Conservation Plan 2020 - Appendixes A—C

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CASCADE NATURAL GAS CORPORATION
A Subsidiary of MDU Resources Group, Inc.

In the Community to Serve®

Washington Conservation Incentive Program New & Existing Home Incentives

New & Existing Homes

Rebates effective for installs on or after **February 19, 2019**. Incentives may be subject to change and are only applicable for tariff approved measures in place at the time of installation.

High-Efficiency Natural Gas Measures	Basic Specifications	Incentive
Furnace [1]	95% + AFUE	$400
Hearth (Fireplace) [2]	70% + EnerGuide FE (Fireplace Efficiency)	$300
Combination Radiant Heat [1 & 3]	95% + AFUE, pre-approval required	$1,250
Condensing Tankless Water Heater [3]	0.87 + UEF / 0.93 + UEF	$250/$350
Exterior Entry (not sliding) Door [1]	U ≤ 0.21	$100
Condensing Boiler [1]	95% + AFUE	$750
Programmable Thermostat [1]	7 day (flexibility)/5+2 (workweek/weekend)/5+1+1 day models	$25

Existing Homes

Energy-Saving Measure [1]	Basic Specifications	Incentive
Floor Insulation [4]	Post R ≥ 30 or fill cavity to ≥ R-19, prior condition must not exceed R-11	$0.75/sqft
Wall Insulation [4]	Post R ≥ 11 or fill cavity, prior condition must not exceed R-4	$0.75/sqft
Ceiling or Attic Insulation [4] Attic insulation cannot fill cavity	Tier 1: Post R ≥ 38, Prior condition must not exceed R-19 Tier 2: Post R ≥ 49, Prior condition must not exceed R-19	$0.75/sqft $1.00/sqft
Whole House Air Sealing [4 & 5]	Minimum 400 CFM50 reduction using pre and post blower door testing	$150
Duct Sealing [4]	30% or more of supply ducts in unconditioned space	$150
Duct Insulation [4]	Post R ≥ 8, prior condition must not exceed R-0	$0.50 per linear foot
Windows	ENERGY STAR® Northern Zone, U Factor ≤ 0.27 Pre-existing must be single pane	$5.00/sqft
Add on Rebates	**Basic Specifications**	**Incentive**
Bundle A: In *addition* to your standard incentives	**Any Two:** Floor, Wall, Ceiling/Attic Insulation, or Air Sealing. Minimum of 1,000 sqft insulation total	+$250
Bundle B: In *addition* to your standard incentives	**Air Sealing and any two** insulation measures Minimum of 1,000 sqft insulation total	+$500

New Homes

Energy-Saving Measure [1&6]	Basic Specifications	Incentive
ENERGY STAR® Certified Home	National Program Requirements Version 3.1 (Rev. 08)	$2,000
Built Green Certified Home	Requires Built Green Certification	$2,000

1. *Home must be heated by natural gas and a VRF or multizone ductless electric heat pump cannot be present.*
2. *Must use intermittent ignition device. Specifically, per CSA P.4-15 Testing Standard referenced to downloadable Natural Resources Canada EnerGuide database of December 3, 2018 and later. Eligibility for older models not referenced in the December 2018 or later downloadable database, based per CSA P.4 Testing Standard referenced to downloadable Natural Resources Canada EnerGuide database of February 14, 2017. Ventless fireplaces are not eligible.*
3. *Water-heating fuel must be provided by Cascade Natural Gas for all water-heating incentives. Use of tankless water heater is acceptable for combined space and water heating with a Uniform Energy Factor (UEF) of 0.95 or higher. Combined use of indirect, non-fired tank is acceptable for use with approved 95% AFUE Boiler where required.*
4. *Insulation and air sealing must be performed by a CNGC qualified Trade Ally. Visit www.cngc.com/energy-efficiency for a list of qualified Cascade Trade Allies in your area.*
5. *Requires WA Department of Commerce Combustion Safety Test Report Exhibit 5.3.1A.*
6. *These New Home only rebates may not be combined with any other measure except Hearths (Fireplaces). Built Green measures require proof of a natural gas heating system, such as a photo or invoice.*

Last Updated 02/2019

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Washington Conservation Incentive Program New & Existing Home Incentives

Eligibility Requirements

Rebates effective for installs on or after **February 19, 2019**. Incentives may be subject to change and are only applicable for tariff approved measures in place at the time of installation.

