2017 Electric Integrated Resource Plan

James Gall
IRP Manager
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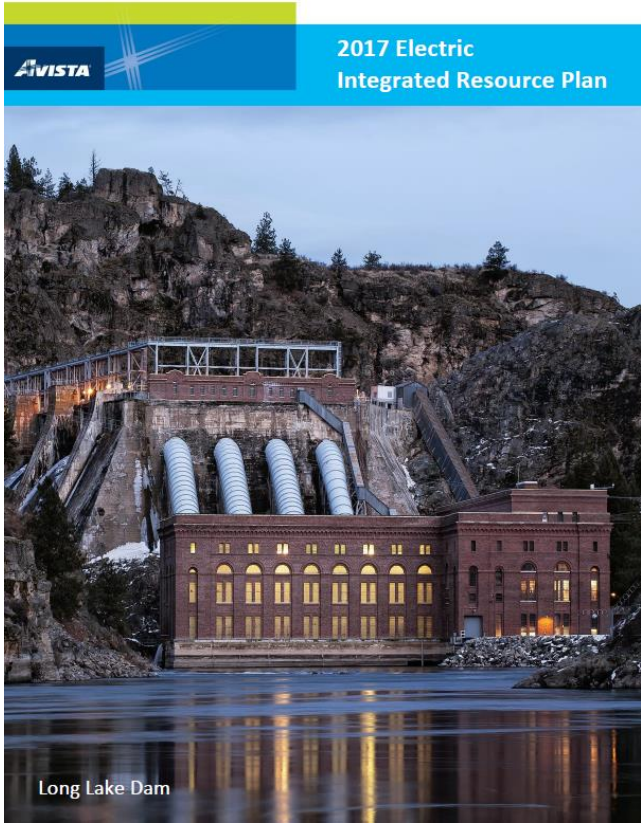
Agenda

- IRP Purpose and Process
- Energy Market Forecast
- Load Forecast & Conservation
- Resource Needs Assessment
- Preferred Resource Strategy
- Colstrip Analysis
- Other Portfolio Scenarios
- Actions Items



IRP Purpose

- Required by Idaho and Washington every other year
- Guides resource strategy over the next two years and resource procurements over the next 20 years
- Based on significant modeling effort and makes many assumptions regarding the future
- Scenarios used to evaluate additional future outcomes
- Supports rate recovery, but not a preapproval process

IRP Process

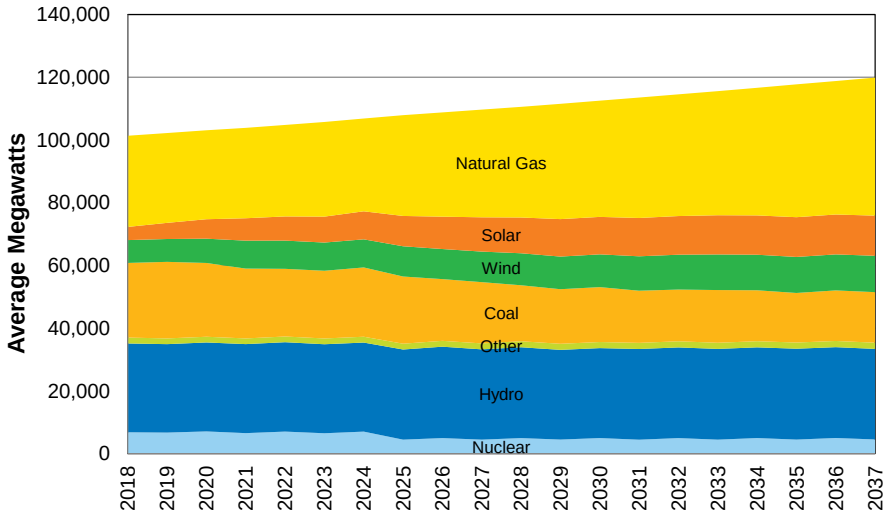
- 2017 IRP Work plan submitted August 31, 2016
- Technical Advisory Committee (TAC) met six times over 18 months
  - The TAC members provide input on what to study, how to study, and review results of the plan
  - Participants include customers, academics, elected officials, utilities, utility commission staff, advocacy and consumer organizations, state offices, and vendors
- IRP was filed with the WUTC on August 30, 2017 and is available at:

