\$	\$	2,666	-	-	5.7%	10.0%	Retiro12Med	\$	1,073.27	DEER	DEER	7th Plan
6	ID	Commercial	Grocery-ID	New	Ventilation	Ventilation - ECM on VAV	None	Installed	18	\$12,640.23	\$	\$	3,708	0.0002	0.0002	15.5%	50.0%	Retiro12Med	\$	26,137	7th Plan	7th Plan	7th Plan
7	ID	Commercial	Grocery-ID	New	Ventilation	Ventilation - Variable Speed	None	Installed	15	\$9,770,626.52	\$	\$	18,513	0.0001	0.0002	16.3%	50.0%	Retiro12Med	\$	44,527.24	DEER	DEER	Illinois TRM
8	ID	Commercial	Grocery-ID	New	Ventilation	Ventilation - Demand Control	Standard	Demanded Controlled Fans	10	\$12,343.80	\$	\$	2,452	0.0002	0.0002	15.8%	48.0%	Retiro12Med	\$	438.64	7th Plan	7th Plan	7th Plan
9	ID	Commercial	Grocery-ID	New	Cooling	Desstratification Fans (HVLS)	None	Installed	15	\$31,338.64	\$	\$	2	0.0003	0.0001	15.0%	15.0%	Retiro12Med	\$	438,556.75	AEGBEST	AEGBEST	AEGBEST
10	ID	Commercial	Grocery-ID	New	Heating	Desstratification Fans (HVLS)	None	Installed	15	\$31,338.64	\$	\$	5	-	-	15.0%	15.0%	Retiro12Med	\$	438,556.75	AEGBEST	AEGBEST	AEGBEST
11	ID	Commercial	Grocery-ID	New	Cooling	RTU - Maintenance	Standard Unit	Tuned Up Unit	3	\$6,386.19	\$	\$	37	0.0003	0.0001	15.1%	25.0%	Retiro20Fast	\$	54,016.16	Illinois TRM	Illinois TRM	AEGBEST
12	ID	Commercial	Grocery-ID	New	Cooling	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Rooftop Controller	15	\$3,480.26	\$	\$	9,056	0.0003	0.0001	15.4%	45.0%	Retiro15Low	\$	35.03	7th Plan	7th Plan	7th Plan
13	ID	Commercial	Grocery-ID	New	Cooling	RTU - Evaporative Precool	No Precooler	Precooler Installed	15	\$118,526.98	\$	\$	73	0.0003	0.0001	15.8%	75.0%	Retiro15Low	\$	139,422.33	DEER	DEER	7th Plan
14	ID	Commercial	Grocery-ID	New	Cooling	Ductless Mini Split Heat Pu	None	Installed	15	\$665,496.49	\$	\$	156	0.0003	0.0001	15.1%	25.0%	Retiro15Med	\$	132,585.07	RTF	RTF	7th Plan
15	ID	Commercial	Grocery-ID	New	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$665,496.49	\$	\$	216	0.0003	0.0001	15.1%	25.0%	Retiro15Med	\$	132,585.07	RTF	RTF	7th Plan
16	ID	Commercial	Grocery-ID	New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$	\$	34,870	0.0003	0.0001	10.0%	10.0%	Retiro12Med	\$	69.43	7th Plan	7th Plan	7th Plan
17	ID	Commercial	Grocery-ID	New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$	\$	50,541	0.0002	0.0002	10.0%	10.0%	Retiro12Med	\$	69.43	7th Plan	7th Plan	7th Plan
18	ID	Commercial	Grocery-ID	New	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	15	\$33,386.90	\$	\$	13,896	0.0001	0.0002	10.0%	10.0%	Retiro12Med	\$	69.43	7th Plan	7th Plan	7th Plan
19	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - High Efficiency	3.85 GPM Average Baseline	3.85 GPM Unit	10	\$102.01	\$	\$	0	0.0002	0.0003	26.6%	65.0%	Retiro20Fast	\$	82,773.80	DEER	DEER	Illinois TRM
20	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - Faucet Mo	Standard Faucet	Motion Sensor-Controlled Faucet	1	\$76.51	\$	\$	-	-	-	25.0%	65.0%	Retiro20Fast	\$	-	AEGBEST	AEGBEST	AEGBEST
21	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - Low Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$79.29	\$96.18	\$	0	0.0002	0.0003	25.6%	65.0%	Retiro20Fast	\$	(2,561,623.26)	RTF	RTF	7th Plan
22	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - High Efficiency	Standard Efficiency Pump	High Efficiency Pump	15	\$1,163.44	\$	\$	2	0.0002	0.0003	15.1%	25.0%	Retiro12Med	\$	48,692.21	Hawaii TRM	Hawaii TRM	7th Plan
23	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - Pipe Insulat	Uninsulated Pipe	R-3.5 Insulation Installed	15	\$75.75	\$	\$	1	0.0002	0.0003	25.7%	75.0%	Retiro12Med	\$	10,559.51	Illinois TRM	Illinois TRM	AEGBEST
24	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - Pre-Rinse S	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve	4	\$1,361.68	\$897.43	\$	0	0.0002	0.0003	25.6%	65.0%	Retiro12Med	\$	(4,494,349.86)	RTF	RTF	7th Plan
25	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - Temperature	Water Set at 115°F	Water Set at 120°F	2	\$157.09	\$	\$	2	0.0002	0.0003	15.8%	75.0%	Retiro12Med	\$	36,224.21	Illinois TRM	Illinois TRM	7th Plan
26	ID	Commercial	Grocery-ID	New	Water Heating	Water Heater - Solar System	Standard Electric Unit	SET 2.5 Solar Unit	10	\$991.85	\$	\$	0	0.0002	0.0002	15.0%	1.0%	Retiro12Med	\$	1,205.22	AEGBEST	AEGBEST	AEGBEST
27	ID	Commercial	Grocery-ID	New	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	\$17,053.75	\$	\$	51,693	0.0002	0.0002	14.1%	at Turnover	Retiro12Med	\$	29.09	7th Plan	7th Plan	7th Plan
28	ID	Commercial	Grocery-ID	New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$28,138.69	\$	\$	71,632	0.0002	0.0002	14.1%	at Turnover	Retiro12Med	\$	34.29	7th Plan	7th Plan	7th Plan
29	ID	Commercial	Grocery-ID	New	Interior Lighting	Light Emitting Diode LED Sign	Standard LED Sign	Enhanced LED Sign	15	\$223.19	\$	\$	0	0.0002	0.0002	21.0%	20.0%	Retiro12Med	\$	41,353.66	7th Plan	7th Plan	7th Plan
30	ID	Commercial	Grocery-ID	New	Interior Lighting	Interior Fluorescent - Bi-Le	Single Level Lighting Controls	Two Level Lighting Controls	16	\$91,851.92	\$	\$	26	0.0002	0.0002	7.6%	15.0%	Retiro12Med	\$	283,380.19	7th Plan	7th Plan	7th Plan
31	ID	Commercial	Grocery-ID	New	Interior Lighting	Interior Fluorescent - Dela	Over/Exit Fixture	Property LIT Fixture	11	\$156.50	\$	\$	4	0.0002	0.0002	17.6%	25.0%	Retiro12Med	\$	4,283.23	Illinois TRM	Illinois TRM	7th Plan
32	ID	Commercial	Grocery-ID	New	Exterior Lighting	Exterior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls	8.6	\$7,904.39	\$	\$	3,085	0.0001	0.0001	15.5%	25.0%	Retiro12Med	\$	288.24	7th Plan	7th Plan	7th Plan
33	ID	Commercial	Grocery-ID	New	Exterior Lighting	Photocell and/or Motion Based Controls	None	Photocell and/or Motion Based Controls	10	\$9,141.36	\$	\$	0	0.0001	0.0001	10.0%	10.0%	Retiro12Med	\$	394.87	7th Plan	7th Plan	7th Plan
34	ID	Commercial	Grocery-ID	New	Exterior Lighting	Exterior Lighting - Photo	None	Solar-Powered Unit Installed	29	\$60,621.85	\$	\$	29	0.0001	0.0001	15.7%	30.0%	Retiro12Med	\$	2,553,688.03	AEGBEST	AEGBEST	AEGBEST
35	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - Anti-Sweat	No Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$	\$	2	0.0002	0.0002	25.7%	75.0%	Retiro12Med	\$	86,955.90	RTF	RTF	7th Plan
36	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - Door Gasket	Standard Door Gasket	Improved Door Gasket	10	\$21.26	\$	\$	0	0.0002	0.0002	75.0%	20.0%	Retiro12Med	\$	62,132.02	RTF	RTF	7th Plan
37	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - Evaporator	Standard Fan Controls	LED Fan Controls	16	\$3,357.65	\$	\$	2	0.0002	0.0002	25.7%	75.0%	Retiro12Med	\$	188,767.17	7th Plan	7th Plan	7th Plan
38	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - Floating He	Fried Discharge Pressure Controls	Fixed Discharge Pressure Controls	15	\$14,471.14	\$	\$	21	0.0002	0.0002	1.1%	75.0%	Retiro12Med	\$	64,128.19	7th Plan	7th Plan	7th Plan
39	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - Strip Curtai	No Strip Curtains	Strip Curtains Installed	2	\$296.14	\$	\$	2	0.0002	0.0002	25.7%	75.0%	Retiro12Med	\$	9,620.10	7th Plan	7th Plan	7th Plan
40	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - High Efficiency	High Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$	\$	2	0.0002	0.0002	34.9%	20.0%	Retiro12Med	\$	62,132.02	AEGBEST	AEGBEST	AEGBEST
41	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - Variable Sp	Inefficient Compressor Loading	Variable Speed Compressor Loading	15	\$31,946.43	\$	\$	96	0.0002	0.0002	25.7%	75.0%	Retiro12Med	\$	30,289.37	DEER	DEER	AEGBEST
42	ID	Commercial	Grocery-ID	New	Refrigeration	Refrigeration - Demand De	Timer Based Defrost	Manual Defrost	10	\$51,331.29	\$	\$	76	0.0002	0.0002	33.1%	75.0%	Retiro12Med	\$	82,866.76	Vermont TRM	Vermont TRM	AEGBEST
43	ID	Commercial	Grocery-ID	New	Refrigeration	Grocery - Display Case - LI	Fluorescent Case Lighting	LED Case Lighting	6	\$7,382.93	\$	\$	29	0.0002	0.0002	6.0%	75.0%	Retiro12Med	\$	47,846.82	7th Plan	7th Plan	7th Plan
44	ID	Commercial	Grocery-ID	New	Refrigeration	Grocery - Display Case - Mo	Motion Sensor Controls	Motion Sensor Controls	15	\$26,261.00	\$	\$	31	0.0002	0.0002	75.0%	10.0%	Retiro12Med	\$	138,750.00	7th Plan	7th Plan	7th Plan
45	ID	Commercial	Grocery-ID	New	Refrigeration	Grocery - Open Display Ca	No Covers	Night Covers	5	\$233.37	\$	\$	7	0.0002	0.0002	6.0%	75.0%	Retiro12Med	\$	6,941.31	DEER	DEER	Illinois TRM
46	ID	Commercial	Grocery-ID	New	Refrigeration	Grocery - ECMs for Display	Standard Motors	ECM Motors	16	\$335.77	\$	\$	0	0.0002	0.0002	6.0%	75.0%	Retiro12Med	\$	1,587,101.96	7th Plan	7th Plan	7th Plan
47	ID	Commercial	Grocery-ID	New	Ventilation	Lighting and Occupancy	Standard Controls	Lighting and Occupancy Controls	16	\$809.75	\$	\$	0	0.0002	0.0002	6.0%	75.0%	Retiro12Med	\$	394.87	7th Plan	7th Plan	7th Plan
48	ID	Commercial	Grocery-ID	New	Ventilation	Cooking - Exhaust Hoods	Constant Speed Hoods	Demanded-Controlled Hoods	18	\$17,441.81	\$	\$	0	0.0002	0.0002	35.2%	50.0%	Retiro12Med	\$	1,150,460.35	7th Plan	7th Plan	7th Plan
49	ID	Commercial	Grocery-ID	New	Office Equipment	Office Equipment - Smart C	Manual Unit	LED Sensing Strip	4	\$3,676.29	\$	\$	3	0.0001	0.0002	10.6%	50.0%	Retiro12Med	\$	34,970.18	RTF	RTF	7th Plan
50	ID	Commercial	Grocery-ID	New	Cooling	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	15	\$26,261.00	\$	\$	35	0.0001	0.0001	0.0%	0.0%	Retiro12Med	\$	150,508.30	Illinois TRM	Illinois TRM	AEGBEST
51	ID	Commercial	Grocery-ID	New	Office Equipment	Occupancy Controls	Manual Controls	Occupancy Controls	15	\$26,261.00	\$	\$	35	0.0001	0.0001	0.0%	0.0%	Retiro12Med	\$	150,508.30	Illinois TRM	Illinois TRM	AEGBEST
52	ID	Commercial	Grocery-ID	New	Office Equipment	Data Center - Best Practi	Baseline Data Center	Best Practice Measures Installed	5	\$5,203.23	\$	\$	887	0.0001	0.0002	0.0%	0.0%	Retiro12Med	\$	15.84	7th Plan	7th Plan	7th Plan
53	ID	Commercial	Grocery-ID	New	Cooling	Data Center - Commercial	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$132.35	\$	\$	564	0.0003	0.0001	0.0%	0.0%	Retiro12Med	\$	3.78	7th Plan	7th Plan	7th Plan
54	ID																						

Measure										Assumptions in First Year (2015)										Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/unit)	Incremental O&M Costs (\$/Unit)	Annual Savings (\$/Unit)	Summer Coincident Peak (kW/MWh)	Winter Coincident Peak (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
1	ID	Commercial	College-ID	Existing	Cooling	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Rooftop Controller	15	\$3,480.26	\$ -	\$ -	4,514	0.0005	0.0001	15.4%	45.0%	Retiro	Retiro15low	\$	66.52	7th Plan	7th Plan	7th Plan	
2	ID	Commercial	College-ID	Existing	Cooling	RTU - Evaporative Precool	No Precooler	Precooler Installed	15	\$14,232.37	\$ -	\$ -	94	0.0005	0.0001	15.8%	75.0%	Retiro	Retiro15low	\$	264,769.80	DEER	DEER	7th Plan	
3	ID	Commercial	College-ID	Existing	Cooling	Ductless Mini Split Heat Pk	None	Installed	15	\$678,595.79	\$ -	\$ -	45	0.0005	0.0001	15.1%	25.0%	Retiro	Retiro5Med	\$	86,453.73	RTF	RTF	7th Plan	
4	ID	Commercial	College-ID	Existing	Heating	Ductless Mini Split Heat Pk	None	Installed	15	\$678,595.79	\$ -	\$ -	59	0.0005	0.0001	15.1%	25.0%	Retiro	Retiro5Med	\$	86,453.73	RTF	RTF	7th Plan	
5	ID	Commercial	College-ID	Existing	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$ -	\$ -	25,133	0.0005	0.0001	10.0%	10.0%	Retiro	Retiro20fast	\$	47.55	7th Plan	7th Plan	7th Plan	
6	ID	Commercial	College-ID	Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$ -	\$ -	10,972	-	0.0003	10.0%	10.0%	Retiro	Retiro20fast	\$	47.55	7th Plan	7th Plan	7th Plan	
7	ID	Commercial	College-ID	Existing	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$33,386.90	\$ -	\$ -	14,265	0.0001	0.0002	10.0%	10.0%	Retiro	Retiro20fast	\$	47.55	7th Plan	7th Plan	7th Plan	
8	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - Faucet Aeri	1.5 GPM Average Baseline	1.5 GPM Average Baseline	10	\$102.01	\$ -	\$ -	0	0.0002	0.0002	25.0%	65.0%	Retiro	Retiro20fast	\$	68,119.34	DEER	Illinois TRM	Illinois TRM	
9	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - Faucet Mo	Standard Faucet	Motion Sensor-Controlled Faucet	1	\$76.51	\$ -	\$ -	-	-	-	25.0%	65.0%	Retiro	Retiro20fast	\$	-	AEQ Research	AEQ Research	7th Plan	
10	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - Low-Flow	5.2 GPM Showerhead	1.5 GPM Showerhead	10	\$79.29	\$96.18	\$ -	-	-	-	0.0002	0.0003	25.0%	65.0%	Retiro	Retiro20fast	\$	(2,031,271.36)	RTF	7th Plan
11	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - High Efficiency	Standard Efficiency Pump	High Efficiency Pump	15	\$1,467.25	\$ -	\$ -	3	0.0002	0.0003	15.1%	25.0%	Retiro	Retiro20fast	\$	40,060.22	Hawaii TRM	Hawaii TRM		
12	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - Pipe Insula	Uninsulated Pipe	1.5" Insulation	15	\$75.75	\$ -	\$ -	-	-	-	0.0002	0.0003	25.0%	75.0%	Retiro	Retiro12Med	\$	6,686.94	Illinois TRM	7th Plan
13	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - Pre-Rinse	1.3 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve	4	\$1,361.68	\$897.43	\$ -	-	-	-	0.0002	0.0003	25.0%	65.0%	Retiro	Retiro12Med	\$	(3,698,437.05)	RTF	7th Plan
14	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - Temperature	Water Set at 135°F	Water Set at 120°F	2	\$198.11	\$ -	\$ -	3	0.0002	0.0003	15.8%	75.0%	Retiro	Retiro12Med	\$	29,809.20	Illinois TRM	Illinois TRM		
15	ID	Commercial	College-ID	Existing	Water Heating	Water Heater - Display Panel	Standard Electric Unit	SEF 2.5 Solar Unit	20	\$1,091.85	\$ -	\$ -	3	0.0002	0.0003	1.2%	15.0%	Retiro	Retiro12Med	\$	29,623.39	AEQ 2015	AEQ 2015		
16	ID	Commercial	College-ID	Existing	Interior Lighting	Interior Lighting - Networks	Standard Controls	Enhanced Controls	15	\$17,053.75	\$ -	\$ -	13,551	0.0002	0.0002	8.1%	at Turnover	Lost Opportunity	LO20fast	\$	111.34	7th Plan	7th Plan	7th Plan	
17	ID	Commercial	College-ID	Existing	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	\$28,138.69	\$ -	\$ -	18,701	0.0002	0.0002	8.2%	at Turnover	Lost Opportunity	LO20fast	\$	131.22	7th Plan	7th Plan	7th Plan	
18	ID	Commercial	College-ID	Existing	Interior Lighting	Interior Lighting - LED Cct	Baseline LED Sign	Light Emitting Capacitor Sign	8	\$21,232.73	\$ -	\$ -	0	0.0002	0.0002	2.1%	5.0%	Retiro	Retiro20fast	\$	162,667.17	7th Plan	7th Plan	7th Plan	
19	ID	Commercial	College-ID	Existing	Interior Lighting	Interior Lighting - Enhance	Single Level Lighting Controls	Two Level Lighting Controls	16	\$93,851.92	\$ -	\$ -	11	0.0001	0.0001	60.0%	60.0%	Retiro	Retiro12Med	\$	84,412.57	PC&E Workpaper	PC&E Workpaper		
20	ID	Commercial	College-ID	Existing	Interior Lighting	Interior Lighting - Overlit Fixture	Single Level Lighting Controls	Properly LR Emitting	11	\$156.50	\$ -	\$ -	1	0.0002	0.0002	17.6%	25.0%	Retiro	Retiro12Med	\$	13,933.77	7th Plan	Illinois TRM		
21	ID	Commercial	College-ID	Existing	Exterior Lighting	Exterior Lighting - Photo Node	Single Level Lighting Controls	Two Level Lighting Controls	8.6	\$3,278.78	\$ -	\$ -	753	0.0001	0.0001	15.5%	25.0%	Retiro	Retiro12Med	\$	521.55	7th Plan	Michigan Energy Measures Datab		
22	ID	Commercial	College-ID	Existing	Exterior Lighting	Exterior Lighting - Enhanced	Photocell and/or Motion Based Controls	Photocell and/or Motion Based Controls	8	\$7,282.73	\$ -	\$ -	11	0.0001	0.0001	60.0%	60.0%	Retiro	Retiro12Med	\$	84,412.57	PC&E Workpaper	PC&E Workpaper		
23	ID	Commercial	College-ID	Existing	Exterior Lighting	Exterior Lighting - Bi-Level	Single Level Lighting Controls	Solar-Wiring Unit Installed	7	\$446,635.31	\$ -	\$ -	13	0.0001	0.0001	15.5%	25.0%	Retiro	Retiro12Med	\$	4,620,671.14	AEQ Research	AEQ Research		
24	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Anti-Sweat	Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$ -	\$ -	0	0.0002	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	2,521,243.90	RTF	RTF		
25	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Door Gasket	Leaky Case Doors	Sealed Case Doors	4	\$126.26	\$ -	\$ -	0	0.0002	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	306,078.46	RTF	DEER		
26	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Evaporator	Load Based Fan Controls	Load Based Fan Controls	16	\$509.65	\$ -	\$ -	0	0.0002	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	709,263.19	7th Plan	7th Plan		
27	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Floating He	Web/Dash Brest Controls	Web/Dash Brest Controls	15	\$14,471.14	\$ -	\$ -	1	0.0002	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	1,409,965.39	7th Plan	7th Plan		
28	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Strip Curtai	No Strip Curtains	Strip Curtains Installed	2	\$296.14	\$ -	\$ -	0	0.0002	0.0002	0.4%	25.0%	Retiro	Retiro12Med	\$	1,059,407.47	7th Plan	7th Plan		
29	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - High Efficiency	High Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$ -	\$ -	0	0.0002	0.0002	25.0%	25.0%	Retiro	Retiro12Med	\$	1,131,212.00	RTF	AEQ 2015		
30	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Variable Sp	Inefficient Compressor Loading	Variable Speed Compressor Loading	15	\$31,946.53	\$ -	\$ -	4	0.0002	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	665,962.43	DEER	AEQ 2015		
31	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Demand Def	Timer Based Defrost	Demand Defrost	10	\$15,539.94	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	1,821,964.08	Vermont TRM	Vermont TRM		
32	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	6	\$1,107.44	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	2,002,741.30	7th Plan	7th Plan		
33	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Display Case - LE	Motion Based Controls	Motion Based Controls	6	\$75.74	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	5,777,898.00	7th Plan	7th Plan		
34	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Night Covers	No Covers	Night Covers	5	\$233.37	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	240,438.28	DEER	Illinois TRM		
35	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - ECMs for Display	Standard Motors	ECM Motors	16	\$335.77	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	66,431,882.53	7th Plan	7th Plan		
36	ID	Commercial	College-ID	Existing	Refrigeration	Refrigeration - Exhaust Ducts	Lighting and Compressor Controls	Lighting and Compressor Controls	15	\$396.58	\$ -	\$ -	0	0.0002	0.0002	0.0%	0.0%	Retiro	Retiro12Med	\$	720,120.00	7th Plan	Illinois TRM		
37	ID	Commercial	College-ID	Existing	Ventilation	Cooking - Exhaust Hood	Constant Speed Hoods	Constant Speed Hoods	18	\$17,441.81	\$ -	\$ -	0	0.0001	0.0002	25.4%	50.0%	Retiro	Retiro20fast	\$	5,015,487.60	7th Plan	Illinois TRM		
38	ID	Commercial	College-ID	Existing	Office Equipment	Office Equipment - Smart T	Standard Unit	Load Sensing Strip	4	\$3,676.29	\$ -	\$ -	6	0.0001	0.0002	10.6%	50.0%	Retiro	Retiro12Med	\$	143,600.91	RTF	RTF		
39	ID	Commercial	College-ID	Existing	Cooling	Office - Guest Room Con	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	19	0.0005	0.0001	0.0%	0.0%	Retiro	Retiro5Med	\$	9,999.00	Illinois TRM	AEQ-BEST		
40	ID	Commercial	College-ID	Existing	Interior Lighting	Guest Room Con	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	19	0.0005	0.0001	0.0%	0.0%	Retiro	Retiro5Med	\$	9,999.00	Illinois TRM	AEQ-BEST		
41	ID	Commercial	College-ID	Existing	Office Equipment	Data Center - Best Practi	Baseline Data Center	Best Practice Measures Installed	5	\$57.52	\$ -	\$ -	708	0.0005	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	16.17	7th Plan	7th Plan		
42	ID	Commercial	College-ID	Existing	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	393	0.0001	0.0001	0.0%	0.0%	Retiro	Retiro5Med	\$	1.37	7th Plan	7th Plan		
43	ID	Commercial	College-ID	Existing	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	211	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	1.37	7th Plan	7th Plan		
44	ID	Commercial	College-ID	Existing	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	1,006	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	1.37	7th Plan	7th Plan		
45	ID	Commercial	College-ID	Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$17.37	\$ -	\$ -	168	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	1.37	7th Plan	7th Plan		
46	ID	Commercial	College-ID	Existing	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$2.95	\$ -	\$ -	1,778	0.0005	0.0001	0.0%	0.0%	Retiro	Retiro5Med	\$	0.29	7th Plan	7th Plan		
47	ID	Commercial	College-ID	Existing	Office Equipment	Office Equipment - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$2.95	\$ -	\$ -	57	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro5Med	\$	0.29	7th Plan	7th Plan		
48	ID	Commercial	College-ID	Existing	Ventilation	Optimized Variable Volum	Constant Speed Hoods	Demand-Controlled Hoods	18	\$4,159.24	\$ -	\$ -	0	0.0001	0.0001	0.1%	5.0%	Retiro	Retiro5Med	\$	21,397,696.40	7th Plan	7th Plan		
49	ID	Commercial	College-ID	Existing	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	0	0.0002	0.0002	0.1%	5.0%	Retiro	Retiro20fast	\$	3,099,646.79	Ontario Power TRM	Ontario Power TRM		
50	ID	Commercial	College-ID	Existing	Cooling	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	40,871	0.0005	0.0001	0.0%	0.0%	Retiro	Retiro15low	\$	42.81	AEQ Research	AEQ Research		
51	ID	Commercial	College-ID	Existing	Heating	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	172,927	0.0005	0.0003	0.0%	0.0%	Retiro	Retiro15low	\$	70,281.81	AEQ Research	AEQ Research		
52	ID	Commercial	College-ID	Existing	Ventilation	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	23,614	0.0001	0.0002	0.0%	0.0%	Retiro	Retiro15low	\$	42.81	AEQ Research	AEQ Research		
53	ID	Commercial																							