- Applications must be received within 90 days of install date.
- Applicant must be a Washington State Cascade Natural Gas customer on residential rate schedule 503 (see bill).
- Homes must be heated by natural gas to be eligible for space heating and weatherization rebates.
    - Homes using a **VRF or multizone ductless electric heat pump are ineligible for space heating rebates.**
- Measures must be installed by a Washington State licensed contractor, except doors and programmable thermostats. **Note:** if installing insulation or air sealing you must use a CNGC qualified Trade Ally.
- Appliances and building materials specified by Washington state code are not eligible for Cascade Natural gas incentives.
- ENERGY STAR homes must be approved by an ENERGY STAR verifier.
- Built Green Homes must present Built Green Certification.
- Review all terms and conditions for the program at **www.cngc.com/energy-efficiency**

How to qualify for Cascade Natural Gas incentives:

1. **Establish your eligibility** visit **www.cngc.com/energy-efficiency** or Call 866.626.4479 for program requirements.
2. **Install energy-efficient home improvements.** Contact a CNGC Trade Ally or Washington licensed contractor to install eligible measures. Visit **www.cngc.com/energy-efficiency** for a list of qualified trade allies. Note: if installing insulation or air sealing you must use a CNGC qualified Trade Ally.
3. **Submit Application**. Obtain the application at **www.cngc.com/energy-efficiency** or call 866.626.4479. Sign and send with a copy of your invoice to:

Mail: Cascade Energy Efficiency Admin
1600 Iowa Street, Bellingham, WA 98229

Fax: 360.788.2396

Upon receipt of completed applications, please allow up to 12 weeks for processing.

Home Energy Savings Kit[3]

Water and energy saving shower heads and faucet aerators available upon request. Please call 866.626.4479 for details or apply online.

For questions or more information, please visit us online at www.cngc.com/energy-efficiency or call 866.626.4479.

Cascade Natural Gas
WA Commercial and Industrial Incentives

Rebates effective on installs on or after February 19, 2019

Heating

Warm Air Furnaces - $5.00/kBtu/hr
High Efficiency Condensing Furnace—Min 91% AFUE
Ex: 120 kBtuh x $5/ kBtuh = $600

HVAC Unit Heater - $5.00/kBtu/hr
High Efficiency Condensing Min—91% AFUE
Ex: 180 kBtuh x $5/ kBtuh = $900

Radiant Heating - $15.00/kBtu/hr
Direct fired radiant heating
Ex: 180 kBtuh x $15/ kBtuh = $2,700

Boiler Vent Damper - $1,000
Min 1,000 kBtu input

Boiler Steam Trap[2 & 3] - $125
Min 300 kBtu in; steam pressure at 7psig or > Retrofit Only

Demand Control Ventilation[4] - $20/nominal ton
5 tons ≤ Unit Cooling Capacity ≤ 20 tons.
Pre-Approval Required.

High-Efficiency Condensing Boiler - $6.00/kBtu/hr
Min 90% Thermal Eff & 300 kBtu input
Ex: 1600 kBtuh x $6/ kBtuh = $9,600

Kitchen Equipment/Appliances

Connectionless 6 Pan Gas Steamer - $1,200
ENERGY STAR® or CEE/FSTC Qualified
≥38% Cooking Eff / ≤2,083 Btu/hr/pan Idle Rate

Gas Griddle - $500
ENERGY STAR®
≥38% Cooking Eff/ ≤2650 Btu/hr sq ft Idle Rate

Multi-Tank Conveyor Low Temp Dishwasher[3] - $2,500
Gas Main w/Electric Booster ENERGY STAR®
≤2.0 kw Idle Rate; ≤ 0.50 gallons/rack

Connectionless 3 Pan Gas Steamer - $850
ENERGY STAR® or CEE/FSTC Qualified
≥38% Cooking Eff / ≤2,083 Btu/hr/pan Idle Rate

Gas Convection Oven - $800
ENERGY STAR®
≥42% Cooking Eff/ ≤13,000 Btu/hr Idle Rate

Gas Conveyor Oven - $450
≥42% tested baking efficiency

Double Rack Oven - $2,500
FSTC Qualified
≥50% Cooking Eff/ ≤3,500 Btu/hr/Idle Rate D Rack