  http://myavista.com/IRP

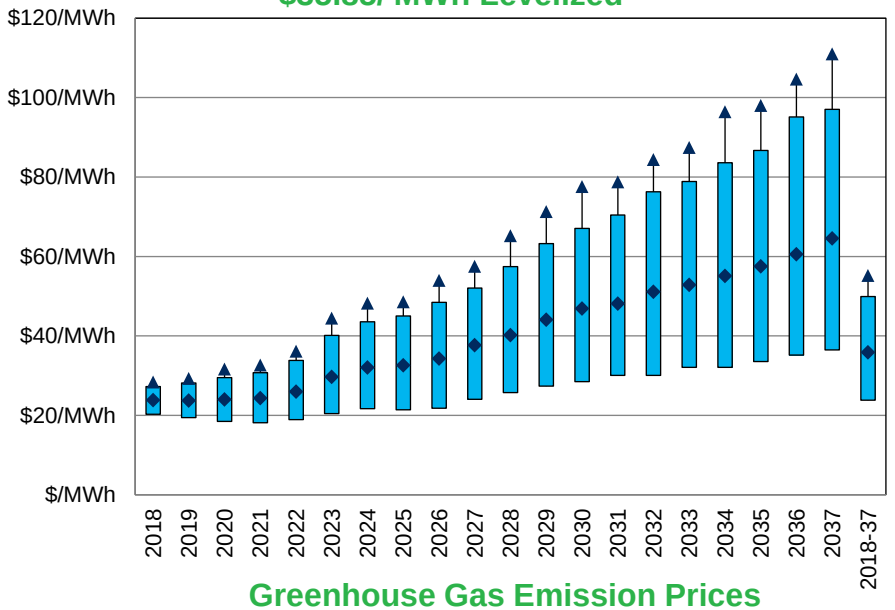
Energy Market Forecast

Market Forecast

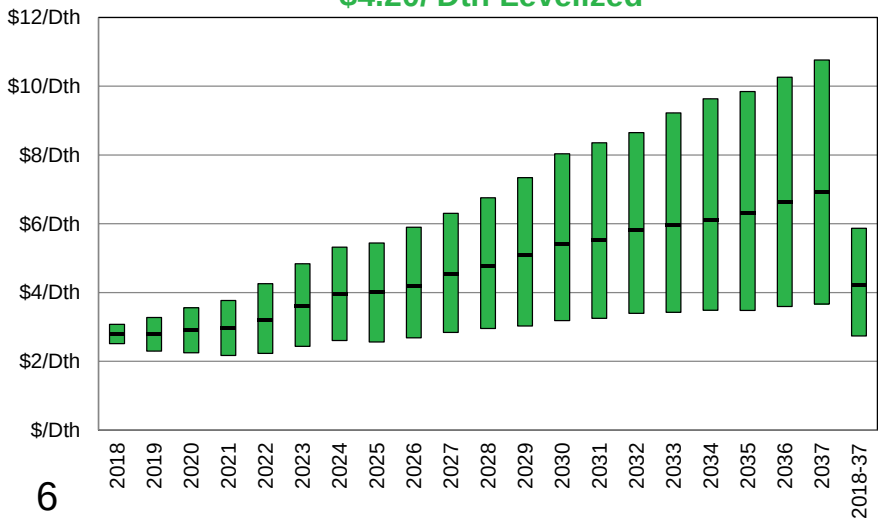
Western Interconnect Energy Supply



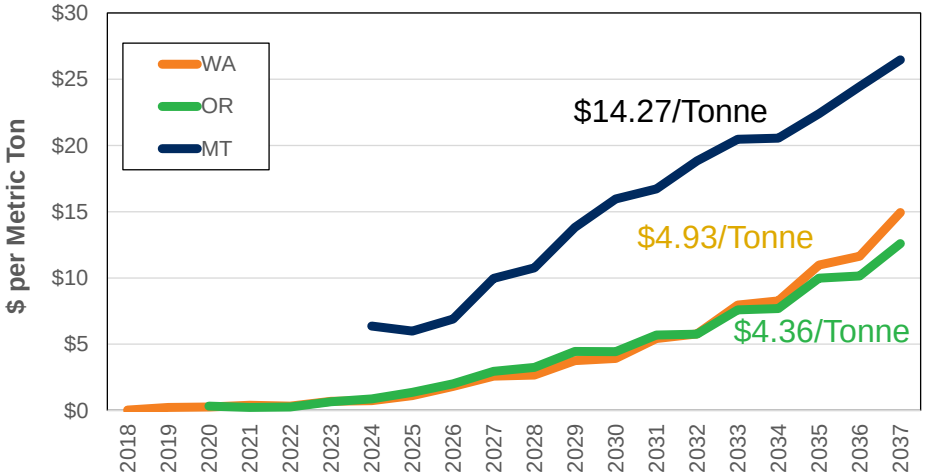
Mid-Columbia Electric Price Forecast
$35.85/ MWh Levelized