Measure										Assumptions in First Year (2015)										Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
	ID	Commercial	College-ID	New	Water Heating	Water Heater - Pipe Insulation	Uninsulated Pipe	R-3.5 Insulation Installed		15	\$75.75	\$	\$	1	0.0002	0.0003	25.7%	75.0%	Retrofitted	Retrofitted2	\$	8,370.82	Illinois TRM	Illinois TRM	AEQ-BEST
	ID	Commercial	College-ID	New	Water Heating	Water Heater - Pre-Rinse	1.31 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve		4	\$1,361.68	\$ 897.43	\$	0	0.0002	0.0003	25.6%	65.0%	Retrofitted	Retrofitted2	\$	(3,563,851.21)	RTF	RTF	
	ID	Commercial	College-ID	New	Water Heating	Water Heater - Temperature	Water Set at 135°F	Water Set at 120°F		2	\$198.11	\$	\$	3	0.0002	0.0003	15.8%	75.0%	Retrofitted	Retrofitted2	\$	28,724.45	Illinois TRM	Illinois TRM	AEQ-BEST
	ID	Commercial	College-ID	New	Water Heating	Water Heater - Solar System	SET 2.5 Solar Unit	Standard Electric Unit		20	\$1,091.85	\$	\$	0	0.0002	0.0003	1.2%	1.2%	Retrofitted	Retrofitted2	\$	1,091.85	Illinois TRM	Illinois TRM	AEQ 2015
	ID	Commercial	College-ID	New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls		15	\$17,053.75	\$	\$	13,483	0.0002	0.0002	14.1%	at Turnover	Lost Opportunity	L020Fast	\$	111.12	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls		15	\$28,138.69	\$	\$	18,679	0.0002	0.0002	14.1%	at Turnover	Lost Opportunity	L020Fast	\$	130.96	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Interior Lighting	Interior Lighting - LED Exit	Baseline LED Sign	Light Emitting Capacitor Sign		15	\$221.19	\$	\$	0	0.0002	0.0002	2.1%	5.0%	Retrofitted	Retrofitted2	\$	162,551.13	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Interior Lighting	Interior Fluorescent - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls		16	\$91,851.92	\$	\$	0	0.0002	0.0002	7.6%	15.0%	Retrofitted	Retrofitted2	\$	912,104.31	Illinois TRM	Illinois TRM	Michigan Energy Measures Datab
	ID	Commercial	College-ID	New	Interior Lighting	Interior Fluorescent - Delta	Property LR Fixture	Property LR Fixture		11	\$156.50	\$	\$	1	0.0002	0.0002	17.6%	25.0%	Retrofitted	Retrofitted2	\$	13,756.02	Illinois TRM	Illinois TRM	Michigan Energy Measures Datab
	ID	Commercial	College-ID	New	Exterior Lighting	Exterior Lighting - Bi-Level	Single Level Lighting Controls	Two Level Lighting Controls		8.6	\$3,278.78	\$	\$	731	0.0001	0.0001	15.3%	25.0%	Retrofitted	Retrofitted2	\$	509.13	7th Plan	7th Plan	Michigan Energy Measures Datab
	ID	Commercial	College-ID	New	Exterior Lighting	Exterior Lighting - Enhanced	Standard Controls	Photocontrol and/or Motion Based Controls		8	\$7,282.73	\$	\$	11	0.0001	0.0001	60.0%	60.0%	Retrofitted	Retrofitted2	\$	8,407.56	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper
	ID	Commercial	College-ID	New	Exterior Lighting	Exterior Lighting - Photo	Standard Controls	Solar Powered Unit Installed		9	\$446,635.31	\$	\$	13	0.0001	0.0001	15.7%	30.0%	Retrofitted	Retrofitted2	\$	4,510,651.44	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Anti-Sweat	Non Anti-Sweat Heater Controls	Anti-Sweat Heater Controls		8	\$981.35	\$	\$	0	0.0002	0.0002	0.4%	25.0%	Retrofitted	Retrofitted2	\$	3,225,409.37	RTF	RTF	
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Door Gasket	Leaky Case Doors	Sealed Case Doors		4	\$121.26	\$	\$	0	0.0002	0.0002	0.4%	25.0%	Retrofitted	Retrofitted2	\$	607,812.84	RTF	RTF	
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Evaporator	Standard Controls	Load Based Fan Controls		16	\$503.65	\$	\$	0	0.0002	0.0002	0.4%	25.0%	Retrofitted	Retrofitted2	\$	945,322.21	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Floating Heat	Fixed Discharge Pressure Controls	Webtub Reset Controls		15	\$14,471.14	\$	\$	1	0.0002	0.0002	0.4%	25.0%	Retrofitted	Retrofitted2	\$	1,515,443.65	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Strip Curtains	No Strip Curtains	Strip Curtains Installed		2	\$296.14	\$	\$	0	0.0002	0.0002	0.4%	25.0%	Retrofitted	Retrofitted2	\$	1,202,472.64	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor		15	\$601.12	\$	\$	0	0.0002	0.0002	0.4%	25.0%	Retrofitted	Retrofitted2	\$	2,701,256.63	AEQ 2015	RTF	RTF
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Variable Speed	Inefficient Compressor Loading	Variable Speed Compressor Loading		15	\$31,946.43	\$	\$	4	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	715,792.49	DEER	DEER	AEQ 2015
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Demand Defrost	Timer Based Defrost	Demanded Defrost		10	\$51,331.29	\$	\$	3	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	1,958,263.60	Vermont TRM	Vermont TRM	AEQ 2015
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Strip Curtains	LED Case Lighting	LED Case Lighting		6	\$1,107.44	\$	\$	0	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	2,210,907.96	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Enhanced	Motion Based Controls	NIGHT Covers		8	\$75.74	\$	\$	0	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	4,377,576.04	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Open Display Case	No Covers	NIGHT Covers		5	\$233.37	\$	\$	0	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	257,485.88	DEER	DEER	Illinois TRM
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - ECMs for Display	Standard Motors	ECM Motors		16	\$337.77	\$	\$	0	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	73,338,869.78	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor		5	\$436.58	\$	\$	0	0.0002	0.0002	0.4%	25.0%	Retrofitted	Retrofitted2	\$	732,394.84	Illinois TRM	Illinois TRM	Illinois TRM
	ID	Commercial	College-ID	New	Refrigeration	Refrigeration - Variable Speed	Standard Controls	Demanded Controlled Hoods		17	\$1,441.81	\$	\$	0	0.0002	0.0002	35.2%	50.0%	Retrofitted	Retrofitted2	\$	9,412,074.41	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Office Equipment	Office Equipment - Smart	Standard Unit	Load Sensing Strip		4	\$3,676.29	\$	\$	9	0.0001	0.0002	10.6%	50.0%	Retrofitted	Retrofitted2	\$	10,340.54	RTF	RTF	
	ID	Commercial	College-ID	New	Cooling	Occupying - Guest Room	Manual Controls	Occupancy Controls		15	\$26,261.00	\$	\$	25	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
	ID	Commercial	College-ID	New	Cooling	Occupancy - Room Control	Manual Controls	Occupancy Controls		15	\$26,261.00	\$	\$	25	0.0002	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
	ID	Commercial	College-ID	New	Office Equipment	Data Center - Best Practice	Baseline Data Center	Best Practice Measures Installed		5	\$57.52	\$	\$	726	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	15.84	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Cooling	Data Center - Commercial	Commercially Available Measures Installed	Commercially Available Measures Installed		8	\$17.60	\$	\$	436	0.0005	0.0001	0.0%	0.0%	Retrofitted	Retrofitted2	\$	1.33	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Ventilation	Data Center - Commercial	Commercially Available Measures Installed	Commercially Available Measures Installed		8	\$17.60	\$	\$	207	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	1.33	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Ventilation	Data Center - Commercial	Commercially Available Measures Installed	Commercially Available Measures Installed		10	\$37.60	\$	\$	1,033	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	1.33	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed		8	\$17.60	\$	\$	172	0.0001	0.0002	0.0%	0.0%	Retrofitted	Retrofitted2	\$	1.33	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed		6	\$3.24	\$	\$	1,975	0.0002	0.0001	0.0%	0.0%	Retrofitted	Retrofitted2	\$	0.27	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Office Equipment	Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed		6	\$3.24	\$	\$	1,975	0.0002	0.0001	0.0%	0.0%	Retrofitted	Retrofitted2	\$	0.27	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Ventilation	Optimized Variable Volume	Constant Speed Hoods	Constant Speed Hoods		18	\$4,159.24	\$	\$	0	0.0001	0.0001	1.1%	5.0%	Retrofitted	Retrofitted2	\$	20,952,592.80	7th Plan	7th Plan	7th Plan
	ID	Commercial	College-ID	New	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls		10	\$86.76	\$	\$	0	0.0002	0.0002	0.1%	5.0%	Retrofitted	Retrofitted2	\$	2,596,119.56	Ontario Power TRM	Ontario Power TRM	7th Plan
	ID	Commercial	College-ID	New	Cooling	Advanced New Constructs	Standard Building Practices	LED Average Design		25	\$208,668.13	\$	\$	45,684	0.0002	0.0001	10.6%	50.0%	Retrofitted	Retrofitted2	\$	41.62	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Cooling	Advanced New Constructs	Standard Building Practices	LED Average Design		25	\$208,668.13	\$	\$	45,684	0.0002	0.0001	10.6%	50.0%	Retrofitted	Retrofitted2	\$	41.62	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Ventilation	Advanced New Constructs	Standard Building Practices	LED Average Design		25	\$208,668.13	\$	\$	23,440	0.0002	0.0002	10.6%	50.0%	Retrofitted	Retrofitted2	\$	41.62	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Water Heating	Advanced New Constructs	Standard Building Practices	LED Average Design		25	\$208,668.13	\$	\$	40,548	0.0002	0.0002	10.6%	50.0%	Retrofitted	Retrofitted2	\$	41.62	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Interior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design		25	\$208,668.13	\$	\$	25,970	0.0002	0.0002	19.9%	50.0%	Retrofitted	Retrofitted2	\$	41.62	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Interior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design		25	\$208,668.13	\$	\$	14,018	0.0002	0.0002	11.9%	50.0%	Retrofitted	Retrofitted2	\$	41.62	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Cooling	Strategic Energy Management	None	Implemented		3	\$4,455.96	\$	\$	6,827	0.0005	0.0001	3.4%	29.0%	Retrofitted	Retrofitted2	\$	27.58	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Heating	Strategic Energy Management	None	Implemented		3	\$4,455.96	\$	\$	26,688	0.0005	0.0001	3.4%	29.0%	Retrofitted	Retrofitted2	\$	27.58	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Interior Lighting	Strategic Energy Management	None	Implemented		3	\$4,455.96	\$	\$	3,463	0.0001	0.0002	3.4%	29.0%	Retrofitted	Retrofitted2	\$	27.58	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Water Heating	Strategic Energy Management	None	Implemented		3	\$4,455.96	\$	\$	6,054	0.0002	0.0003	3.4%	29.0%	Retrofitted	Retrofitted2	\$	27.58	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Interior Lighting	Strategic Energy Management	None	Implemented		3	\$4,455.96	\$	\$	3,914	0.0002	0.0001	9.9%	29.0%	Retrofitted	Retrofitted2	\$	27.58	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Exterior Lighting	Strategic Energy Management	None	Implemented		3	\$4,455.96	\$	\$	2,099	0.0001	0.0001	4.3%	29.0%	Retrofitted	Retrofitted2	\$	27.58	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Refrigeration	Strategic Energy Management	None	Implemented		3	\$4,455.96	\$	\$	421	0.0002	0.0002	29.0%	29.0%	Retrofitted	Retrofitted2	\$	27.58	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	College-ID	New	Office Equipment	Strategic Energy																			

Measure						Assumptions in First Year (2015)													Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$)	Average Annual Savings (kWh/Unit/Year)	Summer Coincident Peak Factor (kW/MW)	Winter Coincident Peak Factor (kW/MW)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
	ID	Commercial	School-ID	Existing	Exterior Lighting	Photovoltaic	None	Solar Powered Unit Installed	7	\$427,117.16	\$ -	\$ -	17	0.0001	0.0001	15.5%	25.0%	Retrofit	Retrol2Med	\$ 3,430,045.50	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Refrigeration	Anti-Sweat	None	Anti-Sweat Heater Controls	8	\$981.35	\$ -	\$ -	0	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 2,150,679.27	RTF	DEER	RTF
	ID	Commercial	School-ID	Existing	Refrigeration	Door Gasket	Leaky Case Doors	Sealed Case Doors	4	\$21.26	\$ -	\$ -	0	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 431,696.61	RTF	DEER	RTF
	ID	Commercial	School-ID	Existing	Refrigeration	Evaporator	Load-Balanced Fan Controls	Load-Balanced Fan Controls	16	\$503.65	\$ -	\$ -	0	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 8,020,988.68	RTF	DEER	7th Plan
	ID	Commercial	School-ID	Existing	Refrigeration	Floating He	Fixed Discharge Pressure Controls	Webbub Reset Controls	15	\$14,471.14	\$ -	\$ -	1	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 2,002,733.03	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Refrigeration	Strip Curtai	None	No Strip Curtains Installed	2	\$296.14	\$ -	\$ -	0	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 903,699.04	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Refrigeration	High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor	15	\$601.12	\$ -	\$ -	0	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 21,437,504.94	AEQ 2015	RTF	RTF
	ID	Commercial	School-ID	Existing	Refrigeration	Variable Speed	Variable Speed Compressor Loading	Variable Speed Compressor Loading	15	\$13,946.43	\$ -	\$ -	5	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 568,083.33	DEER	AEQ 2015	AEQ 2015
	ID	Commercial	School-ID	Existing	Refrigeration	Demand Def	Timer Based Defrost	Demand Defrost	10	\$15,539.94	\$ -	\$ -	0	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$ 1,554,177.43	Vermont TRM	Vermont TRM	AEQ 2015
	ID	Commercial	School-ID	Existing	Refrigeration	Display Case - LE	Fluorescent Case Lighting	LED Case Lighting	6	\$1,107.44	\$ -	\$ -	0	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$ 7,078,384.58	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Refrigeration	Display Case - Mo	Motor Based Controls	Motor Based Controls	8	\$75.74	\$ -	\$ -	0	0.0001	0.0001	10.0%	0.0%	Retrofit	Retrol2Med	\$ 4,522,999.15	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Refrigeration	Display Case - Mo	Night Covers	Night Covers	5	\$203.37	\$ -	\$ -	0	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$ 205,097.70	DEER	Illinois TRM	Illinois TRM
	ID	Commercial	School-ID	Existing	Refrigeration	ECMs for Display	Standard Motors	ECM Motors	16	\$335.77	\$ -	\$ -	0	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$ 56,667,929.90	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Refrigeration	Vending Machine - Occup	None	Lighting and Compressor Controls	15	\$511.81	\$ -	\$ -	0	0.0001	0.0001	0.4%	25.0%	Retrofit	Retrol2Med	\$ 614,306.19	Illinois TRM	Illinois TRM	Illinois TRM
	ID	Commercial	School-ID	Existing	Ventilation	Exhaust Hoods	Constant Speed Hoods	Demand Controlled Hoods	18	\$17,441.81	\$ -	\$ -	0	0.0001	0.0002	25.4%	50.0%	Retrofit	Retrol2Med	\$ 8,447,513.49	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Office Equipment	Office Equipment - Smart	Standard Unit	Low Sensing Strip	4	\$3,676.29	\$ -	\$ -	5	0.0000	0.0002	10.6%	50.0%	Retrofit	Retrol2Med	\$ 196,295.00	RTF	RTF	RTF
	ID	Commercial	School-ID	Existing	Cooling	Lodging - Guest Room	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	10	-	0.0003	0.0%	0.0%	Retrofit	Retrol2Med	\$ 9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
	ID	Commercial	School-ID	Existing	Heating	Lodging - Guest Room	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	10	-	0.0003	0.0%	0.0%	Retrofit	Retrol2Med	\$ 9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
	ID	Commercial	School-ID	Existing	Office Equipment	Office Equipment	Best Practice Measures Installed	Best Practice Measures Installed	5	\$90.39	\$ -	\$ -	993	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 15.17	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$12.20	\$ -	\$ -	209	-	-	0.0%	0.0%	Retrofit	Retrol2Med	\$ 1.17	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$12.20	\$ -	\$ -	112	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 1.17	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$12.20	\$ -	\$ -	965	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 1.17	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$12.20	\$ -	\$ -	236	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 1.17	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$16.2	\$ -	\$ -	948	-	-	0.0%	0.0%	Retrofit	Retrol2Med	\$ 0.28	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$16.2	\$ -	\$ -	80	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 0.28	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Ventilation	Variable Volume	Demand Controlled Hoods	Demand Controlled Hoods	15	\$4,159.24	\$ -	\$ -	0	0.0001	0.0001	0.1%	0.1%	Retrofit	Retrol2Med	\$ 40,274,039.98	7th Plan	7th Plan	7th Plan
	ID	Commercial	School-ID	Existing	Miscellaneous	Pump Pool - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	0	0.0000	0.0000	0.1%	5.0%	Retrofit	Retrol2Med	\$ 3,946,069.28	Ontario Power TRM	Ontario Power TRM	7th Plan
	ID	Commercial	School-ID	Existing	Cooling	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	21,689	-	-	0.0%	0.0%	Retrofit	Retrol15Low	\$ 69.00	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Cooling	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	21,689	-	-	0.0%	0.0%	Retrofit	Retrol15Low	\$ 69.00	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Ventilation	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	12,555	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol15Low	\$ 69.00	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Water Heating	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	21,229	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol15Low	\$ 69.00	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Interior Lighting	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	23,242	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol15Low	\$ 69.00	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Advanced New Lightin	Standard Building Practices	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	18,589	0.0000	0.0001	0.0%	0.0%	Retrofit	Retrol15Low	\$ 69.00	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Cooling	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	3,357	-	-	2.3%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Heating	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	15,573	-	-	2.3%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Ventilation	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	1,928	0.0001	0.0002	2.3%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Water Heating	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	1,285	0.0000	0.0002	2.3%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Interior Lighting	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	3,597	0.0000	0.0002	2.3%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Exterior Lighting	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	2,864	0.0001	0.0001	3.0%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Interior Lighting	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	942	0.0000	0.0001	2.3%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Office Equipment	Strategic Energy Managem	None	Implemented	3	\$1,689.45	\$ -	\$ -	1,314	0.0000	0.0002	2.3%	22.0%	Retrofit	Retrol2Med	\$ 17.09	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Cooling	Commissioning	None	Commissioned	3	\$2,206.81	\$ -	\$ -	4,648	-	-	0.0%	0.0%	Retrofit	Retrol2Med	\$ 18.37	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Heating	Commissioning	None	Commissioned	3	\$2,206.81	\$ -	\$ -	21,563	-	-	0.0%	0.0%	Retrofit	Retrol2Med	\$ 18.37	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Ventilation	Commissioning	None	Commissioned	3	\$2,206.81	\$ -	\$ -	2,469	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 18.37	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Water Heating	Commissioning	None	Commissioned	3	\$2,206.81	\$ -	\$ -	1,516	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 18.37	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$2,206.81	\$ -	\$ -	4,150	0.0000	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$ 18.37	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$2,206.81	\$ -	\$ -	3,320	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$ 18.37	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Refrigeration	Commissioning	None	Commissioned	3	\$2,206.81	\$ -	\$ -	2,173	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$ 18.37	AEQ Research	7th Plan	AEQ Research
	ID	Commercial	School-ID	Existing	Cooling	Retrocommissioning	None	Commissioned	3	\$9,733.07	\$ -	\$ -	4,602	-	-	10.6%	50.0%	Retrofit	Retrol2Med	\$ 81.04	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Heating	Retrocommissioning	None	Commissioned	3	\$9,733.07	\$ -	\$ -	21,379	-	-	10.6%	50.0%	Retrofit	Retrol2Med	\$ 81.04	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Ventilation	Retrocommissioning	None	Commissioned	3	\$9,733.07	\$ -	\$ -	2,415	0.0001	0.0002	10.6%	50.0%	Retrofit	Retrol2Med	\$ 81.04	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Water Heating	Retrocommissioning	None	Commissioned	3	\$9,733.07	\$ -	\$ -	1,506	0.0000	0.0002	10.6%	50.0%	Retrofit	Retrol2Med	\$ 81.04	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$9,733.07	\$ -	\$ -	4,130	0.0000	0.0002	20.2%	50.0%	Retrofit	Retrol2Med	\$ 81.04	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$9,733.07	\$ -	\$ -	3,284	0.0000	0.0001	11.9%	50.0%	Retrofit	Retrol2Med	\$ 81.04	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	School-ID	Existing	Refrigeration	Retrocommissioning	None	Commissioned	3	\$9,733.07</													