ENERGY STAR® Gas Fryer - $750

Door Type Dishwasher Low Temp Gas[3] - $800
ENERGY STAR®
≤.6 kw Idle Rate/ ≤1.18 gallon/rack

Weatherization

Windows - $5.00/sq ft - (retrofit only)
Pre-Existing must be single pane; Post must be
ENERGY STAR® Northern Zone, U-Factor ≤ 0.27

Attic Insulation[1] - (retrofit only)
Ex: 1000 sq ft x $2/ sq ft = $2000
Tier 1: Min R-30 - $2.00/sq ft
Tier 2: Min R-45 - $2.50/sq ft

Roof Insulation[1] - (retrofit only)
Tier 1: Min R-21 - $2.00/sq ft
Tier 2: Min R-30 - $2.50/sq ft

Wall Insulation[1] - (retrofit only)
Tier 1: Min R-11 - $1.25/sq ft
Tier 2: Min R-19 - $1.50/sq ft

Floor Insulation[1] - (retrofit only)
Min R-30 - $0.75/sq ft

Hot Fluid Pipe Insulation[3] - (retrofit only)
> 140F, <200F, 1.5" insulation - $15.00 per linear foot,
≥ 200F, 2.5" insulation- $25.00 per linear foot

Water

Energy Savings Kits[3] - FREE
A: Kitchen Pre Rinse Spray Valve
B: Low Flow Showerheads & Bath Aerators

Domestic Hot Water Tankless Water Heater[3]
.87 UEF/Thermal Efficiency - $120/gpm
.93 UEF/Thermal Efficiency - $150/gpm
Ex: 0.93 UEF 6 GPM x $150/ kBtuh = $900

DHW Recirculation Controls[3] - $200
Continuous Operation DHW Pump. Retrofit Only.
Pre-approval required.

Motion Control Faucet[3] - $105
Maximum flow rate of 1.8 gpm
WaterSense® Certified and Below Deck Mixing Valve

Domestic Hot Water Tanks[3] - $2.50/kBtu/hr
Condensing tank, Min 91% Thermal Eff
Ex: 199 kBtuh x $2.50/ kBtuh = $497.50

Ozone Injection Laundry[3] - $2,500
Venturi injection or bubble diffusion - Min 125 lb. total washer/extractor capacity. **Pre-approval required.**

If you are planning equipment or building upgrades that do not fit within the standard incentives, but significantly reduce natural gas consumption, please call 866.450.0005 to learn about custom project opportunities.

1. Insulation must be installed in an existing building, heated by natural gas, without functional insulation. Rebate will not exceed total project costs. Wall minimum value of R-11 applies only where existing walls have no internal insulation cavities.
2. This measure will only be allowed where the customer agrees to regular trap maintenance and replacement every seven (7) years.
3. Incentive eligibility contingent upon use of natural gas fired domestic hot water serving the specified measure equipment or fixture.
4. For Existing Packaged HVAC Units equipped with Gas Fired Furnace and Direct Expansion Cooling Sections DCV Unit; Controller must meet Joint Utility Advanced Rooftop Control Guidelines.
5. Kitchen equipment is defined as dishwashers, steamers, ovens, fryers, and griddles.

Who is eligible to participate?

- Mixed purpose facilities that include buildings on both Residential Rate Schedule 503 and qualifying Rate Schedules 504, 505, 511, and 570 as part of the same Cascade Natural Gas customer account are also eligible for custom conservation incentives.
- Incentives apply on qualified high-efficiency natural gas equipment such as heating, insulation, water heating systems, cooking equipment installed as replacement, retrofit as well as new installation in place of standard efficiency equipment. If the equipment installation, replacement, or retrofit provides significant increase over existing high-efficiency equipment, and is not listed here please contact program representative for potential custom incentive.
- Eligible measures installed are subject to the available incentives coinciding with the date of the installation as outlined in CNGC's tariff.
- Customers requesting custom incentives for site-specific energy efficiency measures must submit estimated costs and natural gas savings associated with the project. Natural gas savings are to be calculated using standard engineering practices. CNGC will review the natural gas savings calculations and reserves the right to modify energy savings estimates.