Stanfield Natural Gas Price Forecast
$4.20/ Dth Levelized



Greenhouse Gas Emission Prices
$ per Metric Ton

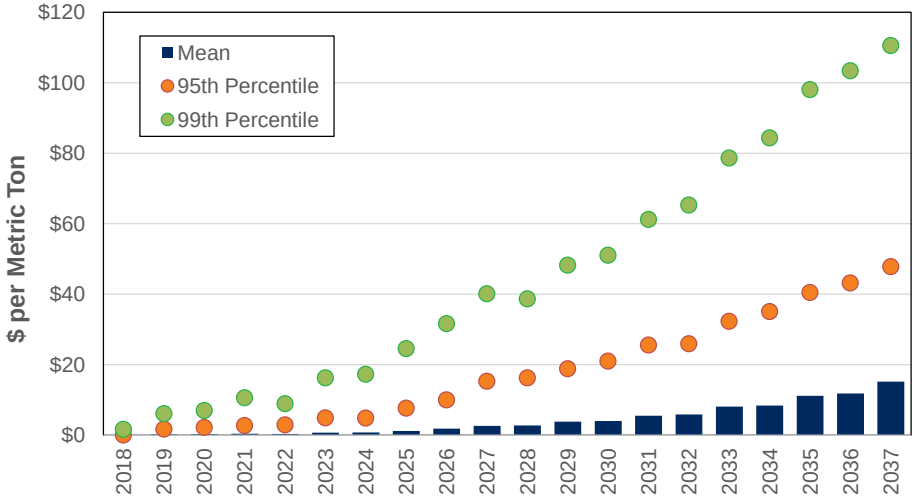


Greenhouse Gas Emission Pricing

Dynamic emission prices derived from policy rather than a direct input price

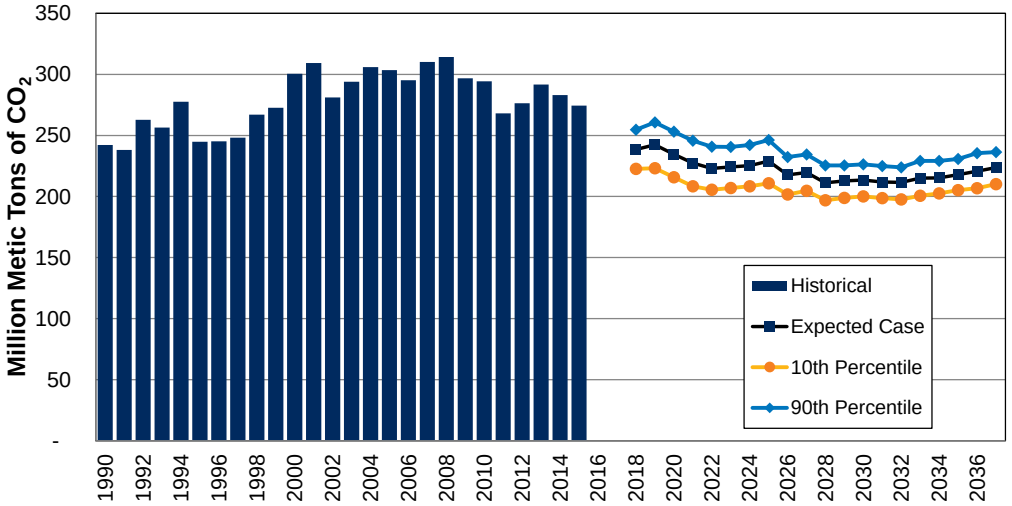
- **Washington:** Clean Air Rule
- **Oregon:** 30 percent reduction as compared to 2015 emission levels
- **Montana:** Clean Power Plan with new source component (delayed by four years)
- **Other Areas:** known carbon taxes and AB32 for California, and other states subject to Clean Power Plan (delayed by four years)
- **Renewable Portfolio Standards:** all state renewable standards and voluntary renewable resources
- **State Level Emission Performance Standards**
- **Announced Resource Retirements**