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Annual Average Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
ID	Commercial	School	ID	New	Refrigeration	Grocery - Open Display Case	No Covers	Night Covers	5	\$233.37	\$ -	\$ -	0	0.0001	0.0001	0.0%	0.0%	Retrol2Med	\$ 219,643.34	DEER	DEER	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Refrigeration	Grocery - ECMs for Display	Standard Motors	ECM Motors	16	\$335.77	\$ -	\$ -	0	0.0001	0.0001	0.0%	0.0%	Retrol2Med	\$ 62,559,193.12	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Refrigeration	Vending Machine - Occupancy	Standard Motors	Lighting and Compressor Controls	5	\$511.81	\$ -	\$ -	0	0.0001	0.0001	0.4%	25.0%	Retrol2Med	\$ 624,749.71	Illinois TRM	Illinois TRM	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Ventilation	Exhaust Hood - Demand Controlled Soods	Standard Unit	Demand Controlled Hoods	15	\$1,441.81	\$ -	\$ -	0	0.0002	0.0002	0.0%	50.0%	Retrol2Med	\$ 92,250,989.20	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Office Equipment	Office Equipment - Smart	Standard Unit	Load Sensing Strip	4	\$3,676.29	\$ -	\$ -	6	0.0000	0.0002	10.6%	50.0%	Retrol2Med	\$ 140,592.97	RTF	RTF	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Cooling	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	14	-	-	0.0%	0.0%	Retrol2Med	\$ 9,999.00	Illinois TRM	Illinois TRM	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Heating	Lodging - Guest Room Con	Manual Controls	Occupancy Controls	15	\$26,261.00	\$ -	\$ -	(34)	-	-	0.0%	0.0%	Retrol2Med	\$ 9,999.00	Illinois TRM	Illinois TRM	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Office Equipment	Best Practice	Baseline Data Center	Best Practice Measures Installed	5	\$80.39	\$ -	\$ -	0	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ -	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$114.42	\$ -	\$ -	235	-	-	0.0%	0.0%	Retrol2Med	\$ 1.09	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Ventilation	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$114.42	\$ -	\$ -	110	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$ 1.09	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$114.42	\$ -	\$ -	867	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ 1.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$114.42	\$ -	\$ -	241	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ 1.09	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$17.77	\$ -	\$ -	1,062	-	-	0.0%	0.0%	Retrol2Med	\$ 0.27	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$17.77	\$ -	\$ -	81	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ 0.27	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Ventilation	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	18,545	0.0001	0.0002	0.1%	50.0%	Retrol2Med	\$ 39,436,995.94	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	0	0.0000	0.0001	0.1%	5.0%	Retrol2Med	\$ 3,305,043.55	Ontario Power TRM	Ontario Power TRM	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Cooling	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	24,576	-	-	10.6%	50.0%	Retrol2Med	\$ 66.25	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Heating	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	105,244	0.0001	0.0002	10.6%	50.0%	Retrol2Med	\$ 66.25	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Ventilation	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	12,455	0.0001	0.0002	10.6%	50.0%	Retrol2Med	\$ 66.25	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Water Heating	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	21,974	0.0002	0.0002	10.6%	50.0%	Retrol2Med	\$ 66.25	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Interior Lighting	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	22,433	0.0000	0.0002	19.9%	50.0%	Retrol2Med	\$ 66.25	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Interior Lighting	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$208,668.13	\$ -	\$ -	18,545	0.0001	0.0001	21.9%	50.0%	Retrol2Med	\$ 66.25	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Cooling	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	3,645	-	-	2.3%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Heating	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	15,601	-	-	0.003	2.3%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan
ID	Commercial	School	ID	New	Ventilation	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	1,840	0.0001	0.0002	2.3%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Water Heating	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	1,271	0.0000	0.0002	2.3%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Interior Lighting	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	3,366	0.0000	0.0002	7.3%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Exterior Lighting	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	2,758	0.0001	0.0001	3.0%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Interior Lighting	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	1,204	0.0000	0.0002	2.3%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Office Equipment	Strategic Energy Managem	None	Implemented	3	\$1,915.22	\$ -	\$ -	1,841	0.0000	0.0002	2.3%	22.0%	Retrol2Med	\$ 18.22	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Cooling	Commissioning	None	Commissioned	3	\$2,391.77	\$ -	\$ -	5,083	-	-	10.9%	75.0%	Retrol2Med	\$ 18.86	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Heating	Commissioning	None	Commissioned	3	\$2,391.77	\$ -	\$ -	21,755	0.0000	0.0003	10.9%	75.0%	Retrol2Med	\$ 18.86	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Water Heating	Commissioning	None	Commissioned	3	\$2,391.77	\$ -	\$ -	2,566	0.0001	0.0002	10.9%	75.0%	Retrol2Med	\$ 18.86	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Water Heating	Commissioning	None	Commissioned	3	\$2,391.77	\$ -	\$ -	1,514	0.0000	0.0002	10.9%	75.0%	Retrol2Med	\$ 18.86	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Interior Lighting	Commissioning	None	Commissioned	3	\$2,391.77	\$ -	\$ -	3,902	0.0000	0.0002	26.1%	75.0%	Retrol2Med	\$ 18.86	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Exterior Lighting	Commissioning	None	Commissioned	3	\$2,391.77	\$ -	\$ -	3,201	0.0000	0.0002	26.1%	75.0%	Retrol2Med	\$ 18.86	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Refrigeration	Commissioning	None	Commissioned	3	\$2,391.77	\$ -	\$ -	1,812	0.0001	0.0001	18.8%	75.0%	Retrol2Med	\$ 18.86	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Cooling	Retroscreening	None	Commissioned	3	\$10,548.84	\$ -	\$ -	5,039	-	-	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Heating	Retroscreening	None	Commissioned	3	\$10,548.84	\$ -	\$ -	21,554	-	-	0.003	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan
ID	Commercial	School	ID	New	Ventilation	Retroscreening	None	Commissioned	3	\$10,548.84	\$ -	\$ -	2,528	0.0001	0.0002	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Water Heating	Retroscreening	None	Commissioned	3	\$10,548.84	\$ -	\$ -	1,508	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Interior Lighting	Retroscreening	None	Commissioned	3	\$10,548.84	\$ -	\$ -	3,880	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	School	ID	New	Exterior Lighting	Retroscreening	None	Commissioned	3	\$10,548.84	\$ -	\$ -	3,178	0.0001	0.0001	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	New	Refrigeration	Insulation - Ceiling	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	2,775	0.0001	0.0001	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Ceiling	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	43,592	0.0001	0.0001	15.5%	50.0%	Retrol2Med	\$ 23.54	RTF	RTF	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Ceiling	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	113,917	0.0000	0.0003	15.5%	50.0%	Retrol2Med	\$ 23.54	RTF	RTF	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Ceiling	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	32,138	0.0001	0.0001	15.5%	50.0%	Retrol2Med	\$ 23.54	RTF	RTF	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Cooling	Insulation - Ducting	R-8	Standard Roof	20	\$53,227.46	\$ -	\$ -	25,471	0.0001	0.0001	35.0%	35.0%	Retrol2Med	\$ -	DEER	DEER	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Ducting	R-8	Standard Roof	20	\$53,227.46	\$ -	\$ -	(25,832)	0.0000	0.0003	15.3%	35.0%	Retrol2Med	\$ -	DEER	DEER	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Ventilation	Insulation - Ducting	R-4	Standard Roof	8	\$8,337.27	\$ -	\$ -	11,057	0.0002	0.0001	15.3%	35.0%	Retrol2Med	\$ -	DEER	DEER	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Cool Roofs	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	11,057	0.0002	0.0001	15.3%	35.0%	Retrol2Med	\$ -	DEER	DEER	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Cool Roofs	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	1,508	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Cool Roofs	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	3,880	0.0000	0.0002	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Ventilation	Insulation - Cool Roofs	R-13	Standard Roof	45	\$83,940.24	\$ -	\$ -	3,178	0.0001	0.0001	0.0%	0.0%	Retrol2Med	\$ 83.17	7th Plan	7th Plan	Illinois TRM	7th Plan	
ID	Commercial	Health	ID	Existing	Heating	Insulation - Wall Cavity	R-9	Standard Roof	20															

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$/Year)	Annual Energy Savings (kWh/Unit/Year)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
	ID	Commercial	Health-ID	Existing	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$430.70	\$ -	\$ -	1,878	0.0001	0.0002	0.0%	0.0%	RetrosMed	\$	3.34	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	Existing	Cooling	Data Center - Commercial	Baseline Data Center	Cutting Edge Measures Installed	6	\$28.24	\$ -	\$ -	16,396	0.0002	0.0001	0.0%	0.0%	RetrosMed	\$	0.28	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	Existing	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$28.24	\$ -	\$ -	634	0.0001	0.0002	0.0%	0.0%	RetrosMed	\$	0.28	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	Existing	Cooling	Demand-Controlled Volumes	Baseline Data Center	Demand-Controlled Hoods	18	\$4,159.24	\$ -	\$ -	0	0.0001	0.0002	0.1%	0.1%	RetrosMed	\$	3,348.92	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	Existing	Miscellaneous	Pool Pump - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$ -	\$ -	0	0.0001	0.0002	0.1%	5.0%	RetrosMed	\$	5,157,312.51	Ontario Power TRM	Ontario Power TRM	7th Plan
	ID	Commercial	Health-ID	Existing	Cooling	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	380,315	0.0002	0.0001	0.0%	0.0%	Retros15low	\$	29.51	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Heating	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	994,131	0.0002	0.0001	0.0%	0.0%	Retros15low	\$	29.51	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Ventilation	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	278,416	0.0001	0.0002	0.0%	0.0%	Retros15low	\$	29.51	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Water Heating	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	366,303	0.0001	0.0002	0.0%	0.0%	Retros15low	\$	29.51	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Interior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	257,978	0.0001	0.0002	0.0%	0.0%	Retros15low	\$	29.51	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Exterior Lighting	Advanced New Constructs	Standard Building Practices	LED Average Design	25	\$1,043,340.65	\$ -	\$ -	48,644	0.0001	0.0001	0.0%	0.0%	Retros15low	\$	29.51	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Cooling	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	58,755	0.0001	0.0002	4.3%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Heating	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	153,699	0.0001	0.0003	4.3%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Ventilation	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	42,505	0.0001	0.0002	4.3%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Water Heating	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	57,046	0.0001	0.0002	4.3%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Interior Lighting	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	39,925	0.0001	0.0002	10.4%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Exterior Lighting	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	7,509	0.0001	0.0001	5.2%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Refrigeration	Strategic Energy Management	None	Implemented	3	\$47,290.02	\$ -	\$ -	8,059	0.0001	0.0002	4.3%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Office Equipment	Commissioning	None	Commissioned	3	\$47,290.02	\$ -	\$ -	10,719	0.0001	0.0002	4.3%	28.0%	Retros12Med	\$	41.79	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Cooling	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	81,353	0.0001	0.0001	0.0%	0.0%	Retros12Med	\$	46.32	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Heating	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	212,815	0.0001	0.0003	0.0%	0.0%	Retros12Med	\$	46.32	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Ventilation	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	58,853	0.0002	0.0002	0.0%	0.0%	Retros12Med	\$	46.32	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Water Heating	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	26,329	0.0001	0.0002	0.0%	0.0%	Retros12Med	\$	46.32	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	46,068	0.0001	0.0002	0.0%	0.0%	Retros12Med	\$	46.32	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	8,664	0.0001	0.0001	0.0%	0.0%	Retros12Med	\$	46.32	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Refrigeration	Commissioning	None	Commissioned	3	\$62,792.67	\$ -	\$ -	162,997	0.0001	0.0002	0.0%	0.0%	Retros12Med	\$	46.32	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Cooling	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	80,708	0.0002	0.0001	10.6%	50.0%	Retros12Med	\$	204.28	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Heating	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	217,077	0.0002	0.0003	10.6%	50.0%	Retros12Med	\$	204.28	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Ventilation	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	58,398	0.0001	0.0002	10.6%	50.0%	Retros12Med	\$	204.28	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Water Heating	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	26,112	0.0001	0.0002	10.6%	50.0%	Retros12Med	\$	204.28	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	45,797	0.0001	0.0002	20.2%	50.0%	Retros12Med	\$	204.28	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	8,600	0.0001	0.0001	11.9%	50.0%	Retros12Med	\$	204.28	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	Existing	Refrigeration	Retrocommissioning	None	Commissioned	3	\$276,945.87	\$ -	\$ -	180,450	0.0001	0.0002	10.6%	50.0%	Retros12Med	\$	204.28	AEQ Research	AEQ Research	AEQ Research
	ID	Commercial	Health-ID	New	Cooling	Insulation - Ceiling	R-13	R-38	45	\$83,940.24	\$ -	\$ -	44,475	0.0002	0.0001	74.4%	99.0%	Retros20	\$	23.46	RTF	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Heating	Insulation - Ceiling	R-13	R-38	45	\$83,940.24	\$ -	\$ -	115,119	0.0002	0.0003	75.4%	99.0%	Retros20	\$	23.46	RTF	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Ventilation	Insulation - Ceiling	R-13	R-38	45	\$83,940.24	\$ -	\$ -	26,013	0.0001	0.0002	75.4%	99.0%	Retros20	\$	23.46	RTF	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Cooling	Insulation - Ducting	R-8	R-8	20	\$53,227.46	\$ -	\$ -	14,122	0.0002	0.0001	15.3%	35.0%	Retros20	\$	15.36	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Heating	Insulation - Ducting	R-8	R-8	20	\$53,227.46	\$ -	\$ -	35,699	0.0001	0.0003	15.3%	35.0%	Retros20	\$	15.36	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Ventilation	Insulation - Ducting	R-4	R-4	20	\$53,227.46	\$ -	\$ -	8	0.0002	0.0001	15.3%	35.0%	Retros20	\$	15.36	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Building Shell - Cool Roofs	Standard Roof	Standard Roof	Cool Roof	20	\$49,593.04	\$ -	\$ -	664	0.0002	0.0001	45.1%	50.0%	Retros20	\$	10.42	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$49,593.04	\$ -	\$ -	982	0.0001	0.0003	45.1%	50.0%	Retros20	\$	10.42	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$49,593.04	\$ -	\$ -	45	0.0002	0.0001	45.1%	50.0%	Retros20	\$	10.42	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Cooling	Insulation - Wall Cavity	R-9	R-23	45	\$73,570.46	\$ -	\$ -	211	0.0002	0.0001	65.5%	99.0%	Retros20	\$	81.70	RTF	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Heating	Insulation - Wall Cavity	R-9	R-23	45	\$73,570.46	\$ -	\$ -	426	0.0001	0.0003	65.5%	99.0%	Retros20	\$	81.70	RTF	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Ventilation	Insulation - Wall Cavity	R-9	R-23	45	\$73,570.46	\$ -	\$ -	225	0.0001	0.0002	65.5%	99.0%	Retros20	\$	81.70	RTF	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Cooling	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$526.27	\$ -	\$ -	85	0.0002	0.0001	99.0%	99.0%	Retros20	\$	9,999.00	DEER	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Heating	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$526.27	\$ -	\$ -	263	0.0001	0.0003	99.0%	99.0%	Retros20	\$	9,999.00	DEER	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Ventilation	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$526.27	\$ -	\$ -	76	0.0002	0.0002	99.0%	99.0%	Retros20	\$	9,999.00	DEER	RTF	AEQ-BEST
	ID	Commercial	Health-ID	New	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$84,686.63	\$ -	\$ -	653	0.0002	0.0001	66.4%	66.4%	Retros15low	\$	502.39	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	New	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$84,686.63	\$ -	\$ -	8,053	0.0001	0.0003	66.4%	66.4%	Retros15low	\$	502.39	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	New	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$84,686.63	\$ -	\$ -	1,289	0.0001	0.0002	66.4%	66.4%	Retros15low	\$	502.39	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	New	Cooling	Chiller - Chilled Water Res	None	Enabled	10	\$2,426.31	\$ -	\$ -	2	0.0002	0.0001	15.4%	45.0%	Retros12Med	\$	128,870.35	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Cooling	Chiller - Chilled Water Res	Constant Flow	Variable Flow	15	\$231,116.66	\$ -	\$ -	1,135	0.0002	0.0001	15.4%	45.0%	Retros12Med	\$	14,914.99	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Chiller - Load Speed Fan	Part-Load Operation	Constant Temperature	Variable Temperature	15	\$14,819.04	\$ -	\$ -	28	0.0002	0.0001	15.4%	45.0%	Retros12Med	\$	46,445.02	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	\$2,426.31	\$ -	\$ -	2	0.0002	0.0001	15.8%	75.0%	Retros12Med	\$	95,691.29	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Cooling	HVAC - Economizer	None	Installed	10	\$117,045.85	\$ -	\$ -	540	0.0002	0.0001	50.1%	60.0%	Retros12Med	\$	21,231.07	DEER	DEER	AEQ-BEST
	ID	Commercial	Health-ID	New	Heating	Space Heating - Heat Recor	None	Installed	14	\$32,512.37	\$ -	\$ -	65,973	0.0001	0.0003	5.7%	10.0%	Retros12Med	\$	456.93	DEER	DEER	7th Plan
	ID	Commercial	Health-ID	New	Ventilation	ECM on VAV	None	Installed	15	\$61,201.13	\$ -	\$ -	39,421	0.0001	0.0002	15.3%	50.0%	Retros12Med	\$	130.01	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	New	Heating	Ventilation - Variable Sone	None	Installed	15	\$176,847	\$ -	\$ -	176,847	0.0002	0.0002	16.3%	50.0%	Retros12Med	\$	22,766.45	DEER	DEER	Illinois TRM
	ID	Commercial	Health-ID	New	Ventilation	Ventilation - Demand Cont	Standard	Demand-Controlled Fans	15	\$62,733.98	\$ -	\$ -	23,422	0.0001	0.0002	15.8%	75.0%	Retros12Med	\$	22,427	7th Plan	7th Plan	7th Plan
	ID	Commercial	Health-ID	New	Heating	Desaturation Fans (HVLS)	None	Installed	15	\$156,693.20	\$ -	\$ -	51	0.0002	0.0001	15.0%	15.0%	Retros12Med	\$</				