How to qualify for Cascade Natural Gas incentives

1. Establish eligibility:
   Call 1.866.450.0005 or visit www.cngc.com/energy-efficiency for program requirements.
2. Install energy-efficient upgrades:
   Contact a licensed contractor or one of our Trade Allies to install eligible measures.
3. Submit application:
   Available online at www.cngc.com/energy-efficiency.
   Sign and enclose:
   - ☐ Application
   - ☐ W9 form
   - ☐ CNG bill
   - ☐ Invoice/Quote showing total cost, model number and R Values for insulation measures

Mail forms to:

Cascade Natural Gas Corporation,
c/o Lockheed Martin Energy
22121 20th Avenue SE, Bothell, WA 98021
Fax: 877.671.2998

Upon receipt of completed application, please allow six to eight weeks for processing and payment.

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SECOND QUARTER SUMMARY

APRIL - JUNE

2019 FEASIBILITY WORK BOOK (FWB) ACTIVITY OVERVIEW

CASCADE NATURAL GAS CORPORATION®
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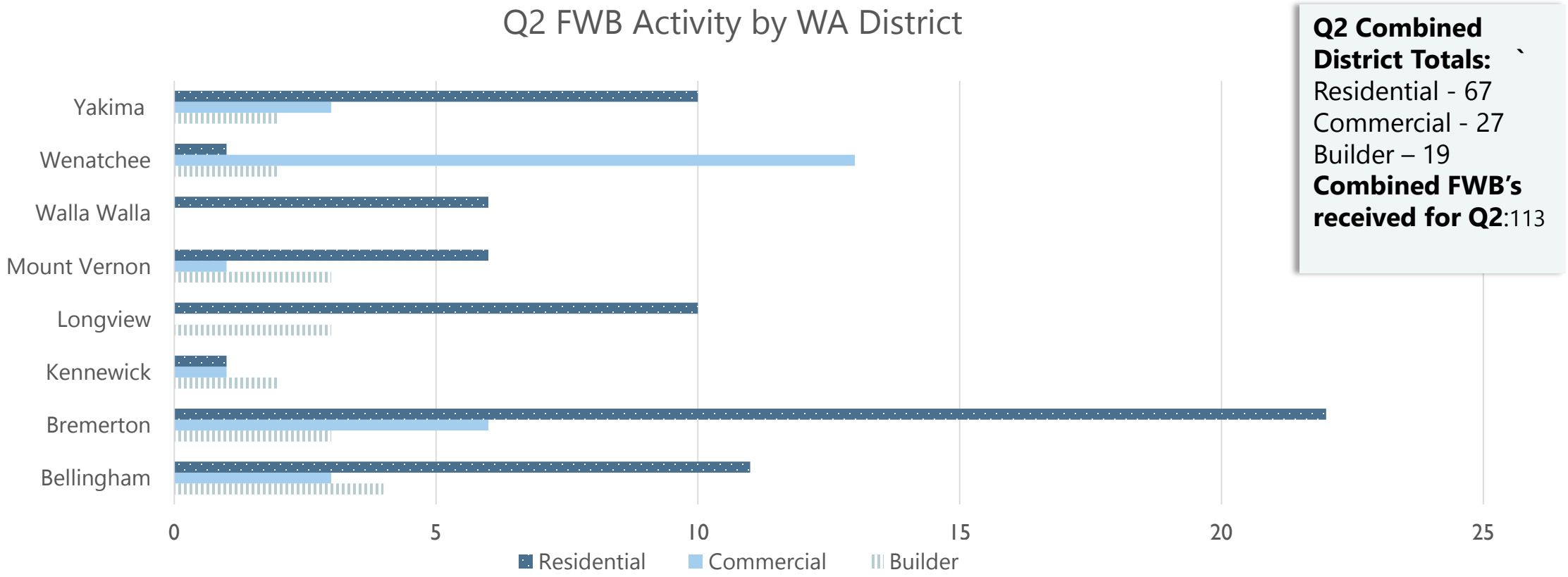
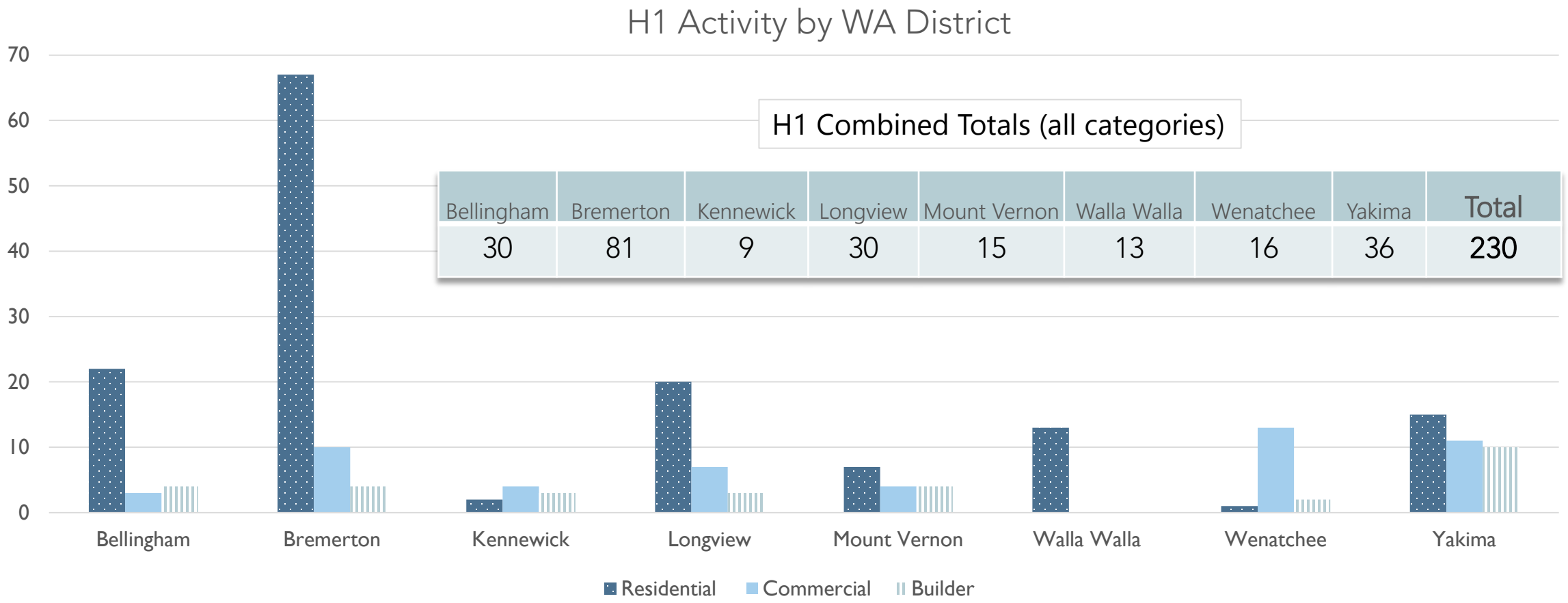