Washington Clean Air Rule Shadow Prices

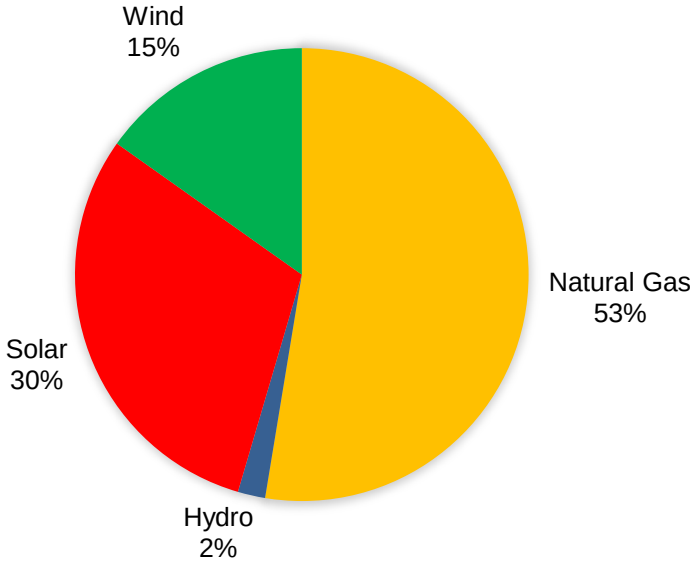


Wholesale Market is Changing

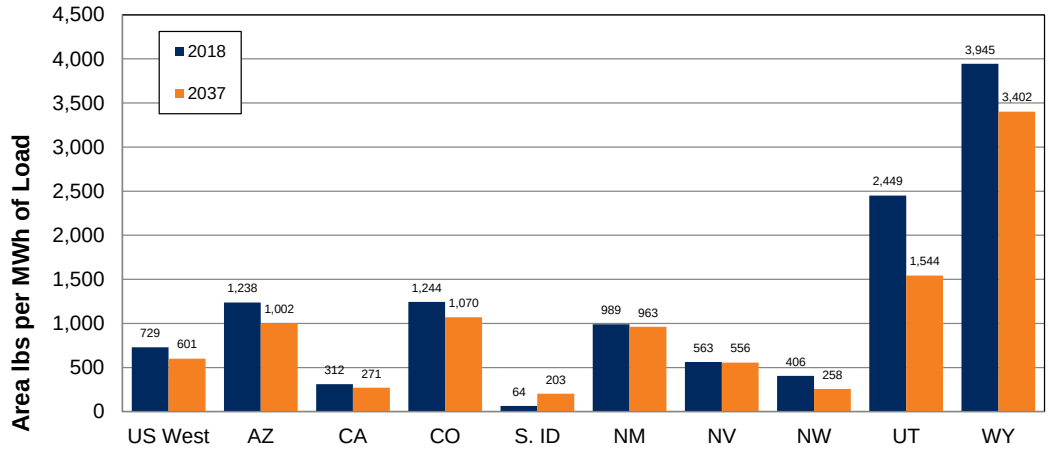
Western Interconnect GHG Emissions



New Resources to Meet Load Growth and Replace Lost Coal & Nuclear