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$)	Annual Average Savings (kWh/Unit Gwetter)	Summer Coincident Peak Factor (kW/MW)	Winter Coincident Peak Factor (kW/MW)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
1	ID	Commercial	Health-ID	New	Cooling	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	57,848	0.0002	0.0001	4.3%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
2	ID	Commercial	Health-ID	New	Heating	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	149,347	0.0001	0.0003	4.3%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
3	ID	Commercial	Health-ID	New	Ventilation	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	33,394	0.0001	0.0002	4.3%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
4	ID	Commercial	Health-ID	New	Water Heating	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	56,108	0.0001	0.0002	4.3%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
5	ID	Commercial	Health-ID	New	Interior Lighting	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	37,965	0.0001	0.0002	10.4%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
6	ID	Commercial	Health-ID	New	Exterior Lighting	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	6,658	0.0001	0.0001	5.2%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
7	ID	Commercial	Health-ID	New	Refrigeration	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	7,774	0.0001	0.0002	4.3%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
8	ID	Commercial	Health-ID	New	Office Equipment	Strategic Energy Management	None	Implemented	3	\$46,355.85	\$ -	\$ -	13,381	0.0001	0.0002	4.3%	28.0%	Retrofit	Retrol2Med	\$	40.51	AEG Research	7th Plan	AEG Research
9	ID	Commercial	Health-ID	New	Cooling	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	80,671	0.0001	0.0001	10.9%	75.0%	Retrofit	Retrol2Med	\$	43.79	AEG Research	7th Plan	AEG Research
10	ID	Commercial	Health-ID	New	Heating	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	208,258	0.0001	0.0003	10.9%	75.0%	Retrofit	Retrol2Med	\$	43.79	AEG Research	7th Plan	AEG Research
11	ID	Commercial	Health-ID	New	Ventilation	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	46,568	0.0001	0.0002	10.9%	75.0%	Retrofit	Retrol2Med	\$	43.79	AEG Research	7th Plan	AEG Research
12	ID	Commercial	Health-ID	New	Water Heating	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	25,955	0.0001	0.0002	10.9%	75.0%	Retrofit	Retrol2Med	\$	43.79	AEG Research	7th Plan	AEG Research
13	ID	Commercial	Health-ID	New	Interior Lighting	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	44,004	0.0001	0.0002	26.1%	75.0%	Retrofit	Retrol2Med	\$	43.79	AEG Research	7th Plan	AEG Research
14	ID	Commercial	Health-ID	New	Exterior Lighting	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	7,726	0.0001	0.0001	13.2%	75.0%	Retrofit	Retrol2Med	\$	43.79	AEG Research	7th Plan	AEG Research
15	ID	Commercial	Health-ID	New	Refrigeration	Commissioning	None	Commissioned	3	\$59,389.11	\$ -	\$ -	18,152	0.0001	0.0002	10.9%	75.0%	Retrofit	Retrol2Med	\$	43.79	AEG Research	7th Plan	AEG Research
16	ID	Commercial	Health-ID	New	Cooling	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	79,946	0.0002	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$	193.12	AEG Research	7th Plan	AEG Research
17	ID	Commercial	Health-ID	New	Heating	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	206,400	0.0001	0.0003	0.0%	0.0%	Retrofit	Retrol2Med	\$	193.12	AEG Research	7th Plan	AEG Research
18	ID	Commercial	Health-ID	New	Ventilation	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	46,150	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$	193.12	AEG Research	7th Plan	AEG Research
19	ID	Commercial	Health-ID	New	Water Heating	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	25,845	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$	193.12	AEG Research	7th Plan	AEG Research
20	ID	Commercial	Health-ID	New	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	43,745	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$	193.12	AEG Research	7th Plan	AEG Research
21	ID	Commercial	Health-ID	New	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	7,668	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$	193.12	AEG Research	7th Plan	AEG Research
22	ID	Commercial	Health-ID	New	Refrigeration	Retrocommissioning	None	Commissioned	3	\$261,934.50	\$ -	\$ -	17,905	0.0001	0.0002	15.6%	50.0%	Retrofit	Retrol2Med	\$	193.12	AEG Research	7th Plan	AEG Research
23	ID	Commercial	Lodging-ID	Existing	Cooling	Insulation - Ceiling	R-13	None	45	\$161,850.22	\$ -	\$ -	36,624	0.0003	0.0000	15.5%	50.0%	Retrofit	Retrol2Med	\$	54.65	RTF	AEG-BEST	RTF
24	ID	Commercial	Lodging-ID	Existing	Heating	Insulation - Ceiling	R-13	None	45	\$161,850.22	\$ -	\$ -	98,855	-	0.0006	15.5%	50.0%	Retrofit	Retrol2Med	\$	54.65	RTF	AEG-BEST	RTF
25	ID	Commercial	Lodging-ID	Existing	Ventilation	Insulation - Ceiling	R-13	None	45	\$161,850.22	\$ -	\$ -	25,098	0.0001	0.0002	15.5%	50.0%	Retrofit	Retrol2Med	\$	54.65	RTF	AEG-BEST	RTF
26	ID	Commercial	Lodging-ID	Existing	Cooling	Insulation - Ducting	R-4	None	20	\$68,420.71	\$ -	\$ -	-	-	-	15.3%	35.0%	Retrofit	Retrol2Med	\$	-	DEER	AEG-BEST	DEER
27	ID	Commercial	Lodging-ID	Existing	Heating	Insulation - Ducting	R-4	None	20	\$68,420.71	\$ -	\$ -	-	-	-	15.3%	35.0%	Retrofit	Retrol2Med	\$	-	DEER	AEG-BEST	DEER
28	ID	Commercial	Lodging-ID	Existing	Ventilation	Insulation - Ducting	R-4	None	20	\$68,420.71	\$ -	\$ -	-	-	-	15.3%	35.0%	Retrofit	Retrol2Med	\$	-	DEER	AEG-BEST	DEER
29	ID	Commercial	Lodging-ID	Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	14,384	0.0003	0.0000	45.1%	50.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	AEG-BEST	DEER
30	ID	Commercial	Lodging-ID	Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	(25,810)	-	0.0006	45.1%	50.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	AEG-BEST	DEER
31	ID	Commercial	Lodging-ID	Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$ -	\$ -	272	0.0001	0.0002	45.1%	50.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	AEG-BEST	DEER
32	ID	Commercial	Lodging-ID	Existing	Cooling	Insulation - Wall Cavity	R-9	None	45	\$97,916.90	\$ -	\$ -	(708)	0.0003	0.0000	30.3%	50.0%	Retrofit	Retrol2Med	\$	1,173.11	RTF	AEG-BEST	RTF
33	ID	Commercial	Lodging-ID	Existing	Heating	Insulation - Wall Cavity	R-9	None	45	\$97,916.90	\$ -	\$ -	33	0.0001	0.0002	30.3%	50.0%	Retrofit	Retrol2Med	\$	1,173.11	RTF	AEG-BEST	RTF
34	ID	Commercial	Lodging-ID	Existing	Ventilation	Insulation - Wall Cavity	R-9	None	45	\$97,916.90	\$ -	\$ -	31	0.0001	0.0002	30.3%	50.0%	Retrofit	Retrol2Med	\$	1,173.11	RTF	AEG-BEST	RTF
35	ID	Commercial	Lodging-ID	Existing	Cooling	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	30.1%	35.0%	Retrofit	Retrol2Med	\$	-	DEER	AEG-BEST	RTF
36	ID	Commercial	Lodging-ID	Existing	Heating	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	30.1%	35.0%	Retrofit	Retrol2Med	\$	-	DEER	AEG-BEST	RTF
37	ID	Commercial	Lodging-ID	Existing	Ventilation	HVAC - Duct Leakage Reduc	20% Leakage	Sealed	18	\$256.60	\$ -	\$ -	-	-	-	30.1%	35.0%	Retrofit	Retrol2Med	\$	-	DEER	AEG-BEST	RTF
38	ID	Commercial	Lodging-ID	Existing	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	3,027	0.0003	0.0000	47.8%	47.8%	Retrofit	Retrol2Med	\$	1,128.57	7th Plan	7th Plan	7th Plan
39	ID	Commercial	Lodging-ID	Existing	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	38,962	0.0003	0.0006	47.8%	47.8%	Retrofit	Retrol2Med	\$	1,128.57	7th Plan	7th Plan	7th Plan
40	ID	Commercial	Lodging-ID	Existing	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$ -	\$ -	6,959	0.0003	0.0002	47.8%	47.8%	Retrofit	Retrol2Med	\$	1,128.57	7th Plan	7th Plan	7th Plan
41	ID	Commercial	Lodging-ID	Existing	Cooling	Chiller - Chilled Water Res	None	Enabled	10	\$1,183.02	\$ -	\$ -	0	0.0003	0.0000	15.4%	45.0%	Retrofit	Retrol2Med	\$	639,157.00	DEER	AEG-BEST	DEER
42	ID	Commercial	Lodging-ID	Existing	Heating	Chiller - Chilled Water Res	Constant Flow	Variable Flow	15	\$112,088.02	\$ -	\$ -	122	0.0003	0.0000	15.4%	45.0%	Retrofit	Retrol2Med	\$	80,594.37	DEER	AEG-BEST	DEER
43	ID	Commercial	Lodging-ID	Existing	Ventilation	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	15	\$7,060.67	\$ -	\$ -	3	0.0003	0.0000	15.5%	50.0%	Retrofit	Retrol2Med	\$	186,073.80	DEER	AEG-BEST	DEER
44	ID	Commercial	Lodging-ID	Existing	Cooling	HVAC - Economizer	Constant Temperature	Variable Temperature	10	\$1,183.02	\$ -	\$ -	0	0.0003	0.0000	15.4%	45.0%	Retrofit	Retrol2Med	\$	1,183.02	DEER	AEG-BEST	DEER
45	ID	Commercial	Lodging-ID	Existing	Heating	HVAC - Economizer	Constant Temperature	Variable Temperature	10	\$57,069.29	\$ -	\$ -	47	0.0003	0.0000	45.2%	60.0%	Retrofit	Retrol2Med	\$	141,540.00	DEER	AEG-BEST	DEER
46	ID	Commercial	Lodging-ID	Existing	Ventilation	Space Heating - Heat Recor	None	Installed	14	\$166,342.30	\$ -	\$ -	15,431	-	-	2.8%	10.0%	Retrofit	Retrol2Med	\$	1,026.63	DEER	AEG-BEST	DEER
47	ID	Commercial	Lodging-ID	Existing	Heating	Ventilation - ECM on VAV	None	Installed	15	\$40,620.63	\$ -	\$ -	11,675	0.0001	0.0002	15.5%	50.0%	Retrofit	Retrol2Med	\$	270.55	DEER	AEG-BEST	DEER
48	ID	Commercial	Lodging-ID	Existing	Ventilation	Ventilation - Variable Speed	None	Installed	15	\$57,246.00	\$ -	\$ -	57,246	0.0002	0.0002	2.8%	10.0%	Retrofit	Retrol2Med	\$	46,159.19	DEER	AEG-BEST	DEER
49	ID	Commercial	Lodging-ID	Existing	Ventilation	Ventilation - Demand Cont	Standard	Demand Controlled Fans	15	\$40,307.53	\$ -	\$ -	7,697	0.0001	0.0002	15.8%	75.0%	Retrofit	Retrol2Med	\$	454.72	7th Plan	7th Plan	7th Plan
50	ID	Commercial	Lodging-ID	Existing	Heating	Desatratification Fans (MVs)	None	Installed	15	\$100,709.85	\$ -	\$ -	3	0.0003	0.0000	15.0%	15.0%	Retrofit	Retrol2Med	\$	477,900.81	AEG Research	AEG Research	AEG Research
51	ID	Commercial	Lodging-ID	Existing	Heating	Desatratification Fans (MVs)	None	Installed	15	\$100,709.85	\$ -	\$ -	3	0.0003	0.0000	15.0%	15.0%	Retrofit	Retrol2Med	\$	477,900.81	AEG Research	AEG Research	AEG Research
52	ID	Commercial	Lodging-ID	Existing	Cooling	RTU - Maintenance	RTU with Constant Speed Fan	Turned Up Unit	10	\$16,186.31	\$ -	\$ -	55	0.0003	0.0000	15.4%	25.0%	Retrofit	Retrol2Med	\$	96,497.10	Illinois TRM	Illinois TRM	Illinois TRM
53	ID	Commercial	Lodging-ID	Existing	Cooling																			

Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	7th Plan Measure Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
1	ID	Commercial	Lodging-ID	Existing	Water Heating	Commissioning	None	Commissioned	3	\$9,495.08	\$	\$	21,337	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$9,495.08	\$	\$	9,818	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$9,495.08	\$	\$	7,818	0.0001	0.0001	0.0%	0.0%	Retrofit	Retrol2Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Refrigeration	Commissioning	None	Commissioned	3	\$9,495.08	\$	\$	15,633	0.0001	0.0002	0.0%	0.0%	Retrofit	Retrol2Med	\$	20.82	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Cooling	Retroc Commissioning	None	Commissioned	3	\$41,877.86	\$	\$	22,579	0.0003	0.0000	10.6%	50.0%	Retrofit	Retrol2Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Heating	Retroc Commissioning	None	Commissioned	3	\$41,877.86	\$	\$	60,833	-	0.0006	10.6%	50.0%	Retrofit	Retrol2Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Ventilation	Retroc Commissioning	None	Commissioned	3	\$41,877.86	\$	\$	15,152	0.0001	0.0002	10.6%	50.0%	Retrofit	Retrol2Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Water Heating	Commissioning	None	Commissioned	3	\$41,877.86	\$	\$	21,337	0.0001	0.0002	10.6%	50.0%	Retrofit	Retrol2Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Interior Lighting	Retroc Commissioning	None	Commissioned	3	\$41,877.86	\$	\$	9,818	0.0001	0.0002	20.2%	50.0%	Retrofit	Retrol2Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Exterior Lighting	Retroc Commissioning	None	Commissioned	3	\$41,877.86	\$	\$	7,788	0.0001	0.0001	11.9%	50.0%	Retrofit	Retrol2Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	Existing	Refrigeration	Retroc Commissioning	None	Commissioned	3	\$41,877.86	\$	\$	15,633	0.0001	0.0002	10.6%	50.0%	Retrofit	Retrol2Med	\$	91.83	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Cooling	Insulation - Ceiling	R-13	R-13	45	\$161,850.22	\$	\$	42,854	0.0003	0.0000	75.4%	99.0%	Retrofit	Retrol2Med	\$	52.58	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	Insulation - Ceiling	R-13	R-13	45	\$161,850.22	\$	\$	99,157	-	0.0006	75.4%	99.0%	Retrofit	Retrol2Med	\$	52.58	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Ventilation	Insulation - Ceiling	R-13	R-13	45	\$161,850.22	\$	\$	24,175	0.0001	0.0002	75.4%	99.0%	Retrofit	Retrol2Med	\$	52.58	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Cooling	Insulation - Ducting	R-4	R-4	20	\$68,420.71	\$	\$	-	-	-	15.3%	35.0%	Retrofit	Retrol2Med	\$	52.58	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	Insulation - Ducting	R-4	R-4	20	\$68,420.71	\$	\$	-	-	-	15.3%	35.0%	Retrofit	Retrol2Med	\$	52.58	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Ventilation	Insulation - Ducting	R-4	R-4	20	\$68,420.71	\$	\$	-	-	-	15.3%	35.0%	Retrofit	Retrol2Med	\$	52.58	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$	\$	7,022	0.0003	0.0000	45.1%	50.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$	\$	25,800	0.0006	0.0006	45.1%	50.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20	\$63,748.87	\$	\$	1,223	0.0001	0.0002	45.1%	50.0%	Retrofit	Retrol2Med	\$	9,999.00	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Cooling	Insulation - Wall Cavity	R-9	R-9	45	\$97,916.90	\$	\$	146	0.0003	0.0000	65.5%	99.0%	Retrofit	Retrol2Med	\$	6,683.59	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	Insulation - Wall Cavity	R-9	R-9	45	\$97,916.90	\$	\$	897	0.0001	0.0002	65.5%	99.0%	Retrofit	Retrol2Med	\$	6,683.59	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Ventilation	Insulation - Wall Cavity	R-9	R-9	45	\$97,916.90	\$	\$	16	0.0001	0.0002	65.5%	99.0%	Retrofit	Retrol2Med	\$	6,683.59	RTF	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$	\$	-	-	-	99.0%	99.0%	Retrofit	Retrol2Med	\$	-	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$	\$	-	-	-	99.0%	99.0%	Retrofit	Retrol2Med	\$	-	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$256.60	\$	\$	-	-	-	99.0%	99.0%	Retrofit	Retrol2Med	\$	-	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$	\$	3,426	0.0003	0.0000	66.4%	66.4%	Retrofit	Retrol15w	\$	1,117.11	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$	\$	37,849	0.0001	0.0006	66.4%	66.4%	Retrofit	Retrol15w	\$	1,117.11	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$901,693.68	\$	\$	6,537	0.0001	0.0002	66.4%	66.4%	Retrofit	Retrol15w	\$	1,117.11	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Cooling	Chiller - Chilled Water Res	None	Enabled	10	\$118,182.02	\$	\$	0	0.0003	0.0000	15.4%	45.0%	Retrofit	Retrol2Med	\$	587,223.35	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	Chiller - Chilled Water Res	None	Enabled	10	\$118,182.02	\$	\$	129	0.0003	0.0000	15.4%	45.0%	Retrofit	Retrol2Med	\$	74,045.70	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Cooling	Chiller - Variable Speed Fa	Constant Flow	Part-Load Operation	15	\$7,060.67	\$	\$	4	0.0003	0.0000	15.5%	50.0%	Retrofit	Retrol2Med	\$	170,954.45	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	Chiller - Variable Speed Fa	Constant Flow	Part-Load Operation	15	\$7,060.67	\$	\$	4	0.0003	0.0000	15.5%	50.0%	Retrofit	Retrol2Med	\$	170,954.45	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Cooling	Variable Speed Chiller - Con	None	Variable Temperature	10	\$118,182.02	\$	\$	0	0.0003	0.0000	15.8%	50.0%	Retrofit	Retrol2Med	\$	432,957.32	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Heating	HVAC - Economizer	None	Installed	10	\$57,069.29	\$	\$	20	0.0003	0.0000	15.1%	60.0%	Retrofit	Retrol2Med	\$	323,010.51	DEER	7th Plan	AEQ-BEST
1	ID	Commercial	Lodging-ID	New	Ventilation	Space Heating - Heat Recor	None	Installed	14	\$166,342.30	\$	\$	14,973	-	0.0006	5.7%	10.0%	Retrofit	Retrol2Med	\$	1,022.39	DEER	7th Plan	7th Plan
1	ID	Commercial	Lodging-ID	New	Heating	Ventilation - ECM on VAV	None	Installed	15	\$40,620.63	\$	\$	0	0.0003	0.0000	15.6%	27.0%	Retrofit	Retrol2Med	\$	278.24	DEER	7th Plan	7th Plan
1	ID	Commercial	Lodging-ID	New	Ventilation	Ventilation - Variable Spee	None	Installed	15	\$48,815.00	\$	\$	5,815	0.0001	0.0002	16.3%	50.0%	Retrofit	Retrol2Med	\$	47,418.36	DEER	7th Plan	7th Plan
1	ID	Commercial	Lodging-ID	New	Ventilation	Ventilation - Demand Con	Standard	Demand Controlled Fans	15	\$40,307.53	\$	\$	7,247	0.0001	0.0002	15.8%	75.0%	Retrofit	Retrol2Med	\$	467.12	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Cooling	Destrafficking Fans (HVLS)	None	Installed	15	\$100,709.85	\$	\$	3	0.0003	0.0000	15.0%	15.0%	Retrofit	Retrol2Med	\$	462,705.01	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Heating	Destrafficking Fans (HVLS)	None	Installed	15	\$100,709.85	\$	\$	3	0.0003	0.0000	15.0%	15.0%	Retrofit	Retrol2Med	\$	462,705.01	AEQ Research	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Cooling	RTU - Maintenance	Standard Unit	Turned Up Unit	3	\$16,186.31	\$	\$	64	0.0003	0.0000	15.1%	25.0%	Retrofit	Retrol20Fast	\$	81,718.93	Illinois TRM	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Cooling	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Rooftop Controller	15	\$11,184.17	\$	\$	18,890	0.0003	0.0000	15.4%	45.0%	Retrofit	Retrol35w	\$	52.99	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Cooling	RTU - Advanced Controls	No Precooler	Precooler Installed	15	\$15,236.17	\$	\$	127	0.0003	0.0000	15.8%	75.0%	Retrofit	Retrol35w	\$	210,914.87	DEER	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Heating	RTU - Advanced Controls	No Precooler	Precooler Installed	15	\$15,236.17	\$	\$	127	0.0003	0.0000	15.8%	75.0%	Retrofit	Retrol35w	\$	210,914.87	DEER	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$1,503,955.46	\$	\$	571	-	0.0006	15.5%	50.0%	Retrofit	Retrol5Med	\$	147,586.00	RTF	7th Plan	7th Plan
1	ID	Commercial	Lodging-ID	New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$107,292.14	\$	\$	74,178	0.0003	0.0000	5.0%	5.0%	Retrofit	Retrol2Med	\$	77.27	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$107,292.14	\$	\$	74,178	0.0003	0.0000	5.0%	5.0%	Retrofit	Retrol2Med	\$	77.27	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$107,292.14	\$	\$	41,364	0.0001	0.0002	5.0%	5.0%	Retrofit	Retrol2Med	\$	77.27	7th Plan	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Water Heating	Water Heater - Faucet Aer	1.39 GPM Average Baseline	0.94 GPM Unit	10	\$102.01	\$	\$	0	0.0001	0.0002	25.6%	65.0%	Retrofit	Retrol20Fast	\$	27,511.93	AEQ Research	7th Plan	Illinois TRM
1	ID	Commercial	Lodging-ID	New	Water Heating	Water Heater - Faucet Aer	1.39 GPM Average Baseline	Smart Sensor-Controlled Faucet	3	\$76.51	\$	\$	-	-	-	25.6%	65.0%	Retrofit	Retrol20Fast	\$	27,511.93	AEQ Research	7th Plan	Illinois TRM
1	ID	Commercial	Lodging-ID	New	Water Heating	Water Heater - Low Flow S	1.5 GPM Showerhead	1.5 GPM Showerhead	0	\$0.00	\$	\$	96.18	0.0001	0.0002	25.6%	65.0%	Retrofit	Retrol20Fast	\$	851,367.81	RTF	7th Plan	AEQ Research
1	ID	Commercial	Lodging-ID	New	Water Heating	Water Heater - High Effici	Standard Efficiency Pump	High Efficiency Pump	15	\$11,249.57	\$	\$	61	0.0001	0.0002	15.1%	25.0%							