Q2 Combined District Totals: `
Residential - 67
Commercial - 27
Builder – 19
Combined FWB's received for Q2:113

Wenatchee went from zero activity in Q1, to producing the highest numbers of all districts for commercial energy efficiency (EE) interest in Q2. Along with their astounding commercial success, Wenatchee was also able to put numbers on the board for residential, as well as keeping up with the builder average (two). Yakima saw reduced builder EE intertest, dropping from eight to two. However, their residential numbers did increase by two fold. Bremerton typically delivers the bulk of the residential EE interest, but their district had a significant decrease of 51% for Q2. However, with that deficit, Bremerton still produced more than twice as much as all other districts.

There were 230 new customers who expressed interest in energy efficiency through the FWB process the in first half (H1). Of those 230 interested customers, Bremerton made up 35% of that participation. In previous quarters, we've typically seen the majority of the FWB activity out of the Bremerton district, followed by Bellingham. However, in this first half reporting, Yakima came in second. Bellingham and Longview both ending H1 with a combined total of 30 interested customers for all categories, coming in third behind Bremerton.



H1 Combined Totals (all categories)

Bellingham	Bremerton	Kennewick	Longview	Mount Vernon	Walla Walla	Wenatchee	Yakima	Total
30	81	9	30	15	13	16	36	230

For 2020–2024, NEEA is proposing to operate a portfolio of natural gas market transformation programs that includes two gas-only programs (Condensing Rooftop Units, Efficient Gas Water Heating) and one dual-fuel program (Next Step Homes). This diverse portfolio covers residential and commercial products, retrofit and new construction applications, a range from pre-commercialized products to those currently in the market, and three product groups: HVAC, Water Heating, and New Construction.