Greenhouse Gas Emission Intensity is Falling

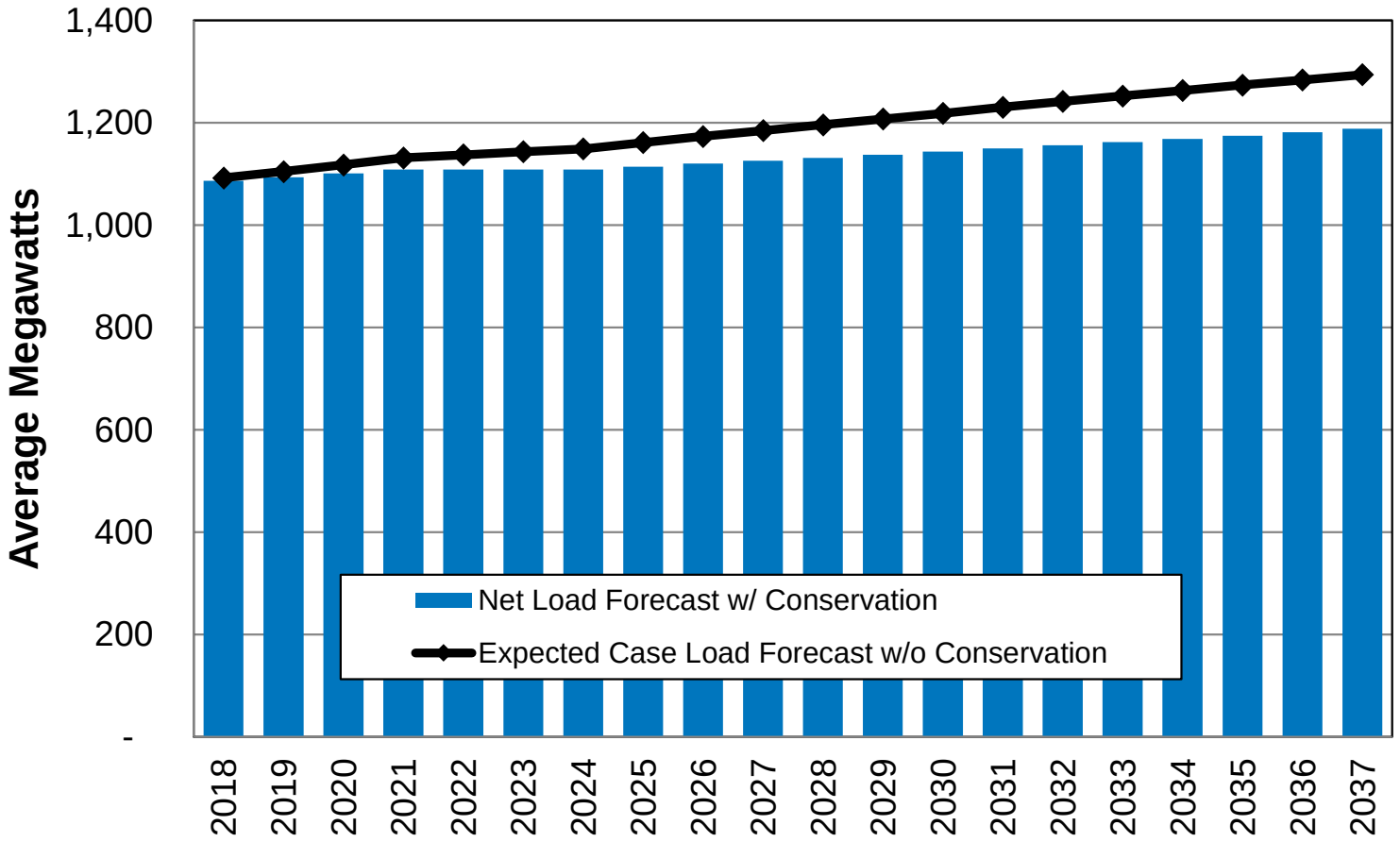


NW emissions fall 36%

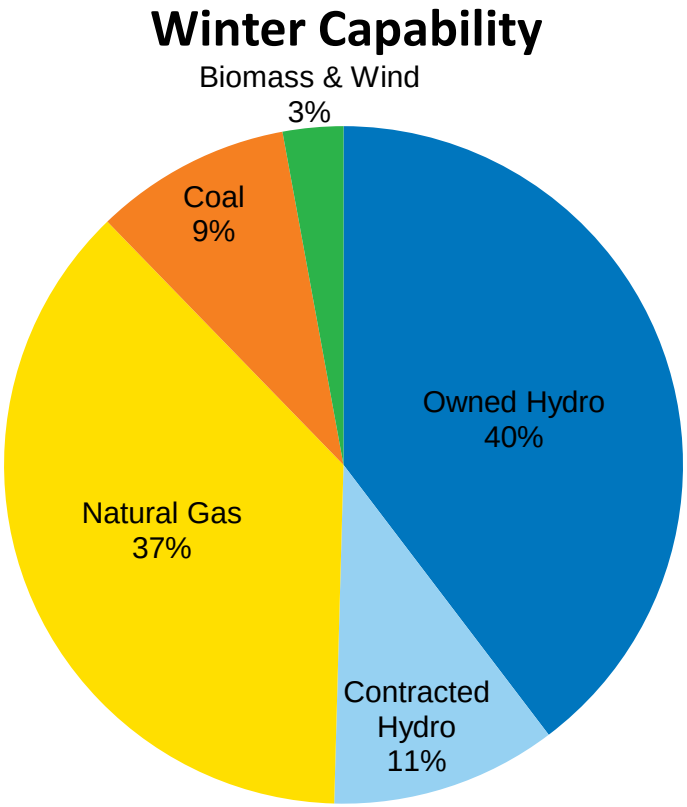
Avista Portfolio Planning

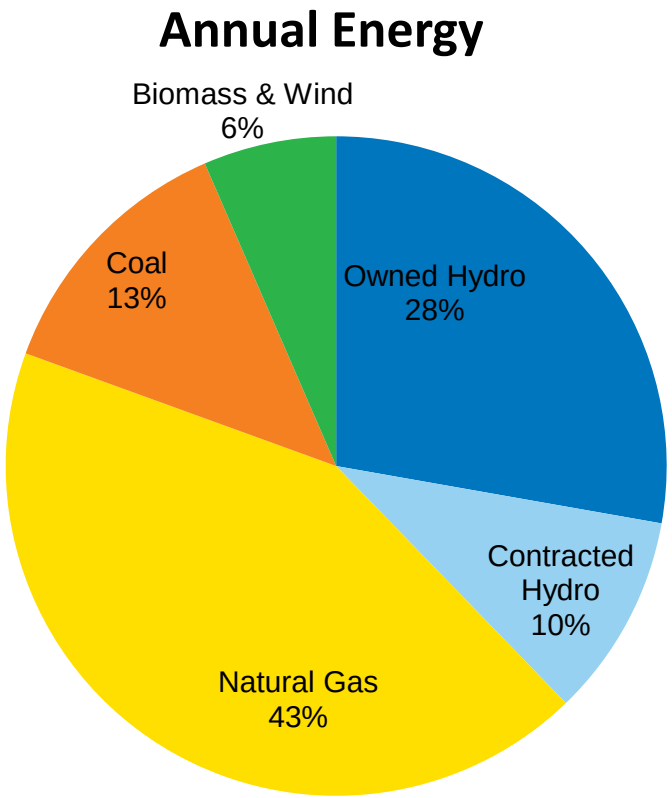
Load Forecast

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