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/Unit	Incremental O&M Costs (\$)	Average Annual Savings (kWh/Unit Greater)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
	ID	Commercial	Warehouse - ID Existing	Cooling	Insulation - Ceiling	R-13	R-38	45 \$100,728.29	\$ -	-	-	29,021	-	-	15.5%	50.0%	Retrofit	RetroIven20	\$ 46.33	RTF	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	Insulation - Ceiling	R-13	R-38	45 \$100,728.29	\$ -	-	-	84,501	-	0.0005	15.5%	50.0%	Retrofit	RetroIven20	\$ 46.33	RTF	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Insulation - Ceiling	R-13	R-38	45 \$100,728.29	\$ -	-	-	4,737	0.0001	0.0002	15.5%	50.0%	Retrofit	RetroIven20	\$ 46.33	RTF	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	Insulation - Ducting	R-4	R-8	20 \$42,581.97	\$ -	-	-	5,795	-	-	15.3%	35.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	Insulation - Ducting	R-4	R-8	20 \$42,581.97	\$ -	-	-	(22,015)	-	0.0005	15.3%	35.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Insulation - Ducting	R-4	R-8	20 \$42,581.97	\$ -	-	-	43	0.0001	0.0002	15.3%	35.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20 \$39,674.43	\$ -	-	-	11,447	-	-	45.1%	50.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20 \$39,674.43	\$ -	-	-	(22,005)	-	0.0005	45.1%	50.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Building Shell - Cool Roofs	Standard Roof	Cool Roof	20 \$39,674.43	\$ -	-	-	51	0.0001	0.0002	45.1%	50.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	Insulation - Wall Cavity	R-9	R-23	45 \$34,380.27	\$ -	-	-	(2,017)	-	-	30.3%	50.0%	Retrofit	RetroIven20	\$ 109.74	RTF	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	Insulation - Wall Cavity	R-9	R-23	45 \$34,380.27	\$ -	-	-	18,806	-	-	30.3%	50.0%	Retrofit	RetroIven20	\$ 109.74	RTF	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Insulation - Wall Cavity	R-9	R-23	45 \$34,380.27	\$ -	-	-	241	0.0001	0.0002	30.3%	50.0%	Retrofit	RetroIven20	\$ 109.74	RTF	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18 \$115.78	\$ -	-	-	(1)	-	-	30.1%	35.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18 \$115.78	\$ -	-	-	(27)	-	0.0005	30.1%	35.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18 \$115.78	\$ -	-	-	3	0.0001	0.0002	30.1%	35.0%	Retrofit	RetroIven20	\$ 9,999.00	DEER	RTF	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30 \$39,574.98	\$ -	-	-	169	-	-	47.8%	47.8%	Retrofit	RetroI55w	\$ 936.31	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30 \$39,574.98	\$ -	-	-	2,339	-	0.0005	47.8%	47.8%	Retrofit	RetroI55w	\$ 936.31	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30 \$39,574.98	\$ -	-	-	92	0.0001	0.0002	47.8%	47.8%	Retrofit	RetroI55w	\$ 936.31	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Cooling	Chiller - Chilled Water Vari	Constant Flow	Variable Flow	15 \$50,845.66	\$ -	-	-	120	-	-	15.4%	45.0%	Retrofit	RetroI2Med	\$ 3,642.18	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	Chiller - Chilled Water Vari	Constant Flow	Variable Flow	15 \$50,845.66	\$ -	-	-	120	-	-	15.4%	45.0%	Retrofit	RetroI2Med	\$ 3,642.18	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Chiller - Chilled Water Vari	Constant Flow	Variable Flow	15 \$50,845.66	\$ -	-	-	120	-	-	15.4%	45.0%	Retrofit	RetroI2Med	\$ 3,642.18	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	HVAC - Economizer	None	Installed	10 \$25,750.09	\$ -	-	-	88	-	-	45.2%	60.0%	Retrofit	RetroI2Med	\$ 31,467.45	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	HVAC - Economizer	None	Installed	10 \$25,750.09	\$ -	-	-	88	-	-	45.2%	60.0%	Retrofit	RetroI2Med	\$ 31,467.45	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	HVAC - Economizer	None	Installed	10 \$25,750.09	\$ -	-	-	88	-	-	45.2%	60.0%	Retrofit	RetroI2Med	\$ 31,467.45	DEER	DEER	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	Space Heating - Heat Reco	None	Installed	13 \$31,057.19	\$ -	-	-	3,937	-	0.0005	2.8%	10.0%	Retrofit	RetroI2Med	\$ 750.25	DEER	DEER	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Heating	Space Heating - Heat Reco	None	Installed	13 \$31,057.19	\$ -	-	-	3,937	-	0.0005	2.8%	10.0%	Retrofit	RetroI2Med	\$ 750.25	DEER	DEER	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Space Heating - Heat Reco	None	Installed	13 \$31,057.19	\$ -	-	-	3,937	-	0.0005	2.8%	10.0%	Retrofit	RetroI2Med	\$ 750.25	DEER	DEER	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Cooling	Destraffication Fans (VFDs)	None	Installed	15 \$62,677.28	\$ -	-	-	2	-	-	15.8%	75.0%	Retrofit	RetroI2Med	\$ 352,242.03	AEQ Research	AEQ Research	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Heating	Destraffication Fans (VFDs)	None	Installed	15 \$62,677.28	\$ -	-	-	2	-	-	15.8%	75.0%	Retrofit	RetroI2Med	\$ 352,242.03	AEQ Research	AEQ Research	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Destraffication Fans (VFDs)	None	Installed	15 \$62,677.28	\$ -	-	-	2	-	-	15.8%	75.0%	Retrofit	RetroI2Med	\$ 352,242.03	AEQ Research	AEQ Research	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Cooling	RTU - Maintenance	Standard Unit	Turned Up Unit	3 \$7,303.38	\$ -	-	-	29	-	-	15.1%	25.0%	Retrofit	RetroI20Fast	\$ 82,843.09	Illinois TRM	Illinois TRM	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Heating	RTU - Advanced Controls	RTU with Constant Speed Fan	None	Installed	15 \$6,960.52	\$ -	-	11,582	-	-	15.4%	45.0%	Retrofit	RetroI35w	\$ 53.72	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Ventilation	RTU - Advanced Controls	RTU with Constant Speed Fan	None	Installed	15 \$6,960.52	\$ -	-	11,582	-	-	15.4%	45.0%	Retrofit	RetroI35w	\$ 53.72	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Cooling	RTU - Evaporator Precool	No Precool	Precool	15 \$42,232.37	\$ -	-	-	57	-	-	15.8%	75.0%	Retrofit	RetroI55w	\$ 213,816.30	DEER	DEER	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Heating	RTU - Evaporator Precool	No Precool	Precool	15 \$42,232.37	\$ -	-	-	57	-	-	15.8%	75.0%	Retrofit	RetroI55w	\$ 213,816.30	DEER	DEER	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Ventilation	RTU - Evaporator Precool	No Precool	Precool	15 \$42,232.37	\$ -	-	-	57	-	-	15.8%	75.0%	Retrofit	RetroI55w	\$ 213,816.30	DEER	DEER	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Cooling	Ductless Mini Split Heat Pu	None	Installed	15 \$678,995.79	\$ -	-	-	1	-	-	15.1%	25.0%	Retrofit	RetroI5Med	\$ 117,880.75	RTF	RTF	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Heating	Ductless Mini Split Heat Pu	None	Installed	15 \$678,995.79	\$ -	-	-	1	-	-	15.1%	25.0%	Retrofit	RetroI5Med	\$ 117,880.75	RTF	RTF	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Ductless Mini Split Heat Pu	None	Installed	15 \$678,995.79	\$ -	-	-	1	-	-	15.1%	25.0%	Retrofit	RetroI5Med	\$ 117,880.75	RTF	RTF	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5 \$66,773.80	\$ -	-	-	51,574	-	-	10.0%	10.0%	Retrofit	RetroIven20	\$ 68.08	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Heating	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5 \$66,773.80	\$ -	-	-	51,574	-	-	10.0%	10.0%	Retrofit	RetroIven20	\$ 68.08	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5 \$66,773.80	\$ -	-	-	51,574	-	-	10.0%	10.0%	Retrofit	RetroIven20	\$ 68.08	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Cooling	Water Heater - Faucet Aer	1.3 GPM Average Baseline	0.94 GPM Unit	10 \$102.01	\$ -	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI20Fast	\$ 332,024.67	DEER	Illinois TRM	Illinois TRM	
	ID	Commercial	Warehouse - ID Existing	Heating	Water Heater - Faucet Aer	1.3 GPM Average Baseline	0.94 GPM Unit	10 \$102.01	\$ -	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI20Fast	\$ 332,024.67	DEER	Illinois TRM	Illinois TRM	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Water Heater - Faucet Aer	1.3 GPM Average Baseline	0.94 GPM Unit	10 \$102.01	\$ -	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI20Fast	\$ 332,024.67	DEER	Illinois TRM	Illinois TRM	
	ID	Commercial	Warehouse - ID Existing	Cooling	Water Heater - Fan Coil	Standard Faucet	Motion Sensor-Controlled Faucet	1 \$76.51	\$ -	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI20Fast	\$ 110,274.637	AEQ Research	AEQ Research	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Heating	Water Heater - Fan Coil	Standard Faucet	Motion Sensor-Controlled Faucet	1 \$76.51	\$ -	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI20Fast	\$ 110,274.637	AEQ Research	AEQ Research	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Water Heater - Fan Coil	Standard Faucet	Motion Sensor-Controlled Faucet	1 \$76.51	\$ -	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI20Fast	\$ 110,274.637	AEQ Research	AEQ Research	AEQ Research	
	ID	Commercial	Warehouse - ID Existing	Cooling	Water Heater - High Effici	High Efficiency Pump	High Efficiency Pump	15 \$617.98	\$ -	-	-	0	0.0001	0.0003	15.1%	25.0%	Retrofit	RetroIven20	\$ 195,303.87	Hawaii TRM	Hawaii TRM	Hawaii TRM	
	ID	Commercial	Warehouse - ID Existing	Heating	Water Heater - High Effici	High Efficiency Pump	High Efficiency Pump	15 \$617.98	\$ -	-	-	0	0.0001	0.0003	15.1%	25.0%	Retrofit	RetroIven20	\$ 195,303.87	Hawaii TRM	Hawaii TRM	Hawaii TRM	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Water Heater - High Effici	High Efficiency Pump	High Efficiency Pump	15 \$617.98	\$ -	-	-	0	0.0001	0.0003	15.1%	25.0%	Retrofit	RetroIven20	\$ 195,303.87	Hawaii TRM	Hawaii TRM	Hawaii TRM	
	ID	Commercial	Warehouse - ID Existing	Cooling	Water Heater - Pipe Insula	Uninsulated Pipe	7-1.5 Insulation Installed	15 \$75.75	\$ -	-	-	0	0.0001	0.0003	25.7%	75.0%	Retrofit	RetroI2Med	\$ 42,356.07	Illinois TRM	Illinois TRM	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	Water Heater - Pipe Insula	Uninsulated Pipe	7-1.5 Insulation Installed	15 \$75.75	\$ -	-	-	0	0.0001	0.0003	25.7%	75.0%	Retrofit	RetroI2Med	\$ 42,356.07	Illinois TRM	Illinois TRM	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Water Heater - Pipe Insula	Uninsulated Pipe	7-1.5 Insulation Installed	15 \$75.75	\$ -	-	-	0	0.0001	0.0003	25.7%	75.0%	Retrofit	RetroI2Med	\$ 42,356.07	Illinois TRM	Illinois TRM	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	Water Heater - Pre-Rinse S	1.3 GPM Kitchen Spray Valve	0.8 L 1.00 GPM Kitchen Spray Valve	4 \$1,361.88	\$ 897.43	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI2Med	\$ (18,026,778.53)	RTF	RTF	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Heating	Water Heater - Pre-Rinse S	1.3 GPM Kitchen Spray Valve	0.8 L 1.00 GPM Kitchen Spray Valve	4 \$1,361.88	\$ 897.43	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI2Med	\$ (18,026,778.53)	RTF	RTF	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Water Heater - Pre-Rinse S	1.3 GPM Kitchen Spray Valve	0.8 L 1.00 GPM Kitchen Spray Valve	4 \$1,361.88	\$ 897.43	-	-	0	0.0001	0.0003	25.6%	65.0%	Retrofit	RetroI2Med	\$ (18,026,778.53)	RTF	RTF	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Cooling	Water Heater - Temp/Pres	SEF 2.5 Sizer Unit	Water Heater - Temp/Pres	20 \$1,091.85	\$ -	-	-	1	0.0001	0.0003	15.2%	15.0%	Retrofit	RetroI2Med	\$ 144,409.24	AEO 2015	AEO 2015	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Heating	Water Heater - Temp/Pres	SEF 2.5 Sizer Unit	Water Heater - Temp/Pres	20 \$1,091.85	\$ -	-	-	1	0.0001	0.0003	15.2%	15.0%	Retrofit	RetroI2Med	\$ 144,409.24	AEO 2015	AEO 2015	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Ventilation	Water Heater - Temp/Pres	SEF 2.5 Sizer Unit	Water Heater - Temp/Pres	20 \$1,091.85	\$ -	-	-	1	0.0001	0.0003	15.2%	15.0%	Retrofit	RetroI2Med	\$ 144,409.24	AEO 2015	AEO 2015	AEQ - BEST	
	ID	Commercial	Warehouse - ID Existing	Cooling	Interior Lighting - LED CCT	Standard Controls	Enhanced Controls	15 \$34,107.50	\$ -	-	-	28,289	-	-	8.1%	at Turnover	Low Opportunity	L20Fast	\$ 107.18	7th Plan	7th Plan	7th Plan	
	ID	Commercial	Warehouse - ID Existing	Heating	Interior Lighting - LED CCT	Standard Controls	Enhanced Controls	15 \$34,1															

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Year)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
1	ID	Commercial	Warehouse - ID New	Ventilation	Insulation - Wall Cavity	R-23	20% Leakage	Sealed	45	\$34,380.27	\$ -	\$ -	(16)	0.0001	0.0002	65.5%	99.0%	Retrolven20	\$ 98.82	RTF	RTF	AEQ - BEST	
2	ID	Commercial	Warehouse - ID New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$115.78	\$ -	\$ -	4	-	-	-	-	99.0%	99.0%	Retrolven20	\$ 9,999.00	DEER	RTF	AEQ - BEST
3	ID	Commercial	Warehouse - ID New	Heating	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$115.78	\$ -	\$ -	(42)	-	0.0005	0.0005	99.0%	99.0%	Retrolven20	\$ 9,999.00	DEER	RTF	AEQ - BEST	
4	ID	Commercial	Warehouse - ID New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$115.78	\$ -	\$ -	(42)	0.0001	0.0002	0.0002	99.0%	99.0%	Retrolven20	\$ 9,999.00	DEER	RTF	AEQ - BEST	
5	ID	Commercial	Warehouse - ID New	Cooling	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$39,574.98	\$ -	\$ -	180	-	-	-	-	66.4%	66.4%	Retrol55w	\$ 923.36	7th Plan	7th Plan	AEQ - BEST
6	ID	Commercial	Warehouse - ID New	Heating	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$39,574.98	\$ -	\$ -	2,282	-	0.0005	0.0005	66.4%	66.4%	Retrol55w	\$ 923.36	7th Plan	7th Plan	AEQ - BEST	
7	ID	Commercial	Warehouse - ID New	Ventilation	Windows - High Efficiency	Single Glaze	High Efficiency Glaze	30	\$39,574.98	\$ -	\$ -	86	0.0001	0.0002	0.0002	66.4%	66.4%	Retrol55w	\$ 923.36	7th Plan	7th Plan	AEQ - BEST	
8	ID	Commercial	Warehouse - ID New	Cooling	Chiller - Chilled Water Rtn	Constant Flow	Enabled	10	\$538.79	\$ -	\$ -	0	-	-	-	-	45.0%	45.0%	Retrol21Med	\$ 2,175.00	13th Plan	DEER	AEQ - BEST
9	ID	Commercial	Warehouse - ID New	Cooling	Chiller - Chilled Water Rtn	Constant Flow	Variable Flow	15	\$50,845.66	\$ -	\$ -	124	-	-	-	-	15.4%	45.0%	Retrol21Med	\$ 34,107.73	DEER	AEQ - BEST	
10	ID	Commercial	Warehouse - ID New	Cooling	Chiller - Variable Speed Fan	On/Off Operation	Part-Load Operation	15	\$3,185.83	\$ -	\$ -	3	-	-	-	-	15.5%	50.0%	Retrol21Med	\$ 76,666.53	DEER	AEQ - BEST	
11	ID	Commercial	Warehouse - ID New	Cooling	Water-Cooled Chiller - Con	Constant Temperature	Variable Temperature	10	\$533.79	\$ -	\$ -	0	-	-	-	-	15.8%	75.0%	Retrol21Med	\$ 185,322.59	DEER	AEQ - BEST	
12	ID	Commercial	Warehouse - ID New	Cooling	HVAC - Economizer	Constant Temperature	Variable Temperature	9	\$2,750.09	\$ -	\$ -	95	-	-	-	-	50.1%	60.0%	Retrol21Med	\$ 30,188.49	DEER	AEQ - BEST	
13	ID	Commercial	Warehouse - ID New	Heating	Space Heating - Heat Reco	None	Installed	14	\$31,057.19	\$ -	\$ -	3,839	-	0.0005	0.0005	5.7%	10.0%	Retrol21Med	\$ 744.78	DEER	AEQ - BEST		
14	ID	Commercial	Warehouse - ID New	Ventilation	Ventilation - ECM on VAV	None	Installed	18	\$25,280.45	\$ -	\$ -	2,017	0.0001	0.0002	0.0002	15.5%	50.0%	Retrol21Med	\$ 896.85	7th Plan	7th Plan	AEQ - BEST	
15	ID	Commercial	Warehouse - ID New	Ventilation	Ventilation - Variable Speed	Standard	Standard	15	\$25,085.59	\$ -	\$ -	10,897	0.0001	0.0002	0.0002	16.3%	50.0%	Retrol21Med	\$ 152,789.10	DEER	AEQ - BEST		
16	ID	Commercial	Warehouse - ID New	Ventilation	Ventilation - Demand Con	Standard	Demand-Controlled Fans	15	\$25,085.59	\$ -	\$ -	1,324	0.0001	0.0002	0.0002	15.8%	75.0%	Retrol21Med	\$ 1,505.14	7th Plan	7th Plan	AEQ - BEST	
17	ID	Commercial	Warehouse - ID New	Cooling	Destraffication Fans (DVL	None	Installed	15	\$62,677.28	\$ -	\$ -	3	-	-	-	-	15.8%	75.0%	Retrol21Med	\$ 344,105.67	AEQ Research	AEQ Research	AEQ - BEST
18	ID	Commercial	Warehouse - ID New	Cooling	Destraffication Fans (DVL	None	Installed	15	\$62,677.28	\$ -	\$ -	13	-	-	0.0005	15.8%	75.0%	Retrol21Med	\$ 344,105.67	AEQ Research	AEQ Research	AEQ - BEST	
19	ID	Commercial	Warehouse - ID New	Cooling	RTU - Maintenance	Standard Unit	Advanced Roofop Controller	3	\$7,303.38	\$ -	\$ -	34	-	-	-	-	25.0%	Retrol21Med	\$ 67,526.27	Illinois TRM	Illinois TRM	AEQ - BEST	
20	ID	Commercial	Warehouse - ID New	Cooling	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Roofop Controller	15	\$6,960.52	\$ -	\$ -	13,948	-	-	-	-	15.4%	45.0%	Retrol35w	\$ 43.79	7th Plan	7th Plan	AEQ - BEST
21	ID	Commercial	Warehouse - ID New	Cooling	RTU - Evaporative Precool	No Precooler	Precoolor Installed	15	\$142,232.37	\$ -	\$ -	68	-	-	-	-	15.8%	75.0%	Retrol55w	\$ 174,309.72	DEER	AEQ - BEST	
22	ID	Commercial	Warehouse - ID New	Cooling	Ductless Mini Split Heat Pu	None	Installed	15	\$678,595.79	\$ -	\$ -	0	-	-	-	-	15.1%	25.0%	Retrol55w	\$ 114,252.38	RTF	7th Plan	AEQ - BEST
23	ID	Commercial	Warehouse - ID New	Heating	Ductless Mini Split Heat Pu	None	Installed	15	\$678,595.79	\$ -	\$ -	350	-	0.0005	0.0005	15.1%	25.0%	Retrol55w	\$ 114,252.38	RTF	7th Plan	AEQ - BEST	
24	ID	Commercial	Warehouse - ID New	Cooling	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$66,773.80	\$ -	\$ -	55,268	-	-	-	-	10.0%	10.0%	Retrolven20	\$ 65.80	7th Plan	7th Plan	AEQ - BEST
25	ID	Commercial	Warehouse - ID New	Heating	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$66,773.80	\$ -	\$ -	146,719	-	-	-	-	10.0%	10.0%	Retrolven20	\$ 65.80	7th Plan	7th Plan	AEQ - BEST
26	ID	Commercial	Warehouse - ID New	Water Heating	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$66,773.80	\$ -	\$ -	7,790	0.0001	0.0002	0.0002	10.0%	10.0%	Retrolven20	\$ 65.80	7th Plan	7th Plan	AEQ - BEST	
27	ID	Commercial	Warehouse - ID New	Water Heating	Water Heater - Faucet Aen	1.33 GPM Average Baseline	0.94 GPM Unit	10	\$102.01	\$ -	\$ -	0	0.0001	0.0003	0.0003	25.6%	65.0%	Retrol20Fast	\$ 311,687.63	DEER	Illinois TRM	Illinois TRM	
28	ID	Commercial	Warehouse - ID New	Water Heating	Water Heater - Faucet Aen	Standard Faucet	Motion Sensor-Controlled Faucet	1	\$76.51	\$ -	\$ -	-	-	-	-	-	25.6%	65.0%	Retrol20Fast	\$	AEQ Research	AEQ Research	AEQ - BEST
29	ID	Commercial	Warehouse - ID New	Water Heating	Water Heater - Low Flow	1.5 GPM Showhead	1.5 GPM Showhead	10	\$79.29	\$ 96.18	\$ -	0	0.0001	0.0003	0.0003	25.0%	65.0%	Retrol20Fast	\$	AEQ Research	AEQ Research	AEQ - BEST	
30	ID	Commercial	Warehouse - ID New	Water Heating	Water Heater - High Effici	High Efficiency Pump	High Efficiency Pump	15	\$617.98	\$ -	\$ -	0	0.0001	0.0003	0.0003	15.1%	25.0%	Retrolven20	\$ 183,141.36	Hawaii TRM	Hawaii TRM	AEQ - BEST	
31	ID	Commercial	Warehouse - ID New	Water Heating	Water Heater - Pipe Insula	Uninsulated Pipe																	