NEEA Cycle Six Natural Gas Programs:

PROGRAMS	MARKET DESCRIPTION	OBJECTIVES
Condensing Rooftop Units (C-RTUs)	Includes the supply chain that manufactures, distributes, specifies, designs and installs commercial HVAC products and the end consumer who purchases them.	1. Transform the market so that Northwest commercial building owners and managers install C-RTUs as standard practice in applicable existing and new small to medium-sized commercial buildings. 2. Increase Northwest specifier and installer skill in designing, sizing and configuring C-RTUs for applicable commercial buildings. 3. Influence a federal requirement of at least 90% efficiency for commercial warm air furnaces. 4. Influence the development of a readily-available C-RTUs with cost, weight and reliability in line with a C-RTUs.
Next Step Homes	Includes the supply chain that designs, builds, verifies and sells residential single-family site built new homes. Leverages the work and resources of the alliance's established, electric Next Step Homes program.	1. Maximize energy efficiency opportunities for new homes in residential new construction code requirements. 2. Influence developers and builders to incorporate advanced energy-efficient products and practices in new homes. 3. Inform and enable code advancement through market adoption of energy-efficient products and practices.
Efficient Gas Water Heating (EGWH)	Includes the supply chain that manufactures, distributes (wholesale and retail), specifies, designs and installs residential gas-fired water heaters and the end consumers who purchase these products.	1. Transform the residential gas water heating market, ultimately making gas heat pump water heaters the standard in gas water heating appliances. 2. Influence federal manufacturing standards for residential storage gas water heaters to require a Uniform Energy Factor >1 for units larger than 35 gallons by 2030.

Status update:
Energy Efficiency's Progress toward the IRP's Two-Year EE Action Plan

- Perform continual technical review of new measures identified by the AEG CPA as well as through participation in the Gas Technology Institute Emerging Technology workgroup for inclusion in the Energy Efficiency program portfolio
    - *Ongoing - see Emerging Technology Section of the Plan for details*
- Review and revise ramp rates within the LoadMAP model in compliance with best practices as recommended from the NWPCC and AEG, to align with measure maturity
    - *Cascade hosted two webinars and a two-day site visit with Applied Energy Group (AEG) to provide training to new hire analysts and discuss updates to the model in light of legislations and code revisions*
- Increase builder outreach
    - *Cascade's new Builder Program Coordinator has personally contacted all active builders in the program and obtained an estimated forecast for remaining 2019 projects. The coordinator will perform additional outreach following the building season in late fall. The program appears to be on track with no diminution in new builder intake and several new builders entering the program for the first time.*
    - *Pilot proposals are included in this plan to evaluate interest in a Point of Sale option for new building contractors.*
    - *The program is proposing a program change for a bonus bundle for new homes installing both a high efficiency tankless unit and a furnace. New home certification programs are difficult to get certified and this will allow the program to encourage high-efficiency upgrades and promote builders to more frequently install multiple measures while recognizing the territory's lack of qualified certifiers for Built Green and ENERGY STAR homes.*
- Partner with Cascade Districts and operations teams to increase customer awareness of Energy Efficiency programs through daily interactions
    - *Staff from the EE Department have reached out to district staff in two key towns, Mt Vernon and Yakima and provided presentations and multiple in-person meetings to coordinate on future opportunities to promote high-efficiency upgrades and clarify the role of EE within the Company as a tool to help customers.*
    - *A Feasibility Workbook (FWB) is completed by the Washington Districts and used to record new customer interest in learning about Energy Efficiency incentives, for the EE department to follow up. The new Energy Services group at Cascade has stepped up their use of the FWBs to provide more*

leads for EE follow up, especially in the Commercial Sector. See FWB Analysis Q2 for further FWB details.