Avista's Current Resource Mix

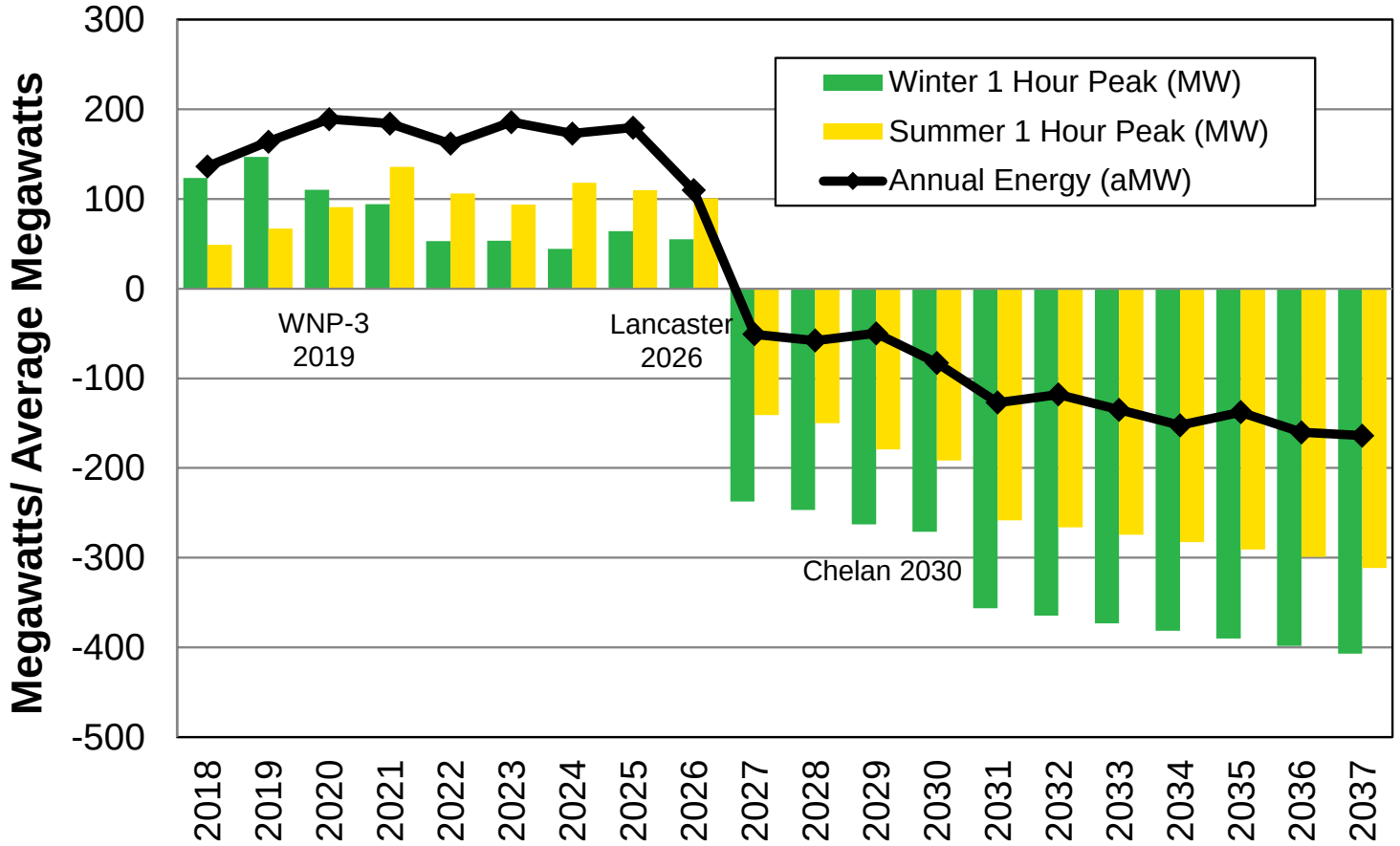




Calculated based on expected capacity and energy in 2018

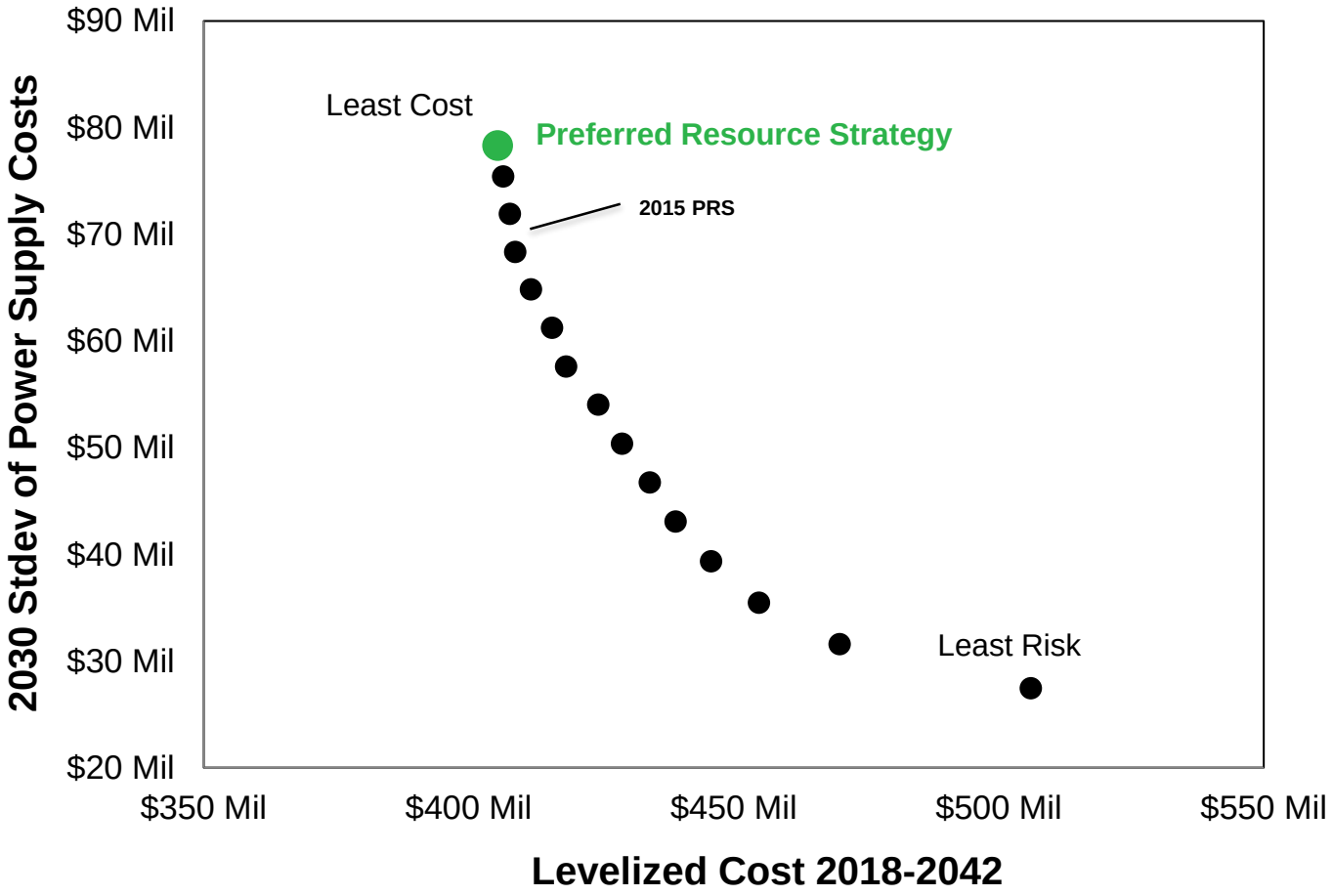
Resource Needs

with Chelan contract extension; no capacity requirements until 2026 when the Lancaster PPA Expires