Measure										Assumptions in First Year (2015)										Sources			
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Year)	Average Annual Savings (kWh/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
ID	Commercial	Miscellaneous - Existing	Cooling	None	HVAC - Economizer	None	Installed	10	55,885.73	\$	-	18	0.0007	-	45.2%	60.0%	Retro12Med	\$	38,067.90	DEER	DEER	AEQ-BEST	
ID	Commercial	Miscellaneous - Existing	Heating	None	Space Heating - Heat Recirc	None	Installed	14	53,726.84	\$	-	624	-	0.0005	-	10.0%	10.0%	Retro12Med	\$	565.92	DEER	DEER	7th Plan
ID	Commercial	Miscellaneous - Existing	Ventilation	None	Ventilation - ECM on VAV	None	Installed	18	52,022.44	\$	-	518	0.0001	0.0002	15.5%	50.0%	Retro12Med	\$	301.89	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Ventilation	None	Ventilation - Variable Speed	None	Installed	15	51,563,300.24	\$	-	2,559	0.0001	0.0002	11.6%	50.0%	Retro12Med	\$	51,430.01	DEER	DEER	Illinois TRM	
ID	Commercial	Miscellaneous - Existing	Ventilation	None	Ventilation - Demand Control	Standard	Installed	15	52,006.85	\$	-	341	0.0001	0.0002	15.1%	25.0%	Retro12Med	\$	574.05	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Cooling	None	Desatirification Fans (HVLS)	None	Installed	10	55,014.18	\$	-	0	0.0007	-	15.0%	15.0%	Retro12Med	\$	206,204.99	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Miscellaneous - Existing	Heating	None	Desatirification Fans (HVLS)	None	Installed	15	55,014.18	\$	-	0	0.0007	-	15.0%	15.0%	Retro12Med	\$	274,204.99	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Miscellaneous - Existing	Cooling	None	RTU - Maintenance	None	Installed	3	51,690.35	\$	-	2	0.0007	-	15.1%	15.1%	Retro12Med	\$	77,918.01	Illinois TRM	Illinois TRM	7th Plan	
ID	Commercial	Miscellaneous - Existing	Cooling	None	RTU - Advanced Controls	RTU with Constant Speed Fan	Advanced Rooftop Controller	15	55,564.84	\$	-	977	0.0007	-	15.4%	45.0%	Retro12Med	\$	50.52	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Cooling	None	RTU - Evaporative Precool	No Precooler	Precooler Installed	15	53,510.26	\$	-	14	0.0007	-	15.8%	75.0%	Retro12Med	\$	201,104.78	DEER	DEER	AEQ Research	
ID	Commercial	Miscellaneous - Existing	Cooling	None	Ductless Mini Split Heat Pumps	None	Installed	15	51,555,107.61	\$	-	29	0.0007	-	15.1%	25.0%	Retro12Med	\$	90,343.30	RTF	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Heating	None	Ductless Mini Split Heat Pumps	None	Installed	15	51,555,107.61	\$	-	122	0.0007	0.0005	15.1%	25.0%	Retro12Med	\$	90,343.30	RTF	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Cooling	None	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	55,341.90	\$	-	4,461	0.0007	-	10.0%	10.0%	Retro12Med	\$	51.27	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Heating	None	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	55,341.90	\$	-	15,771	0.0007	0.0005	10.0%	10.0%	Retro12Med	\$	51.27	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Ventilation	None	Smart/WiFi Enabled Unit	Standard Unit	Smart/WiFi Enabled Unit	5	55,341.90	\$	-	1,958	0.0001	0.0002	10.0%	10.0%	Retro12Med	\$	51.27	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Heater - Faucet Aera	1.39 GPM Average Baseline	1.39 GPM Unit	10	5102.01	\$	-	0	0.0002	0.0004	25.6%	65.0%	Retro12Med	\$	57,724.08	DEER	Illinois TRM	Illinois TRM	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Heater - Faucet Mof	Standard Faucet	Motion Sensor-Controlled Faucet	1	576.51	\$	-	-	-	-	25.0%	65.0%	Retro12Med	\$	-	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Heater - Low-Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	579.29	\$	96.18	0	0.0002	0.0004	25.6%	65.0%	Retro12Med	\$	(1,786,250.80)	RTF	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Heater - High Efficiency	Standard Efficiency Pump	High Efficiency Pump	15	5723.37	\$	-	0	0.0002	0.0004	15.1%	25.0%	Retro12Med	\$	33,554.51	Hawaii TRM	Hawaii TRM	7th Plan	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Heater - Pipe Insulat	R-3.5 Insulation Installed	R-7.5 Insulation	15	575.75	\$	-	1	0.0002	0.0004	25.7%	75.0%	Retro12Med	\$	7,370.04	Illinois TRM	Illinois TRM	AEQ-BEST	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Heater - Pre-Rinse	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve	4	51,361.68	\$	897.43	0	0.0002	0.0004	25.6%	65.0%	Retro12Med	\$	(1,134,042.03)	RTF	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Set at 125°F	None	Water Set at 125°F	2	536.91	\$	-	0	0.0002	0.0004	15.1%	25.0%	Retro12Med	\$	25,260.21	Illinois TRM	Illinois TRM	7th Plan	
ID	Commercial	Miscellaneous - Existing	Water Heating	None	Water Heater - Solar System	Standard Electric Unit	SEF 2.5 Solar Unit	20	51,091.85	\$	-	3	0.0002	0.0004	1.2%	15.0%	Retro12Med	\$	25,125.59	AEO 2015	AEO 2015	AEQ-BEST	
ID	Commercial	Miscellaneous - Existing	Interior Lighting	None	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	52,728.60	\$	-	2,258	0.0001	0.0002	8.1%	at Turnover	Low Opportunity	L020Fast	\$	107.17	7th Plan	7th Plan	7th Plan
ID	Commercial	Miscellaneous - Existing	Interior Lighting	None	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	54,502.19	\$	-	3,119	0.0001	0.0002	8.2%	at Turnover	Low Opportunity	L020Fast	\$	126.31	7th Plan	7th Plan	7th Plan
ID	Commercial	Miscellaneous - Existing	Interior Lighting	None	Interior Lighting - LED Exit	Standard LED Sign	Highly Efficient LED Sign	15	5221.19	\$	-	0	0.0001	0.0002	2.1%	10.0%	Retro12Med	\$	169.72	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Interior Lighting	None	Interior Fluorescent - 84-LE	Standard Level Lighting Controls	Two Level Lighting Controls	16	514,696.31	\$	-	1	0.0001	0.0002	7.6%	15.0%	Retro12Med	\$	962,582.87	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Interior Lighting	None	Interior Fluorescent - Delta	Overlaid Fixture	Properly Lit Fixture	11	525.04	\$	-	0	0.0001	0.0002	17.6%	25.0%	Retro12Med	\$	14,549.22	7th Plan	Illinois TRM	Illinois TRM	
ID	Commercial	Miscellaneous - Existing	Interior Lighting	None	Interior Fluorescent - Delta	Level Lighting Controls	Two Level Lighting Controls	11	543,218.28	\$	-	0	0.0001	0.0002	17.6%	25.0%	Retro12Med	\$	904.78	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Exterior Lighting	None	Exterior Lighting - Enhanced	Standard Controls	Photo-cell and/or Motion Based Controls	8	5705.55	\$	-	1	0.0001	0.0001	60.0%	60.0%	Retro12Med	\$	146,379.84	PG&E Workpaper	PG&E Workpaper	PG&E Workpaper	
ID	Commercial	Miscellaneous - Existing	Exterior Lighting	None	Exterior Lighting - Photo	None	Photo-Powered Unit Installed	7	543,270.05	\$	-	1	0.0001	0.0001	15.5%	25.0%	Retro12Med	\$	8,012,231.80	AEQ Research	AEQ Research	AEQ Research	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Anti-Sweat	No Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	5981.35	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	838,956.43	RTF	RTF	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Sealed Case Doors	Sealed Case Doors	Sealed Case Doors	8	521.26	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	169,723.67	DEER	DEER	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Evaporator	Standard Fan Controls	LED-Based Fan Controls	16	5503.65	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	146,867.87	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Floating Hel	Fixed Discharge Pressure Controls	Webtub Breat Controls	15	514,471.14	\$	-	2	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	725,146.51	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Strip Curtai	Standard Controls	Strip Curtains Installed	15	5296.14	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	253,122.01	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - High Efficiency	Standard Efficiency Compressor	High Efficiency Compressor	15	51401.12	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	13,925,006.24	AEO 2015	AEO 2015	RTF	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Variable Speed	Inefficient Compressor Loading	Variable Speed Compressor Loading	15	531,946.43	\$	-	8	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	342,505.10	DEER	DEER	AEO 2015	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Demand Def	Standard Demand Defrost	Demand Defrost	10	511,539.94	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	937,037.83	Vermont TRM	Vermont TRM	AEO 2015	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Display Case - LE	Standard LED Case Lighting	LED Case Lighting	5	51,107.44	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	2,263,920.00	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Display Case - M	Manual Controls	Motion Based Controls	8	575.74	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	6,529,289.05	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Open Display Ca	No Covers	Night Covers	5	5233.37	\$	-	-	-	-	0.0%	0.0%	Retro12Med	\$	-	DEER	DEER	Illinois TRM	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - ECM for Display	Standard Motors	ECM Motors	16	5335.77	\$	-	0	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	75,083,444.39	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Refrigeration	None	Refrigeration - Exhaust Hood	Lighting and Occupancy Controls	Lighting and Occupancy Controls	16	5299.02	\$	-	0	0.0001	0.0002	5.0%	10.0%	Retro12Med	\$	241,402.56	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Ventilation	None	Cooking - Exhaust Hoods	Standard Speed Hoods	Constant Speed Hoods	18	52,790.69	\$	-	0	0.0001	0.0002	5.1%	10.0%	Retro12Med	\$	5,948,955.84	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Office Equipment	None	Office Equipment - Smart RT	Standard Unit	Light Sensing Strip	4	5588.21	\$	-	1	0.0002	0.0002	10.6%	50.0%	Retro12Med	\$	160,354.92	RTF	RTF	7th Plan	
ID	Commercial	Miscellaneous - Existing	Occupancy Controls	None	Occupancy Controls - Manual	Manual Controls	Occupancy Controls	4	54,201.76	\$	-	4	0.0002	0.0002	0.0%	0.0%	Retro12Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST	
ID	Commercial	Miscellaneous - Existing	Occupancy Controls	None	Occupancy Controls	Manual Controls	Occupancy Controls	15	54,201.76	\$	-	(7)	-	-	0.0005	0.0%	0.0%	Retro12Med	\$	9,999.00	Illinois TRM	Illinois TRM	AEQ-BEST
ID	Commercial	Miscellaneous - Existing	Office Equipment	None	Best Practice Measures Installed	Baseline Data Center	Best Practice Measures Installed	5	533.50	\$	-	415	0.0002	0.0002	0.0%	0.0%	Retro12Med	\$	16.17	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Cooling	None	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	55.29	\$	-	70	0.0007	0.0007	0.0%	0.0%	Retro12Med	\$	1.97	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Ventilation	None	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	55.29	\$	-	29	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	1.97	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Interior Lighting	None	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	55.29	\$	-	179	0.0001	0.0002	0.0%	0.0%	Retro12Med	\$	1.97	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Office Equipment	None	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	55.29	\$	-	98	0.0002	0.0002	0.0%	0.0%	Retro12Med	\$	1.97	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Cooling	None	Cutting Edge Measures Installed	Baseline Data Center	Cutting Edge Measures Installed	8	50.54	\$	-	0	0.0007	0.0007	0.0%	0.0%	Retro12Med	\$	1.28	7th Plan	7th Plan	7th Plan	
ID	Commercial	Miscellaneous - Existing	Office Equipment	None	Cutting Edge Measures Installed	Baseline Data Center	Cutting Edge Measures Installed	8	50.54	\$	-	33	0.0002	0.0002	0.0%	0.0%	Retro12Med	\$	0.28	7th Plan	7th Plan	7th Plan	

Measure										Assumptions in First Year (2015)										Sources									
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits Annual \$/unit	Incremental O&M Costs (\$)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/kWh)	Winter Coincident Peak Factor (kW/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source						
10	ID	Commercial	Miscellaneous - New	Heating	Ductless Mini Split Heat Pumps	None	Installed	15	\$155,107.63	\$	-	-	110	-	0.0005	15.1%	25.0%	RetiroMed	RetiroMed	\$	89,853.81	RTF	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Cooling	Thermostat - WiFi/Interact	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$	-	-	5,328	0.0001	0.0005	10.0%	10.0%	RetiroMed	RetiroMed	\$	48.64	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Heating	Smart/WiFi Enabled Unit	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$	-	-	15,492	0.0007	0.0005	10.0%	10.0%	RetiroMed	RetiroMed	\$	48.64	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Heating	Smart/WiFi Enabled Unit	Standard Unit	Smart/WiFi Enabled Unit	5	\$5,341.90	\$	-	-	1,208	0.0002	0.0002	10.0%	10.0%	RetiroMed	RetiroMed	\$	48.64	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - Faucet Aeraul	1.59 GPM Average Baseline	0.94 GPM Unit	10	\$102.01	\$	-	-	0	0.0002	0.0004	25.6%	65.0%	RetiroMed	RetiroMed	\$	56,371.05	DEER	Illinois TRM	Illinois TRM					
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - Faucet Aeraul	Standard Faucet	Standard Sensor-Controlled Faucet	1	\$76.51	\$	-	-	-	-	-	25.0%	65.0%	RetiroMed	RetiroMed	\$	-	AEG Research	AEG Research	AEG Research					
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - Low Flow	2.2 GPM Showerhead	1.5 GPM Showerhead	10	\$79.29	\$	96.18	-	0	0.0002	0.0004	25.6%	65.0%	RetiroMed	RetiroMed	\$	(1,744,424.84)	RTF	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - High Efficient	High Efficiency Electric Pump	High Efficiency Electric Pump	15	\$273.19	\$	-	-	0	0.0002	0.0004	15.1%	65.0%	RetiroMed	RetiroMed	\$	31,151.62	Hawaii TRM	Hawaii TRM	Hawaii TRM					
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - Pipe Insulation	Uninsulated Pipe	R-3.5 Insulation Installed	15	\$75.75	\$	-	-	-	1	0.0001	0.0004	25.7%	75.0%	RetiroMed	RetiroMed	\$	7,197.28	Illinois TRM	Illinois TRM	AEG-BEST				
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - Pre-Rinse	1.33 GPM Kitchen Spray Valve	0.81-1.00 GPM Kitchen Spray Valve	4	\$1,361.68	\$	897.43	-	0	0.0002	0.0004	25.6%	65.0%	RetiroMed	RetiroMed	\$	(3,060,581.02)	RTF	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - Tempurature	Water Set at 120°F	Water Set at 120°F	2	\$36.91	\$	-	-	1	0.0002	0.0004	15.8%	75.0%	RetiroMed	RetiroMed	\$	24,668.12	Illinois TRM	Illinois TRM	Illinois TRM					
10	ID	Commercial	Miscellaneous - New	Water Heating	Water Heater - Solar Array	SEF 2.5 Solar Unit	SEF 2.5 Solar Unit	20	\$1,091.85	\$	-	-	-	3	0.0002	0.0004	1.8%	55.0%	RetiroMed	RetiroMed	\$	4,536.65	AEO 2015	AEO 2015	AEG-BEST				
10	ID	Commercial	Miscellaneous - New	Interior Lighting	Interior Lighting - Embedded	Standard Controls	Enhanced Controls	15	\$2,728.60	\$	-	-	2,215	0.0001	0.0002	14.1%	at Turnover	Lost Opportunity	L020Fast	\$	108.49	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Interior Lighting	Interior Lighting - Hi-Level	Standard Controls	Enhanced Controls	15	\$4,502.19	\$	-	-	3,070	0.0001	0.0002	14.1%	at Turnover	Lost Opportunity	L020Fast	\$	127.86	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Interior Lighting	Interior Lighting - LED Sign	Baseline LED Sign	Light Emitting Diode Sign	15	\$221.19	\$	-	-	0	0.0001	0.0002	2.1%	5.0%	RetiroMed	RetiroMed	\$	149,220.65	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Interior Lighting	Interior Fluorescent - Bi-Level	Single-Level Lighting Controls	Two-Level Lighting Controls	16	\$14,696.31	\$	-	-	-	1	0.0001	0.0002	15.0%	15.0%	RetiroMed	RetiroMed	\$	952,765.07	7th Plan	7th Plan	7th Plan				
10	ID	Commercial	Miscellaneous - New	Interior Lighting	Interior Fluorescent - Delta	Over/Flt Fixture	Property LR Fixture	11	\$25.04	\$	-	-	-	0	0.0001	0.0002	17.6%	25.0%	RetiroMed	RetiroMed	\$	14,400.83	Illinois TRM	Illinois TRM	Illinois TRM				
10	ID	Commercial	Miscellaneous - New	Exterior Lighting	Exterior Lighting - Hi-Level	Single-Level Lighting Controls	Two-Level Lighting Controls	8.6	\$941.28	\$	-	-	43	0.0001	0.0001	15.5%	25.0%	RetiroMed	RetiroMed	\$	904.23	7th Plan	7th Plan	Michigan Energy Measures Database					
10	ID	Commercial	Miscellaneous - New	Exterior Lighting	Exterior Lighting - Entrance	Standard Controls	Photocell and/or Motion Based Controls	8	\$705.55	\$	-	-	0	0.0001	0.0002	60.0%	60.0%	RetiroMed	RetiroMed	\$	126,387.94	RTF	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Exterior Lighting	Exterior Lighting - Photovo	None	Solar-Powered Unit Installed	7	\$43,270.05	\$	-	-	-	1	0.0001	0.0001	15.7%	30.0%	RetiroMed	RetiroMed	\$	8,011,030.41	AEG Research	AEG Research	AEG Research				
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Anti-Sweat	No Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	8	\$981.35	\$	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	1,073,270.99	RTF	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Door Gaskets	Leaky Case Doors	Sealed Case Doors	4	\$21.26	\$	-	-	0	0.0001	0.0002	26.0%	70.0%	RetiroMed	RetiroMed	\$	198,387.94	RTF	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Evaporator	Standard Unit	Load-Based Fan Controls	16	\$503.65	\$	-	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	166,701.29	7th Plan	7th Plan	7th Plan				
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Floating He	Fixed Discharge Pressure Controls	Web/Duct Breat Controls	15	\$14,471.14	\$	-	-	2	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	766,918.71	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Strip Curtai	No Strip Curtains	Strip Curtains Installed	2	\$296.14	\$	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	450,128.74	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - High Efficient	Refrigeration Efficiency Compressor	High Efficiency Compressor	15	\$693.12	\$	-	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	131,660,151.99	AEO 2015	AEO 2015	AEG Research				
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Variable Sp	Inefficient Compressor Loading	Variable Speed Compressor Loading	15	\$31,946.43	\$	-	-	8	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	362,235.17	DEER	Illinois TRM	AEO 2015					
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Demand Def	Timer Based Defrost	Demand Defrost	10	\$51,331.29	\$	-	-	6	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	991,016.06	Vermont TRM	Vermont TRM	AEO 2015					
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - LE	LED Case Lighting	LED Case Lighting	5	\$1,107.44	\$	-	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	245,700.02	Illinois TRM	Illinois TRM	Illinois TRM				
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Display Case	Manual Controls	Motion Based Controls	8	\$57.74	\$	-	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	8,352,872.99	7th Plan	7th Plan	7th Plan				
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Open Display Ca	No Covers	Night Covers	5	\$233.37	\$	-	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	-	DEER	Illinois TRM	Illinois TRM				
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - ECMs for Dispo	Standard Motors	ECM Motors	16	\$335.77	\$	-	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	96,051,157.11	7th Plan	7th Plan	7th Plan				
10	ID	Commercial	Miscellaneous - New	Refrigeration	Refrigeration - Occupancy	Lighting and Compressor Controls	Lighting and Compressor Controls	16	\$209.92	\$	-	-	-	0	0.0001	0.0002	0.1%	10.0%	RetiroMed	RetiroMed	\$	113,660,151.99	Illinois TRM	Illinois TRM	Illinois TRM				
10	ID	Commercial	Miscellaneous - New	Ventilation	Cooking - Exhaust Hoods	Constant Speed Hoods	Demand-Controlled Hoods	18	\$2,790.69	\$	-	-	-	0	0.0001	0.0002	8.0%	10.0%	RetiroMed	RetiroMed	\$	6,108,220.69	7th Plan	7th Plan	7th Plan				
10	ID	Commercial	Miscellaneous - New	Office Equipment	Office Equipment - Smart RT	Standard Unit	Load Sensing Strip	4	\$588.21	\$	-	-	1	0.0002	0.0002	10.6%	50.0%	RetiroMed	RetiroMed	\$	128,641.34	RTF	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Occupancy	Occupancy - Room Control	Manual Controls	Manual Controls	15	\$4,201.76	\$	-	-	-	1	0.0002	0.0002	10.6%	50.0%	RetiroMed	RetiroMed	\$	9,999,000.00	Illinois TRM	Illinois TRM	Illinois TRM				
10	ID	Commercial	Miscellaneous - New	Heating	Occupancy - Room Control	Manual Controls	Manual Controls	15	\$4,201.76	\$	-	-	-	(6)	0.0005	0.0005	0.0%	0.0%	RetiroMed	RetiroMed	\$	13,660,151.99	Illinois TRM	Illinois TRM	AEG-BEST				
10	ID	Commercial	Miscellaneous - New	Office Equipment	Data Center - Best Practice	Baseline Data Center	Best Practice Measures Installed	5	\$33.50	\$	-	-	425	0.0002	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	15.84	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Cooling	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$5.15	\$	-	-	85	0.0007	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	1.84	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Cooling	Data Center - Commercial	Commercially Available Measures Installed	Commercially Available Measures Installed	8	\$5.15	\$	-	-	175	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	1.84	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Interior Lighting	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$5.15	\$	-	-	101	0.0002	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	1.84	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Office Equipment	Data Center - Commercial	Baseline Data Center	Commercially Available Measures Installed	8	\$5.15	\$	-	-	101	0.0002	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	1.84	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Cooling	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$0.64	\$	-	-	387	0.0002	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	0.27	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Office Equipment	Data Center - Cutting Edge	Baseline Data Center	Cutting Edge Measures Installed	6	\$0.64	\$	-	-	34	0.0002	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	0.27	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Ventilation	Optimized Variable Volume	Constant Speed Hoods	Demand-Controlled Hoods	18	\$4,159.24	\$	-	-	0	0.0001	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	26,038,885.72	7th Plan	7th Plan	7th Plan					
10	ID	Commercial	Miscellaneous - New	Miscellaneous	Pump Pool - Timer	Manual Controls	Scheduled Controls	10	\$86.76	\$	-	-	0	0.0002	0.0002	0.0%	0.0%	RetiroMed	RetiroMed	\$	970,217.18	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM					
10	ID	Commercial	Miscellaneous - New	Advanced New Constructi	LED Average Design	Standard Building Practices	LED Average Design	25	\$33,386.90	\$	-	-	8,943	0.0001	0.0002	10.6%	50.0%	RetiroMed	RetiroMed	\$	43.02	AEG Research	AEG Research	AEG Research					
10	ID	Commercial	Miscellaneous - New	Heating	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$33,386.90	\$	-	-	26,008	-	0.0005	10.6%	50.0%	RetiroMed	RetiroMed	\$	43.02	AEG Research	AEG Research	AEG Research					
10	ID	Commercial	Miscellaneous - New	Ventilation	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$33,386.90	\$	-	-	3,077	0.0001	0.0002	10.6%	50.0%	RetiroMed	RetiroMed	\$	43.02	AEG Research	AEG Research	AEG Research					
10	ID	Commercial	Miscellaneous - New	Water Heating	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$33,386.90	\$	-	-	7,555	0.0002	0.0004	10.6%	50.0%	RetiroMed	RetiroMed	\$	43.02	AEG Research	AEG Research	AEG Research					
10	ID	Commercial	Miscellaneous - New	Interior Lighting	Advanced New Constructi	Standard Building Practices	LED Average Design	25	\$33,386.90	\$	-	-	4,547	0.0001	0.0002	19.9%	70.0%	RetiroMed	RetiroMed	\$	43.02	AEG Research	AEG Research	AEG Research					
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Measure										Assumptions in First Year (2015)										Sources				
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Measure Life (Years)	Average Incremental \$/Unit	Annual Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Annual Savings (\$/Unit)	Summer Coincident (kW/Unit)	Winter Coincident (kW/Unit)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source
WA	Industrial	Industrial - WA	WA New	Process	Motors	Fans & Blowers	Standard NEMA Premium	Standard NEMA Premium	Standard	10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Process	Motors	Compressed Air	Standard NEMA Premium	Standard NEMA Premium	Standard	10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Process	Motors	Material Handling	Standard NEMA Premium	Standard NEMA Premium	Standard	10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Process	Motors	Standard NEMA Premium	Standard NEMA Premium	Standard NEMA Premium	Standard	10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Process	Motors	Standard	Standard	Standard	Standard	15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Process	Motors	Standard	Standard	Standard	Standard	15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Process	Motors	Standard	Standard	Standard	Standard	15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Process	Motors	Standard	Standard	Standard	Standard	15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - WA	WA New	Miscellaneous	Miscellaneous	Standard	Standard	Standard	Standard	18	\$ 0.00	\$ -	\$ -	0.0004	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$ -	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Cooling	Air-Cooled Chiller	COP 3.06 (EER 10.4)	COP 4.40 (EER 15.0)			20	\$23,991.02	\$ -	\$ -	51.04	0.0002	2.5%	at Turnover	Lost Opportunity	LO20Fast	\$	41.51	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Cooling	Water-Cooled Chiller	COP 5.78 (EER 36.4)	COP 6.40 (EER 36.4)			25	\$16,934.84	\$ -	\$ -	136.581	0.0002	2.5%	at Turnover	Lost Opportunity	LO20Fast	\$	9.91	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Cooling	RTU	EER 11.2	EER 13.9, VRF			15	\$6,021.28	\$ -	\$ -	6.980	0.0002	11.3%	at Turnover	Lost Opportunity	LO20Fast	\$	93.65	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)			15	\$28,977.39	\$ -	\$ -	20.70	0.0002	1.7%	at Turnover	Lost Opportunity	LOEven20	\$	132.77	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Cooling	Air-Source Heat Pump	EER 12.0 (COP 3.3)	EER 13.9, VRF			15	\$36,927.82	\$ -	\$ -	10.123	0.0004	11.3%	at Turnover	Lost Opportunity	LOEven20	\$	132.77	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Cooling	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 22.0 (COP 4.4)			25	\$35,280.91	\$ -	\$ -	0.00	0.0002	0.0%	at Turnover	Lost Opportunity	LOEven20	\$	132.77	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 22.0 (COP 4.4)			25	\$44,960.82	\$ -	\$ -	0.00	0.0004	0.0%	at Turnover	Lost Opportunity	LOEven20	\$	132.77	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Heating	Electric Furnace	Standard	Standard			18	\$ 0.00	\$ -	\$ -	0.00	0.0004	2.1%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Heating	Electric Room Heat	Standard	Standard			18	\$ 0.00	\$ -	\$ -	0.00	0.0004	11.3%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Heating	Ventilation	Constant Volume	Variable Air Volume			20	\$2,472.37	\$ -	\$ -	18.944	0.0001	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	11.80	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Interior Lighting	Screen-In	EISA Compliant (13.6 lm/W)	LED 2017 (86.4 lm/W)			8	\$ 20.25	\$ 0.03	\$ -	1.722	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.00	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	Existing	Interior Lighting	Screen-In	F12 Standard (69.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)			17	\$6.70	\$ 0.21	\$ -	8.314	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.06	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	Existing	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (86.4 lm/W)			15	\$9.70	\$ -	\$ -	22.723	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.04	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	Existing	Exterior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)			8	\$ 0.14	\$ 0.02	\$ -	1.605	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.00	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	Existing	Exterior Lighting	Area Lighting	F12 Standard (69.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)			17	\$2.28	\$ 0.07	\$ -	4.507	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.03	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	Existing	Exterior Lighting	Area Lighting	Metal Halide (44.3 lm/W)	LED 2017 (86.4 lm/W)			15	\$11.17	\$ 0.78	\$ -	13.286	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(0.04)	AEO 2015	7th Plan	
WA	Industrial	Industrial - ID	Existing	Motors	Pumps	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Motors	Fans & Blowers	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Motors	Standard NEMA Premium	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Motors	Material Handling	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Motors	Other Motors	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Process	Process Heating	Standard	Standard			15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Process	Process Cooling	Standard	Standard			15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Process	Process Refrigeration	Standard	Standard			15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Process	Process Electrochemical	Standard	Standard			15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Process	Process Other	Standard	Standard			15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	Existing	Miscellaneous	Miscellaneous	Standard	Standard			15	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	New	Cooling	Air-Cooled Chiller	COP 3.06 (EER 10.4)	COP 4.40 (EER 15.0)			20	\$23,991.02	\$ -	\$ -	69.255	0.0002	2.5%	at Turnover	Lost Opportunity	LO20Fast	\$	30.12	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Cooling	Water-Cooled Chiller	COP 5.78 (EER 36.4)	COP 6.40 (EER 36.4)			25	\$16,934.84	\$ -	\$ -	133.806	0.0002	2.5%	at Turnover	Lost Opportunity	LO20Fast	\$	10.12	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Cooling	RTU	EER 11.2	EER 13.9, VRF			15	\$6,021.28	\$ -	\$ -	7.157	0.0002	11.3%	at Turnover	Lost Opportunity	LO20Fast	\$	91.31	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Cooling	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)			15	\$28,977.39	\$ -	\$ -	20.573	0.0002	1.7%	at Turnover	Lost Opportunity	LOEven20	\$	124.92	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Heating	Air-Source Heat Pump	EER 11.0 (COP 3.3)	EER 12.0 (COP 3.4)			15	\$36,927.82	\$ -	\$ -	11.516	0.0004	1.7%	at Turnover	Lost Opportunity	LOEven20	\$	124.92	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Cooling	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 22.0 (COP 4.4)			25	\$35,280.91	\$ -	\$ -	0.00	0.0002	0.0%	at Turnover	Lost Opportunity	LOEven20	\$	-	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Heating	Geothermal Heat Pump	EER 14.0 (COP 3.5)	EER 22.0 (COP 4.4)			25	\$44,960.82	\$ -	\$ -	0.00	0.0004	0.0%	at Turnover	Lost Opportunity	LOEven20	\$	-	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Heating	Electric Furnace	Standard	Standard			18	\$ 0.00	\$ -	\$ -	0.00	0.0004	2.1%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Heating	Electric Room Heat	Standard	Standard			18	\$ 0.00	\$ -	\$ -	0.00	0.0004	11.3%	at Turnover	Lost Opportunity	LO12Med	\$	-	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Heating	Ventilation	Constant Volume	Variable Air Volume			20	\$2,472.37	\$ -	\$ -	20.284	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	11.02	AEO 2015	AEO 2015	
WA	Industrial	Industrial - ID	New	Interior Lighting	Screen-In	EISA Compliant (13.6 lm/W)	LED 2017 (86.4 lm/W)			8	\$ 20.25	\$ 0.03	\$ -	1.722	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.00	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	New	Interior Lighting	Screen-In	F12 Standard (69.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)			17	\$6.70	\$ 0.21	\$ -	8.314	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.06	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	New	Interior Lighting	High-Bay Fixtures	Metal Halide (44.3 lm/W)	LED 2017 (86.4 lm/W)			15	\$9.70	\$ -	\$ -	22.723	0.0002	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.04	AEO 2015	7th Plan	
WA	Industrial	Industrial - ID	New	Exterior Lighting	Screen-In	EISA Compliant (17.4 lm/W)	LED 2017 (86.4 lm/W)			8	\$ 0.14	\$ 0.02	\$ -	1.605	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.00	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	New	Exterior Lighting	Area Lighting	F12 Standard (69.0 lm/W in/W system)	LED 2017 (110.2 lm/W system)			17	\$2.28	\$ 0.07	\$ -	4.507	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	0.03	7th Plan	7th Plan	
WA	Industrial	Industrial - ID	New	Exterior Lighting	Area Lighting	Metal Halide (44.3 lm/W)	LED 2017 (86.4 lm/W)			15	\$11.17	\$ 0.78	\$ -	13.286	0.0001	100.0%	at Turnover	Lost Opportunity	LO20Fast	\$	(0.04)	AEO 2015	7th Plan	
WA	Industrial	Industrial - ID	New	Motors	Pumps	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	New	Motors	Fans & Blowers	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$ -	0.0002	0.0002	100.0%	at Turnover	Lost Opportunity	LOEven20	\$	N/A	N/A	N/A	
WA	Industrial	Industrial - ID	New	Motors	Compressed Air	Standard NEMA Premium	Standard NEMA Premium			10	\$ 0.00	\$ -	\$											