- *The EE team is engaged in ongoing discussions with the new Energy Services Representatives on how to collaborate efficiently for the best customer experience*

- Extend Northwest Energy Efficiency Alliance (NEEA) membership into Cycle 6 (2020-2024) and elevate CNGC's participation to equal status with electric and dual fuel utilities on the Board of Directors allowing regional natural gas market transformation efforts to grow
  - *Monica Cowlishaw – Energy Efficiency & Community Outreach Manager elected to NEEA's Board of Directors*
- Fully engage in NEEA's Next Step Homes program starting in 2019 to support the Company's expanding residential builder outreach efforts
  - *The new Builder Program Coordinator will engage with Next Step Homes in 2020.*
- Expand Commercial/Industrial program outreach and customer engagement
  - *An additional Business Development resource was hired to serve the CNGC territory east of the Cascades*
  - Host customer forums
    - *A forum is tentatively planned in Bellingham in 2020.*
  - Identify opportunities for dual fuel solutions
    - *Cross utility referrals are being incorporated into the initial assessment process were viable. Additionally, the Company is receiving and providing referrals as appropriate with partner utilities.*
  - Expand SPIF offerings
    - *Feedback has been received that SPIFs have not proven a program driver recently. Additional research will be needed to support a decision to expand or discontinue this offering*.
  - Provide selective technical audit support
- Enhanced Trade Ally (TA) engagement
  - Drive Trade Ally participation through the commercial program with the primary objective being to make the incentive program a simple part of the install process for all Trade Allies in the Company's network installing in commercial/industrial properties and second, to increase the network where gaps exist
    - *The C/I program is exploring expanding it's Point of Sale offerings in 2020.*
    - *Additionally, the program performed a Pareto analysis of Missing Information on applications from Trade Allies to establish corrective action.*

- Provide CNGC Sponsored TA training for underperforming measures including air sealing and potential duct sealing if added to the portfolio
    - *The Program is promoting TA training through the Building Performance Center and will seek to do more in 2020.*
- Expand a Point of Sale offering to residential Trade Allies to remove upfront cost barriers for customers to install higher-efficiency upgrades
    - *POS has been offered to six Trade Allies, three of whom are actively participating.*

- Explore geographic pilots and efforts for specific offerings to underperforming areas within the service territory – for example in Zone 2 (Aberdeen, Longview, etc.)
    - *The program is working with Sustainable Connections and the Community energy Challenge to reach rural communities.*
    - *Additionally, the program is working to initiate a targeted outreach pilot to insulation providers who serve Yakima, Longview and Wenatchee.*
- Increase engagement with the agencies delivering the Company's LI Weatherization Incentive Program for the purpose of facilitating increased weatherization services delivered to qualified natural gas customers in Cascade's service area
    - *The Company met with the agencies in 2018 and is planning a similar discussion in fall 2019 to include upcoming program updates.*
    - *Program staff continue to analyze project submittals and costs and update the CAG during quarterly meetings on impacts of evolving prevailing wage regulations to the agencies.*
    - *The program has offered the program budget option in the MOUs for agencies.*
    - *The LI program has increased uptake from 2018 and continues to maintain open communication with agencies seeking feedback and recommendations.*
    - *The Company will make adjustments to its WIP/EWIP tariff to reflect program changes being made at the State Level. This includes the discontinuation of the Department of Commerce's Weatherization Assistance Program Priority List, and the potential addition of other accepted auditing methodologies such as Snugg Pro.*

Paths to Increase Conservation Forecast Precision

- *The Company hired a new Lead Economic Analyst whose expertise is expected to improve the forecast allowing it to be more robust and agile. He has set up quarterly internal reviews to establish a regular cadence of technical review and evaluation of the equipment feeding into the LoadMAP*

model. Additionally, the Company is performing annual review and updating incremental costs for measures within the Company's service territory, reviewing measure maturity and ramp rate progression and scanning of new measures while reviewing market availability of existing measures.