Efficient Frontier

Least Cost Strategy Selected as PRS

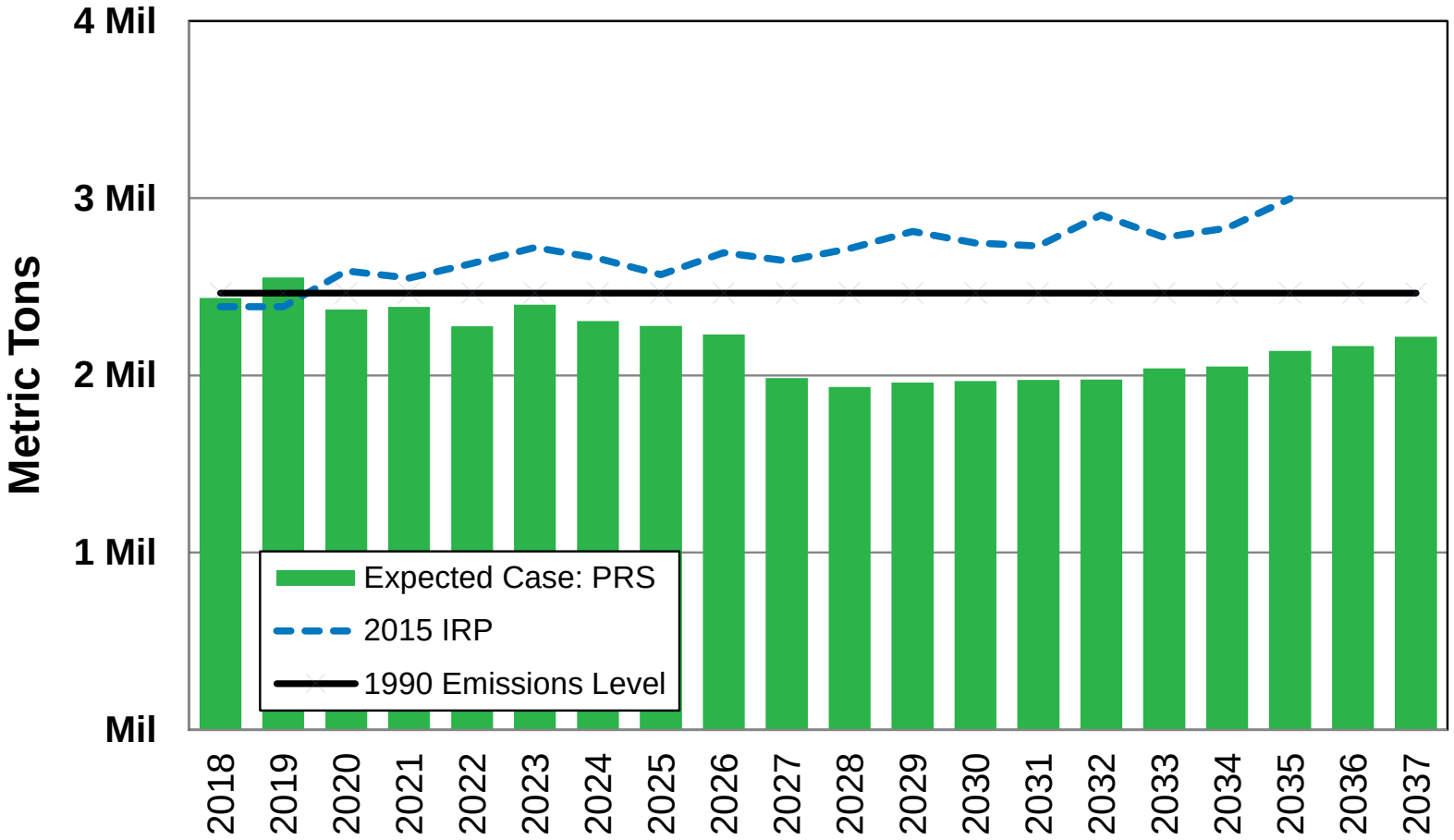


Preferred Resource Strategy

Resource	By the End of Year	Nameplate (MW)	Winter Peak (MW)	Energy (aMW)
Solar	2018	15	0.0	3
Natural Gas Peaker	2026	192	203.7	178
Thermal Upgrades	2026-2029	34	34.0	31
Storage	2029	5	5.0	0
Natural Gas Peaker	2030	96	101.9	89
Natural Gas Peaker	2034	47	46.5	43
Total		**389**	**392**	**344**
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
Total			**247**	**108**

PRS: Direct Greenhouse Gas Emissions

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



Colstrip Scenarios

- **Expected Case**
  - Plant expected to operate through 20-year IRP period, SCR complete in 2027/28, coal combustion residual (CCR) requirement program in place, units 1 & 2 close in 2022 increasing O&M and mercury costs for Units 3 & 4, Montana subject to CO_2 emissions cap in 2024 ($6/tonne to $27/tonne)
- **Retire 2030**
  - Plant retires at end of 2030, plant is depreciated through 2035, no SCR investment, CCR costs remain
- **Retire 2035**
  - Plant retires at end of 2035, plant is depreciated through 2040, no SCR investment, CCR costs remain
- **Dispatch Reduction**
  - Plant costs are same as Expected Case, except emissions limited to 50 percent of Expected Case's operations [$7/tonne (2023) to $38/tonne (2037)]
- **High Retention Cost**
  - Same assumptions as Expected Case except: SCR required in 2022/23, Units 1 & 2 shut down in 2018, accelerating the loss of cost sharing and increase mercury costs, baghouse required for an enhancement to the particulate removal system by 2023
  - Alternative shut down plant by end of 2023

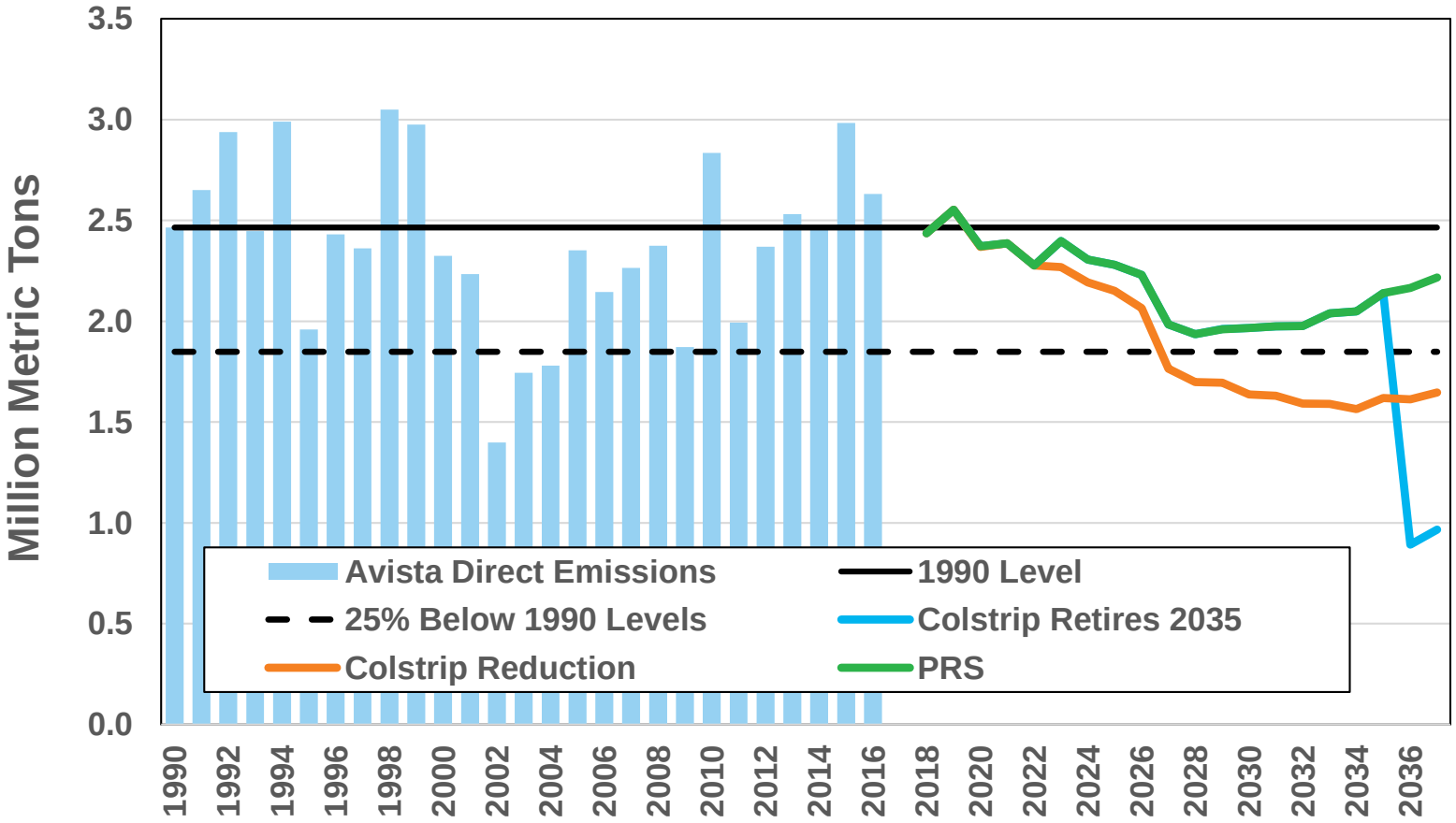
Colstrip Scenario Results

Scenario	Cost [Millions]	Risk [Millions]
Expected Case	$405	$128
Colstrip Retires 2030- NG Peakers	$413 [+$8]	$163 [+$35]
Colstrip Retires 2030- NG CCCT	$415 [+$10]	$150 [+$22]
Colstrip Retires 2035- NG Peakers	$408 [+$3]	$158 [+$30]
Colstrip Reduction	$414 [+$9]	$140 [+$12]
High Retention Cost	$418 [+$13]	$128 [+$0]
Colstrip Retires 2023 (avoiding High Retention Cost)	$414 [+$9]	$163 [+$35]