Measure										Assumptions in First Year (2015)										Sources									
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Non-Energy	Summer	Winter	Base Year	Applicability	Replacement	7th Plan Measure	TRC Levelized	Lifetime Source	Costs Source	Savings Source										
									Measure Life (Years)	Average Incremental \$/Unit	Benefits Annual \$/Unit	Incremental O&M Costs (\$)	Average Annual Savings (\$/kW/Unit/Year)	Summer Coincident Peak Factor (kW/MW)	Winter Coincident Peak Factor (kW/MW)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source						
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Green Rewind (1)	Standard Motor Rewind	Green Motor Rewind	Green Motor Rewind	10	562,653.53	\$ -	-	-	1,860	0.0002	0.0002	10.0%	50.0%	Discretionary	retro5Med	\$	4,397.86	7th Plan	7th Plan	7th Plan	7th Plan	Montana-Dakota Utilities IRP Rep	Montana-Dakota Utilities IRP Rep	Montana-Dakota Utilities IRP Report
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Synchronous Belts	Standard Belts	Synchronous Belts	Synchronous Belts	12	54,692.18	\$ 19,588.31	-	-	28,994	0.0002	0.0002	15.0%	25.0%	Discretionary	retro5Med	\$	(570.71)	7th Plan	7th Plan	7th Plan	7th Plan	Montana-Dakota Utilities IRP Rep	Montana-Dakota Utilities IRP Rep	Montana-Dakota Utilities IRP Report
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Synchronous Belts	Standard Belts	Synchronous Belts	Synchronous Belts	10	520,035.07	\$ 433,999.79	-	-	7,501	0.0002	0.0002	15.0%	36.0%	Discretionary	retro12Med	\$	(48,655.55)	7th Plan	7th Plan	7th Plan	7th Plan	Montana-Dakota Utilities IRP Rep	Montana-Dakota Utilities IRP Rep	Montana-Dakota Utilities IRP Report
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Synchro Block	No Time	Miscellaneous	No Time	10	520,035.07	\$ -	-	-	103,009	0.0002	0.0002	5.1%	10.0%	Discretionary	retro5Med	\$	79.22	7th Plan	7th Plan	7th Plan	7th Plan	Ontario Power TRM	Ontario Power TRM	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Agriculture - Live Stock	Standard Water	Water Heater Controls	Water Heater Controls	10	56,611.47	\$ -	-	-	263,563	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	3.58	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Dairy - Milk Processors	No Precoler	Precoler Installed	Precoler Installed	15	52,710.54	\$ -	-	-	67,454	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	4.28	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Clean Room: Change Filter	Standard	Installed	Installed	15	546,753.84	\$ -	-	-	106,789	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	46.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Clean Room: Chiller Optim	Standard	Installed	Installed	15	546.37	\$ -	-	-	251,359	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	0.26	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Clean Room: Clean Room	Standard	Installed	Installed	15	5,178.35	\$ -	-	-	12,235	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	1.57	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Elec. Chp Fab: Solidstate Dr	Standard	Installed	Installed	15	59,139.20	\$ -	-	-	12,107	0.0002	0.0002	5.1%	7.5%	Discretionary	retro12Med	\$	80.20	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Elec. Chp Fab: Eliminate Ex	Standard	Installed	Installed	15	556,026.54	\$ -	-	-	31,319	0.0002	0.0002	5.1%	7.5%	Discretionary	retro12Med	\$	446.71	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Elec. Chp Fab: Exhaust Inj	Standard	Installed	Installed	15	579,028.50	\$ -	-	-	26,489	0.0002	0.0002	5.1%	7.5%	Discretionary	retro12Med	\$	315.06	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Elec. Chp Fab: Reduce Gas	Standard	Installed	Installed	15	550,168.85	\$ -	-	-	26,626	0.0002	0.0002	5.1%	7.5%	Discretionary	retro12Med	\$	200.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Panel: Hydraulic Press	Standard	Installed	Installed	10	57,802.00	\$ 464.89	-	-	264,719	0.0001	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	2.58	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Wood: Replace Pneumatic	Standard	Installed	Installed	10	50.00	\$ -	-	-	251,359	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Metal: New Arc Furnace	Standard	Installed	Installed	10	567.23	\$ -	-	-	187,368	0.0002	0.0005	5.1%	7.5%	Discretionary	retro5Med	\$	0.05	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Paper: Premium Control Lu	Standard	Installed	Installed	10	528.42	\$ -	-	-	39,495	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	0.10	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Paper: Efficient Pulp Scre	Standard	Installed	Installed	10	522.95	\$ -	-	-	31,757	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	0.11	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Kraft: Efficient Treatmen	Standard	Installed	Installed	10	50.08	\$ -	-	-	31,695	0.0001	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Kraft: Efficient Agitat	Standard	Installed	Installed	10	50.36	\$ -	-	-	484,930	0.0001	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Mech Pulp: Premium Proc	Standard	Installed	Installed	5	533.94	\$ -	-	-	348	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	24.85	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Mech Pulp: Refine-Mat	Standard	Installed	Installed	5	521.13	\$ -	-	-	4,210	0.0002	0.0002	5.1%	7.5%	Discretionary	retro5Med	\$	12.58	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	517.19	\$ -	-	-	8,594	0.0002	0.0002	15.0%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	516.74	\$ -	-	-	16,562	0.0002	0.0002	15.0%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	541.83	\$ -	-	-	1,092	0.0002	0.0002	15.1%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	544.87	\$ -	-	-	2,034	0.0002	0.0002	15.0%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	544.57	\$ -	-	-	951	0.0002	0.0005	15.0%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	522.76	\$ -	-	-	31,089	0.0001	0.0002	15.0%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	537.56	\$ -	-	-	13,738	0.0001	0.0002	15.0%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - High Efficiency Transf	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	501.15	\$ -	-	-	2,826	0.0002	0.0002	15.0%	35.0%	Discretionary	retro5Med	\$	0.00	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	5122.61	\$ -	-	-	23,127	0.0001	0.0001	0.0%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	501.21	\$ -	-	-	46,242	0.0001	0.0001	0.0%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	56.22	\$ -	-	-	1,095	0.0001	0.0001	0.0%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	54.37	\$ -	-	-	5,864	0.0001	0.0001	0.0%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	5268.17	\$ -	-	-	2,741	0.0001	0.0001	0.1%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	50.00	\$ -	-	-	8,026	0.0001	0.0001	0.0%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	50.00	\$ -	-	-	44,884	0.0001	0.0001	0.0%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Strategic Energy Managem	None	Implemented	Implemented	3	510.130.72	\$ -	-	-	8,146	0.0002	0.0002	0.0%	3.0%	Discretionary	retro5Med	\$	18.19	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Commissioning	None	Commissioned	Commissioned	3	57,090.38	\$ -	-	-	6,713	0.0002	0.0002	0.0%	0.0%	Discretionary	retro5Med	\$	12.66	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Commissioning	None	Commissioned	Commissioned	3	515,519.58	\$ -	-	-	3,724.70	0.0002	0.0002	0.0%	0.0%	Discretionary	retro5Med	\$	12.66	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Commissioning	None	Commissioned	Commissioned	3	523,651.85	\$ 5,587.05	-	-	93,451	0.0002	0.0005	0.0%	0.0%	Discretionary	retro5Med	\$	12.66	7th Plan	7th Plan	7th Plan	7th Plan	Michigan Energy Measures Datab	Michigan Energy Measures Datab	Ontario Power TRM
WA	Industrial	Industrial - WA Existing	Motors	Industrial - WA Existing	Motors - Commissioning	None	Commissioned	Commissioned	3	524,652.27	\$ -	-	-	50,987	0.00														

Measure				Assumptions in First Year (2015)										Sources											
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$/Unit)	Average Annual Savings (\$/Unit)	Summer Coincident Peak Factor (kW/MWh)	Winter Coincident Peak Factor (kW/MWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
WA	Industrial	Industrial - WA	New	Motors	Wood- Replace Pneumatic Metal- New Arc Furnace	Standard	Installed	Installed	10	\$3,042.43	\$	440.71	\$	269,413	0.0002	5.1%	7.5%	Discretionary	RetrosMed	\$	0.11	7th Plan	7th Plan	7th Plan	
WA	Industrial	Industrial - WA	New	Process	Paper- Premium Control Le	Standard	Installed	Installed	10	\$3,058.39	\$	-	\$	949.81	0.0001	5.1%	7.5%	Discretionary	RetrosMed	\$	7.09	7th Plan	7th Plan	7th Plan	
WA	Industrial	Industrial - WA	New	Process	Paper- Premium Control Le	Standard	Installed	Installed	10	\$18,687.47	\$	-	\$	39,298	0.0002	5.1%	7.5%	Discretionary	RetrosMed	\$	68.78	7th Plan	7th Plan	7th Plan	
WA	Industrial	Industrial - WA	New	Process	Paper- Premium Control Le	Standard	Installed	Installed	10	\$286.97	\$	-	\$	5,643	0.0001	5.1%	7.5%	Discretionary	RetrosMed	\$	1.33	7th Plan	7th Plan	7th Plan	
WA	Industrial	Industrial - WA	New	Process	Kraft- Effluent Treatment	Standard	Installed	Installed	10	\$934.37	\$	-	\$	31,577	-	0.0005	5.1%	7.5%	Discretionary	RetrosMed	\$	4.29	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Motors	Kraft- Efficient Apptator	Standard	Installed	Installed	10	\$0.00	\$	-	\$	460,898	0.0002	0.0002	5.1%	7.5%	Discretionary	RetrosMed	\$	-	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Process	Mech Pulp- Premium Proc	Standard	Installed	Installed	5	\$2,569.53	\$	-	\$	350	0.0001	5.1%	7.5%	Discretionary	RetrosMed	\$	1,881.20	7th Plan	7th Plan	7th Plan	
WA	Industrial	Industrial - WA	New	Motors	Mech Pulp- Refine Plate H	Standard	Installed	Installed	5	\$45,233.78	\$	-	\$	4,078	0.0001	5.1%	7.5%	Discretionary	RetrosMed	\$	12,360.44	7th Plan	7th Plan	7th Plan	
WA	Industrial	Industrial - WA	New	Cooling	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$1,118.04	\$	-	\$	8,607	0.0002	0.0002	15.0%	65.0%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Heating	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$396.83	\$	-	\$	16,617	0.0002	0.0002	15.0%	65.0%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Ventilation	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$4,907.71	\$	-	\$	992	0.0001	5.1%	7.5%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan	
WA	Industrial	Industrial - WA	New	Interior Lighting	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$1,476.43	\$	-	\$	1,872	0.0002	0.0002	23.0%	65.0%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Exterior Lighting	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$826.63	\$	-	\$	806	0.0001	0.0002	17.2%	65.0%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Motors	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$98,413.58	\$	-	\$	29,775	0.0001	0.0002	15.0%	65.0%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Motors	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$22,254.80	\$	-	\$	15,718	0.0001	0.0002	15.0%	65.0%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Miscellaneous	Transformer - High Effici	Standard Transformer	High Efficiency Transformer	High Efficiency Transformer	10	\$586.42	\$	-	\$	2,819	-	0.0005	15.0%	65.0%	Discretionary	retro5Med	\$	1.07	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Cooling	Strategic Energy Managem	None	Implemented	Implemented	3	\$1,377.01	\$	-	\$	24,796	0.0001	0.0002	0.0%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Heating	Strategic Energy Managem	None	Implemented	Implemented	3	\$1,662.21	\$	-	\$	47,870	0.0001	0.0003	0.0%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Interior Lighting	Strategic Energy Managem	None	Implemented	Implemented	3	\$5,221.01	\$	1,305.25	\$	50,000	0.0002	0.0003	0.0%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Interior Lighting	Strategic Energy Managem	None	Implemented	Implemented	3	\$2,109.80	\$	-	\$	5,395	0.0001	0.0001	0.0%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Exterior Lighting	Strategic Energy Managem	None	Implemented	Implemented	3	\$10,177.13	\$	3,139.64	\$	2,322	-	0.0002	0.1%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Motors	Strategic Energy Managem	None	Implemented	Implemented	3	\$208.08	\$	328.96	\$	85,773	0.0001	0.0002	0.0%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Process	Strategic Energy Managem	None	Implemented	Implemented	3	\$45,196.65	\$	-	\$	45,280	0.0001	0.0002	0.0%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Miscellaneous	Strategic Energy Managem	None	Implemented	Implemented	3	\$3,384.82	\$	14,130.51	\$	8,120	0.0001	0.0003	0.0%	3.0%	Discretionary	RetrosMed	\$	(51.52)	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Interior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$14,452.79	\$	313,076.32	\$	6,225	0.0002	0.0003	10.7%	39.0%	Discretionary	RetrosMed	\$	78.99	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Exterior Lighting	Commissioning	None	Commissioned	Commissioned	3	\$14,478.76	\$	-	\$	5,078	0.0001	0.0001	25.0%	39.0%	Discretionary	RetrosMed	\$	78.99	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Motors	Commissioning	None	Commissioned	Commissioned	3	\$4,769.34	\$	-	\$	98,956	0.0002	0.0002	5.0%	39.0%	Discretionary	RetrosMed	\$	78.99	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Process	Commissioning	None	Commissioned	Commissioned	3	\$1,955.31	\$	-	\$	52,239	0.0002	0.0002	5.0%	39.0%	Discretionary	RetrosMed	\$	78.99	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Miscellaneous	Commissioning	None	Commissioned	Commissioned	3	\$33,727.02	\$	-	\$	9,368	0.0001	0.0001	6.0%	39.0%	Discretionary	RetrosMed	\$	78.99	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Interior Lighting	Retrocommissioning	None	Commissioned	Commissioned	3	\$33.45	\$	-	\$	6,216	-	0.0005	0.0%	0.0%	Discretionary	RetrosMed	\$	133.51	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Exterior Lighting	Retrocommissioning	None	Commissioned	Commissioned	3	\$128.66	\$	-	\$	2,675	0.0001	0.0002	0.0%	0.0%	Discretionary	RetrosMed	\$	133.51	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Motors	Retrocommissioning	None	Commissioned	Commissioned	3	\$6,590.15	\$	-	\$	99,792	0.0001	0.0003	0.0%	0.0%	Discretionary	RetrosMed	\$	133.51	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Miscellaneous	Retrocommissioning	None	Commissioned	Commissioned	3	\$40,399.95	\$	-	\$	99,000	0.0002	0.0002	0.0%	0.0%	Discretionary	RetrosMed	\$	133.51	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Miscellaneous	Retrocommissioning	None	Commissioned	Commissioned	3	\$57,009.13	\$	-	\$	9,362	0.0001	0.0001	0.0%	0.0%	Discretionary	RetrosMed	\$	133.51	AEG Research	AEG Research	AEG Research
WA	Industrial	Industrial - WA	New	Motors	Municipal Sewage Treatment	Standard Sewage Treatment	Optimal Sewage Treatment	Optimal Sewage Treatment	12	\$36,190.52	\$	-	\$	13,882	0.0002	0.0002	5.0%	7.5%	Discretionary	RetrosMed	\$	315.58	7th Plan	7th Plan	7th Plan
WA	Industrial	Industrial - WA	New	Motors	Municipal Water Supply Tr	Standard Water Treatment	Optimal Water Treatment	Optimal Water Treatment	12	\$5,628.16	\$	335.36	\$	5	0.0%	5.0%	25.0%	Discretionary	RetrosMed	\$	7th Plan	7th Plan	7th Plan		
ID	Industrial	Industrial - ID	Existing	Insulation - Ceiling	R-13	Existing	R-38	Existing	45	\$0.00	\$	-	\$	23,436	-	0.0005	20.0%	50.0%	Discretionary	RetrosMed	\$	23.97	RTF	RTF	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Insulation - Ceiling	R-13	Existing	R-38	Existing	45	\$17,974.83	\$	-	\$	49,218	0.0001	0.0002	20.0%	50.0%	Discretionary	RetrosMed	\$	23.97	RTF	RTF	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Ventilation	Insulation - Ceiling	R-13	Existing	R-38	45	\$30,426.70	\$	-	\$	3,362	0.0001	0.0003	20.0%	50.0%	Discretionary	RetrosMed	\$	23.97	RTF	RTF	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Heating	Insulation - Ducting	R-8	Existing	R-20	20	\$24,566.23	\$	-	\$	10,103	0.0002	0.0002	25.0%	50.0%	Discretionary	RetrosMed	\$	9,999.00	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Heating	Insulation - Ducting	R-4	Existing	R-8	20	\$82.73	\$	-	\$	(26,549)	0.0001	0.0001	25.0%	50.0%	Discretionary	RetrosMed	\$	9,999.00	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Ventilation	Insulation - Ducting	R-4	Existing	R-8	20	\$381.42	\$	-	\$	61	0.0002	0.0002	25.1%	50.0%	Discretionary	RetrosMed	\$	9,999.00	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Cooling	Insulation - Wall Cavity	R-9	Existing	R-23	45	\$36,331.48	\$	-	\$	(7,588)	-	0.0005	20.0%	50.0%	Discretionary	RetrosMed	\$	25.73	RTF	RTF	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Heating	Insulation - Wall Cavity	R-9	Existing	R-23	45	\$2,276.42	\$	-	\$	50,000	-	0.0005	20.0%	50.0%	Discretionary	RetrosMed	\$	25.73	RTF	RTF	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Ventilation	Insulation - Wall Cavity	R-9	Existing	R-23	45	\$18,399.58	\$	-	\$	805	0.0001	0.0002	20.0%	50.0%	Discretionary	RetrosMed	\$	25.73	RTF	RTF	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$17,924.77	\$	-	\$	(630)	-	-	25.0%	50.0%	Discretionary	RetrosMed	\$	9,999.00	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$44,765.69	\$	-	\$	(8,267)	-	-	25.0%	50.0%	Discretionary	RetrosMed	\$	9,999.00	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	Sealed	18	\$5,218.59	\$	-	\$	922	0.0002	0.0002	25.1%	50.0%	Discretionary	RetrosMed	\$	9,999.00	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Cooling	Chiller - Chilled Water Res	None	Enabled	Enabled	10	\$50,027.49	\$	-	\$	3,505	-	0.0005	15.0%	50.0%	Discretionary	RetrosMed	\$	1,776.20	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Cooling	Chiller - Chilled Water Res	Constant Flow	Variable Flow	Variable Flow	15	\$25,553.63	\$	-	\$	65,293	-	0.0005	15.0%	35.0%	Discretionary	RetrosMed	\$	37.71	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID	Existing	Cooling	Chiller - Variable Speed F	On/Off Operation	Variable Speed	Variable Speed	8	\$42,163.49	\$	-	\$	17,999	0.0001	0.0002	15.0%	50.0%	Discretionary	RetrosMed	\$	223.19	DEER	DEER	New Jersey TRM
ID	Industrial	Industrial - ID	Existing	Cooling	HVAC - Economizer	None	Installed	Installed	10	\$352.28	\$	-	\$	55,998	-	-	35.0%	75.0%	Discretionary	RetrosMed	\$	0.89	DEER	DEER	AEG - BEST
ID	Industrial	Industrial - ID																							

Measure					Assumptions in First Year (2015)													Sources							
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/Unit)	Incremental O&M Costs (\$)	Average Annual Savings (kWh/Unit Gwetter)	Summer Coincident Peak Factor (kW/MW)	Winter Coincident Peak Factor (kW/MW)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source		
10	ID	Industrial	Industrial-ID	Existing	Process	Transformer - High Efficiency	Standard Transformer	High Efficiency Transformer	10	\$0.00	\$	\$	7,277	0.0001	0.0002	15.1%	35.0%	Discretionary	retro5med	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Miscellaneous	Transformer - High Efficiency	Standard Transformer	High Efficiency Transformer	10	\$0.00	\$	\$	1,312	0.0001	0.0002	15.0%	35.0%	Discretionary	retro5med	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Cooling	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	10,556	0.0002	0.0003	0.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Heating	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	20,713	0.0002	0.0003	0.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Ventilation	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	1,443	-	0.0005	0.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Interior Lighting	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	2,719	0.0001	0.0002	0.7%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Exterior Lighting	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	1,151	0.0001	0.0003	0.1%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Motors	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	38,172	0.0002	0.0003	0.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Process	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	21,038	0.0001	0.0001	0.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Miscellaneous	Strategic Energy Management	None	Implemented	3	\$0.00	\$	\$	3,792	-	-	0.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Interior Lighting	Commissioning	None	Commissioned	3	\$0.00	\$	\$	3,136	-	-	0.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Exterior Lighting	Commissioning	None	Commissioned	3	\$0.00	\$	\$	1,328	0.0001	0.0002	0.0%	0.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Motors	Commissioning	None	Commissioned	3	\$0.00	\$	\$	44,549	0.0001	0.0003	0.0%	0.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Process	Commissioning	None	Commissioned	3	\$0.00	\$	\$	24,628	0.0002	0.0003	0.0%	0.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Miscellaneous	Commissioning	None	Commissioned	3	\$0.00	\$	\$	4,375	0.0001	0.0001	0.0%	0.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$0.00	\$	\$	3,158	0.0002	0.0002	13.2%	39.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$0.00	\$	\$	1,338	0.0001	0.0002	6.4%	39.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Motors	Retrocommissioning	None	Commissioned	3	\$0.00	\$	\$	44,549	-	-	5.1%	39.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Process	Retrocommissioning	None	Commissioned	3	\$0.00	\$	\$	24,628	-	-	0.0%	39.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Miscellaneous	Retrocommissioning	None	Commissioned	3	\$0.00	\$	\$	4,416	0.0001	0.0002	5.0%	39.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Motors	Municipal Sewage Treatment	Standard Sewage Treatment	Optimal Sewage Treatment	12	\$0.00	\$	\$	6,249	0.0001	0.0003	5.0%	7.5%	Discretionary	retro5Med	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	Existing	Motors	Municipal Water Supply Tr	Standard Water Treatment	Optimal Water Treatment	12	\$0.00	\$	\$	6,249	0.0002	0.0003	5.0%	7.5%	Discretionary	retro5Med	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	Insulation - Ceiling	R-13	Insulation - Ceiling	45	\$0.00	\$	\$	24,765	0.0001	0.0001	75.0%	99.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Heating	Insulation - Ceiling	R-13	Insulation - Ceiling	45	\$0.00	\$	\$	49,483	0.0002	0.0002	75.0%	99.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Ventilation	Insulation - Ceiling	R-13	Insulation - Ceiling	45	\$0.00	\$	\$	3,038	-	-	75.0%	99.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	Insulation - Ducting	R-4	Insulation - Ducting	20	\$0.00	\$	\$	9,770	0.0001	0.0005	25.0%	50.0%	Discretionary	Retrolen20	\$	9,999.00	DEER	DEER	7th Plan	
10	ID	Industrial	Industrial-ID	New	Heating	Insulation - Ducting	R-4	Insulation - Ducting	20	\$0.00	\$	\$	25,667	0.0001	0.0002	25.0%	50.0%	Discretionary	Retrolen20	\$	9,999.00	DEER	DEER	7th Plan	
10	ID	Industrial	Industrial-ID	New	Ventilation	Insulation - Ducting	R-4	Insulation - Ducting	20	\$0.00	\$	\$	54	0.0001	0.0003	25.1%	50.0%	Discretionary	Retrolen20	\$	9,999.00	DEER	DEER	7th Plan	
10	ID	Industrial	Industrial-ID	New	Heating	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	45	\$0.00	\$	\$	7,600	0.0002	0.0003	75.0%	99.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Heating	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	45	\$0.00	\$	\$	51,538	0.0001	0.0001	75.0%	99.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Ventilation	Insulation - Wall Cavity	R-9	Insulation - Wall Cavity	45	\$0.00	\$	\$	715	0.0002	0.0002	75.1%	99.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$0.00	\$	\$	1,583	-	-	75.0%	99.0%	Discretionary	Retrolen20	\$	9,999.00	DEER	DEER	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$0.00	\$	\$	7,983	-	-	75.0%	99.0%	Discretionary	Retrolen20	\$	9,999.00	DEER	DEER	7th Plan	
10	ID	Industrial	Industrial-ID	New	Ventilation	HVAC - Duct Leakage Redu	20% Leakage	Sealed	18	\$0.00	\$	\$	821	0.0001	0.0002	75.1%	99.0%	Discretionary	Retrolen20	\$	9,999.00	DEER	DEER	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	Chiller - Chilled Water Res	None	Enabled	10	\$0.00	\$	\$	3,852	-	-	15.0%	50.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Chiller - Chilled Water Res	Variable Flow	Variable Flow	Enabled	15	\$0.00	\$	\$	69,243	-	-	15.0%	45.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Chiller - Variable Speed Fan	On/Off Operation	On/Off Operation	Enabled	15	\$0.00	\$	\$	19,211	0.0001	0.0002	15.0%	45.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	HVAC - Economizer	None	Installed	10	\$0.00	\$	\$	53,866	-	-	35.0%	75.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Ventilation	Ventilation - Demand Cont	Standard	Demand-Controlled Fans	15	\$0.00	\$	\$	934	-	-	15.0%	50.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Motors	Variable Frequency Drive	Standard	Installed	15	\$0.00	\$	\$	24,165	0.0001	0.0002	40.0%	99.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Heating	Desiccation Fans (DMLS)	None	Installed	15	\$0.00	\$	\$	97,003	-	-	15.0%	40.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	RTU - Maintenance	Standard Unit	Tuned Up	3	\$0.00	\$	\$	13,901	-	-	15.0%	75.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Cooling	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$0.00	\$	\$	45,037	0.0001	0.0002	10.0%	20.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Ventilation	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$0.00	\$	\$	91,366	-	-	10.0%	20.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Ventilation	Thermostat - WiFi/Interac	Standard Unit	Smart/WiFi Enabled Unit	5	\$0.00	\$	\$	5,505	-	-	10.1%	20.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Interior Lighting	Interior Lighting - LED CCT	Standard Controls	Enhanced Controls	15	\$0.00	\$	\$	8,638	0.0001	0.0002	13.3%	33.3%	Discretionary	LO20fast	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Interior Lighting	Interior Lighting - Network	Standard Controls	Enhanced Controls	15	\$0.00	\$	\$	32,513	-	-	13.3%	33.3%	Discretionary	LO20fast	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Interior Lighting	Interior Lighting - EMC Ect	Baseline LED Sign	LIGHT Emitting Capacitor Sign	15	\$0.00	\$	\$	985	-	-	15.0%	3.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Interior Lighting	Interior Fluorescent - Bi-Le	Single Level Lighting Controls	Two Level Lighting Controls	16	\$0.00	\$	\$	1,712	0.0001	0.0002	13.6%	40.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Interior Lighting	Interior Fluorescent - Delta	Overlft Fixture	Property LIT Fixture	11	\$0.00	\$	\$	2,501	-	-	23.6%	40.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Interior Lighting	Interior Fluorescent - Delta	Overlft Fixture	Property LIT Fixture	8	\$0.00	\$	\$	3,653	-	-	15.4%	25.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Exterior Lighting	Exterior Lighting - Enhanced	Standard Controls	Photo-Alert or Motion Based Controls	8	\$0.00	\$	\$	2,128	-	-	44.5%	60.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Exterior Lighting	Exterior Lighting - Enhance	None	Solar Powered Unit Installed	7	\$0.00	\$	\$	2,699	-	-	15.6%	30.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Process	Enhanced Controls	Standard Controls	Enhanced Controls	5	\$0.00	\$	\$	-	-	-	15.0%	75.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan	
10	ID	Industrial	Industrial-ID	New	Process	Process - Timers and Cont	Standard Controls	Enhanced Controls	5	\$0.00	\$	\$	-	-	-	0.0001	15.0%	75.0%	Discretionary	Retrolen20	\$	-	7th Plan	7th Plan	7th Plan
10	ID	Industrial	Industrial-ID	New	Process	Process - Timers and Cont	Standard Controls	Enhanced Controls																	

Measure						Assumptions in First Year (2015)													Sources					
Key	State	Sector	Segment	Vintage	End Use	Measure Name	Baseline Definition	Efficient Option Definition	Measure Life (Years)	Average Incremental \$/Unit	Non-Energy Benefits (Annual \$/unit)	Incremental O&M Costs (\$ @/meter)	Average Annual Savings (\$/kWh)	Summer Coincident Peak Factor (\$/kWh)	Winter Coincident Peak Factor (\$/kWh)	Base Year Saturation	Applicability	Replacement Type	7th Plan Measure Ramp Rate Name	TRC Levelized Cost \$/MWh (20-Year)	Lifetime Source	Costs Source	Savings Source	
1	ID	Industrial	Industrial - ID	New	Miscellaneous	Commissioning	None	Commissioned	3	\$0.00	\$ -	\$ -	4,439	0.0001	0.0002	5.0%	39.0%	Discretionary	RetroEven20	\$ -	-	AEG Research	AEG Research	AEG Research
1	ID	Industrial	Industrial - ID	New	Interior Lighting	Retrocommissioning	None	Commissioned	3	\$0.00	\$ -	\$ -	2,936	0.0001	0.0003	0.0%	0.0%	Discretionary	RetroEven20	\$ -	-	AEG Research	AEG Research	AEG Research
1	ID	Industrial	Industrial - ID	New	Exterior Lighting	Retrocommissioning	None	Commissioned	3	\$0.00	\$ -	\$ -	1,226	0.0002	0.0003	0.0%	0.0%	Discretionary	RetroEven20	\$ -	-	AEG Research	AEG Research	AEG Research
1	ID	Industrial	Industrial - ID	New	Motors	Retrocommissioning	None	Commissioned	3	\$0.00	\$ -	\$ -	46,996	0.0001	0.0001	0.0%	0.0%	Discretionary	RetroEven20	\$ -	-	AEG Research	AEG Research	AEG Research
1	ID	Industrial	Industrial - ID	New	Process	Retrocommissioning	None	Commissioned	3	\$0.00	\$ -	\$ -	24,743	0.0002	0.0002	0.0%	0.0%	Discretionary	RetroEven20	\$ -	-	AEG Research	AEG Research	AEG Research
1	ID	Industrial	Industrial - ID	New	Miscellaneous	Retrocommissioning	None	Commissioned	3	\$0.00	\$ -	\$ -	4,439	0.0001	0.0002	0.0%	0.0%	Discretionary	RetroEven20	\$ -	-	AEG Research	AEG Research	AEG Research
1	ID	Industrial	Industrial - ID	New	Motors	Municipal Sewage Treatment	Standard Sewage Treatment	Optimal Sewage Treatment	12	\$0.00	\$ -	\$ -	6,592	-	-	5.0%	7.5%	Discretionary	Retro5Med	\$ -	-	7th Plan	7th Plan	7th Plan
1	ID	Industrial	Industrial - ID	New	Motors	Municipal Water Supply Tr	Standard Water Treatment	Optimal Water Treatment	12	\$0.00	\$ -	\$ -	-	-	0.0005	5.0%	7.5%	Discretionary	Retro5Med	\$ -	-	7th Plan	7th Plan	7th Plan

# 2017 Electric Integrated Resource Plan

## Appendix E – 2017 IRP Transmission Requests



# Appendix E

## New Resource Table For Transmission

Resource	Note	Resource Location	POR or Local Area	POD	Start	Stop	Capacity MW	Year Total
Solar	1	AVA System	AVA System	AVA System	12/2018	Indefinite	15.0	15.0
SCCT	2	TBD	Mid-C/AVA System	AVA System	10/1/2026	Indefinite	196.6	
Kettle Falls		Kettle Falls, WA	Kettle Falls	AVA System	10/1/2026	Indefinite	5.0	
Rathdrum		Rathdrum, WA	Rathdrum	AVA System	10/1/2026	Indefinite	18.5	220.1
Northeast		Spokane, WA	Northeast	AVA System	12/1/2028	Indefinite	7.5	
Kettle Falls		Kettle Falls, WA	Kettle Falls	AVA System	12/1/2028	Indefinite	3.0	10.5
Storage		TBD	Mid-C/AVA System	AVA System	12/1/2029	Indefinite	5.0	5.0
SCCT	2	TBD	Mid-C/AVA System	AVA System	12/1/2030	Indefinite	96.1	96.1
SCCT	2	TBD	Mid-C/AVA System	AVA System	12/1/2034	Indefinite	46.5	46.5

Total      393.2      393.2

### Mid-Columbia Anticipated Contract Extensions

Mid-C contract extensions may replace or modify resources named above

Resource	Note	Resource Location	POR or Local Area	POD	Start	Stop	Capacity MW	Year Total
Wells		Mid-C	Mid-C	AVA System	10/1/2028	TBD	22.0	22.0
Rocky Reach		Mid-C	Mid-C	AVA System	1/1/2031	TBD	59.0	
Rock Island		Mid-C	Mid-C	AVA System	1/1/2031	TBD	21.0	80.0

Total      80.0      80.0

1 The capacity is subject to change depending upon customer participation

2 Modified POR to "Mid-C/AVA System" to reflect possibility of off-system SCCT integrated at Mid-C

# 2017 Electric Integrated Resource Plan

## Appendix F – Summary of Changes to the 2017 IRP from the 2015 IRP



# Appendix F

## Summary of 2017 IRP Changes from the 2015 IRP

Per the request of members of the Technical Advisory Committee (TAC) this summary provides an overview of major changes in the analysis since the 2015 IRP. This document does not describe the specific changes, but rather briefs readers regarding significant or major methodological changes.

### Capacity and Energy Position, Including Load Forecasting

- Inclusion of the 7 percent summer planning margin, the 2015 IRP did not have a summer planning margin. Both plans include meeting operating reserves and regulation requirements.
- Change to electric vehicle forecast from a linear increase to an exponential in the energy forecast.

### Conservation

- Models all conservation measures in PRiSM, versus modeling conservation outside the model. This was done both ways in the 2015 IRP.
- Updated deferred transmission and distribution (T&D) capital to a historical view of cost from a 10-year old study.

### Supply-Side Resource Options

- Added additional storage resource types, now both 1 MW x 3 hours and 1 MW x 6 hours capacity to energy ratio options, the prior IRP only included the 1 MW x 3 hours option.
- Includes deferred T&D capital estimates for storage projects. The 2015 IRP did not have this estimate.
- Added a Montana wind resource option, including a peak capacity credit.
- Assumes investment tax credit (ITC) eligible resources tax credit is not amortized to simulate a PPA rather than utility ownership per the prior IRP.
- Tipping point analysis for renewables replaced with avoided cost calculation for resources options not selected in the PRS.

### Market Analysis

- Use new functionality to estimate carbon emission prices based on emission level goals rather than arbitrary emission prices. This allows for a different price of carbon for each scenario or stochastic draw based on market fundamentals of the emission reduction goal. The prior IRP used fixed input carbon prices based on 10 percent probability of a \$13 per ton “tax”.
- Using a delayed Clean Power Plan for emission reduction for the west (including Montana), with additional reduction requirements based on the Clean Air Rule in Washington, and capping Oregon at 30 percent below 2015 amounts by 2025. The prior plan used the draft Clean Power Plan for regional emission reductions.

- Uses new functionality to allow the AURORA<sup>XMP</sup> model regional renewable portfolio standards, rather than regional renewables input into the model as done in prior plans.
- Added renewable energy beyond the existing RPS levels equal to one percent of load to account for voluntary renewable programs.
- Using only one consultant natural gas price forecast along with market forward prices rather than the average of two consultant forecasts along with market forward prices as in prior plans.

# 2017 Electric Integrated Resource Plan

## Appendix G – Summary of Supply-Side Resource Costs



## Appendix G

### Summary of Supply-Side Resource Costs

Item	Capital Cost with AFUDC (\$/kW)	Fixed O&M (\$/kW-yr)	Heat Rate (Btu/kWh)	Integration (\$/kW-yr)	Variable O&M (\$/MWh)	Units at Site	Unit Size (MW)	Total Project Size (MW)	Total Cost for Segment Size (millions)	Initial Depreciation Life (Yrs)
Advanced Large Frame CT	654	2.2	9,931	n/a	3.73	1	203.0	203.0	132.7	30
Modern Large Frame CT	684	2.2	10,007	n/a	2.67	1	170.5	170.5	116.6	30
Advanced Small Frame CT	875	3.3	11,265	n/a	2.67	1	96.1	96.1	84.1	30
Frame/Aero Hybrid CT	1,042	3.3	8,916	n/a	3.20	1	101.2	101.2	105.4	30
Small Reciprocating Engine Facility	1,229	8.8	7,700	n/a	3.20	5	9.3	46.5	57.2	30
Modern Small Frame CT	1,349	4.4	10,252	n/a	2.67	1	45.1	45.1	60.8	30
Aero CT	1,349	6.6	9,359	n/a	2.67	1	42.5	42.5	57.3	30
1 x 1 Modern CCCT	1,148	19.7	6,771	n/a	4.00	1	341.3	341.3	391.8	30
1 x 1 Advanced CCCT	1,207	16.4	6,845	n/a	3.20	1	285.8	285.8	344.9	30
Washington Wind	1,798	42.7	n/a	4.40	1.07	40	2.5	100.0	179.8	25
Montana Wind	1,636	42.7	n/a	4.40	1.07	40	2.5	100.0	163.6	25
Solar Fixed Panel	1,103	5.3	n/a	1.35	0.00	n/a	n/a	10.0	11.0	25
Solar w/ Single Axis Tracking	1,158	21.3	n/a	1.35	0.00	n/a	n/a	10.0	11.6	25
Battery Storage 1x3	2,139	50.0	n/a	n/a	n/a <sup>1</sup>	n/a	n/a	5	10.7	20
Battery Storage 1x6	3,851	110.0	n/a	n/a	n/a <sup>1</sup>	n/a	n/a	5	19.3	20
Long Lake 2nd Powerhouse	2,294	9.4	n/a	n/a	n/a	n/a	n/a	68.0	156.0	50
Monroe St 2nd Powerhouse	2,027	3.6	n/a	n/a	n/a	n/a	n/a	80.0	162.2	50
Cabinet Gorge 2nd Powerhouse	2,241	0.0	n/a	n/a	n/a	n/a	n/a	110.0	246.5	50

#### Storage \$/kWh

Battery Storage 1x3	713	16.7
Battery Storage 1x6	642	18.3

1) storage variable cost is determined by the cost to charge the battery including losses, for this IRP losses are 18 percent