Cost: Levelized power revenue requirements between 2018 and 2042
Risk: standard deviation of power revenue requirements in 2037

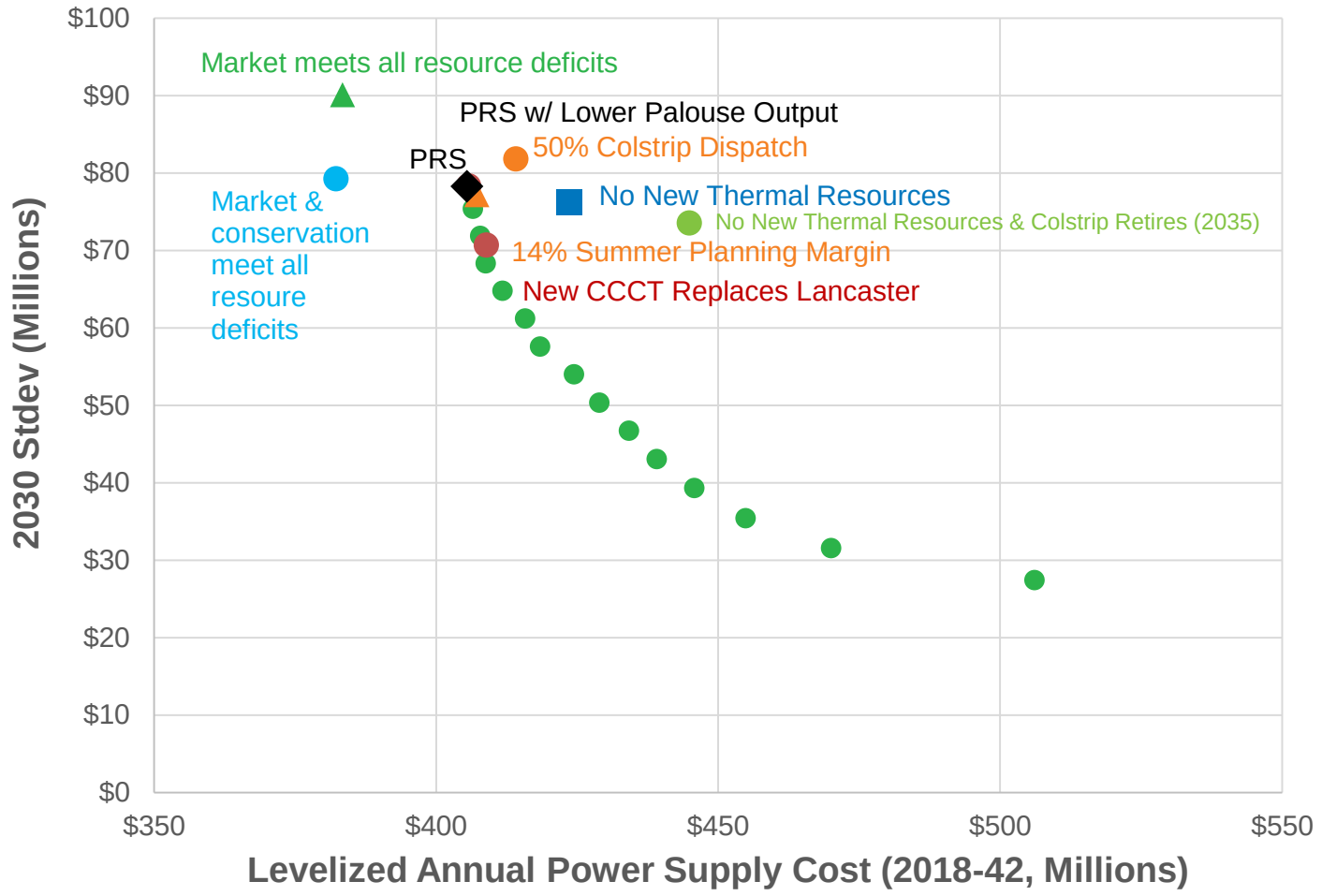
Direct Greenhouse Gas Emissions

Washington State emission goals are in reach



Portfolio Scenarios

Alternative resource strategies add cost, but may lower risk



Two-Year Action Plan Highlights

- Generation Resource Related Analysis
  - Model specific commercially available storage technologies within the IRP; including efficiency rates, capital cost, O&M, life cycle, and ability to provide non-power supply benefits.
  - Update the TAC regarding the EIM study and Avista's plan of action.
  - 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.
  - Monitor state and federal environmental policies effecting Avista's generation fleet.

Two-Year Action Plan Highlights (cont.)

- Energy Efficiency & Demand Response
  - Determine whether or not to move the T&D benefits estimate to a forward looking-value versus a historical value.
  - Determine if a study is necessary to estimate the potential for a winter and summer residential demand response programs and along with an update to the existing commercial and industrial analysis.
- Transmission & Distribution Planning
  - IRP & T&D planning will coordinate on evaluating opportunities for alternative technologies to solve T&D constraints.
- The remaining action items can be found within Chapter 13 of the IRP, at http://myavista.com/IRP