Importance of Outreach and Cohesive Messaging

- *Cascade's customers' natural gas efficiency savings and incentives are part of the exceptional customer experience the EE Department seeks to provide. The J.D. Power 2019 gas Utility Residential Customer Satisfaction Survey for midsize natural gas utility companies in the Western Region compared all 84 companies in the survey, and regardless of size, Cascade ranked first.*

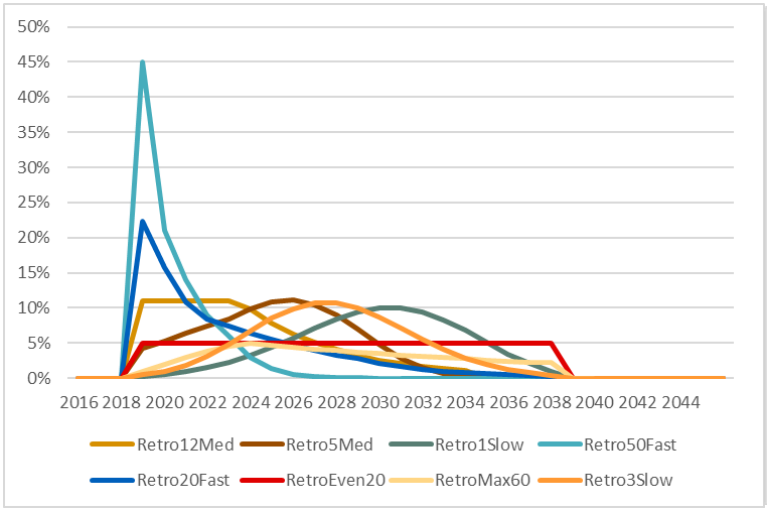
Program Budgets - Reflected in the 2019 CNGC Conservation Plan			
Incentive Estimates			
Program	**Budget**	**Allocated as DBtC**	**Notes**
Residential	$1,920,000	√	See Residential section
Commercial/Industrial	$950,000	√	See Com/Ind section
Low Income	$515,000	√	See Low Income section
Total Incentives	**$3,385,000**		
Non-Incentive/Program Implementation Expenses			
Program	**Budget**		**Notes**
Residential	$924,186		Staffing, software, marketing
Commercial/Industrial	$1,261,274		Third party program management with commercial marketing, remainder toward internal support and program coordination
Low Income	$25,568		Marketing, training, supplies
Portfolio Admin Total	**$2,211,028**		Residential, Com/Ind, & LI Weatherization

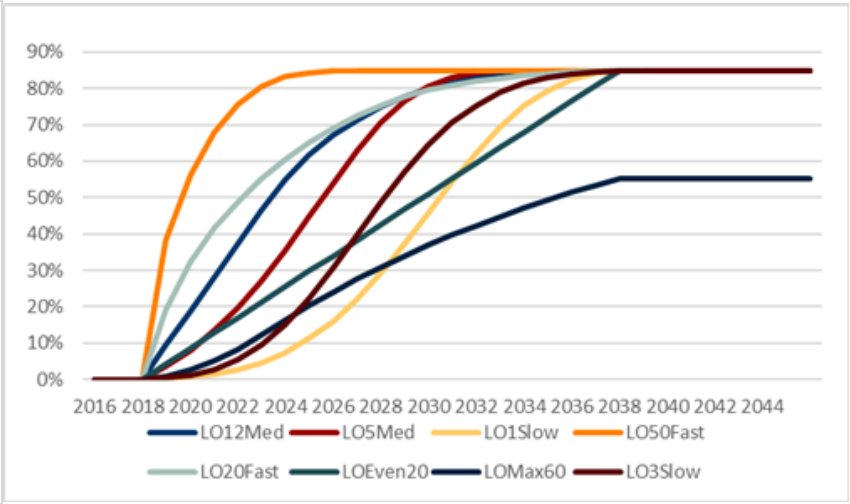
Non-Incentive Expenses Allocation:	**Budget**	**Notes**		
Labor	*$683,047*	Company staff allocated 70% residential/ 30% Commercial/ Industrial, minor low-income hours + part time cyclical temporary assistance for application processing		
Third Party Commercial/ Industrial Program Mgmt.	*$904,750*	Implementation, outreach for C/I EEIP, total for contractor coordination is dependent on vendor goal achievement		
Annual Software fees	*$185,000*	Residential & Low-Income rebate processing and data management, TA Program, maintenance and updates		
Outreach / Trade Ally	*$288,100*	**Breakdown**	**Allocated as DBtC**	**Notes**
		$20,000	√	LI Weatherization Outreach
		$68,800	√	Bonus coupons delivered by TAs to customers & Quality Control Inspections
		$5,500	√	Residential Program partnership with local community energy programs partnerships, e.g. Sustainable Living Center, Community Energy Challenge
		$3,000	√	Partnership with local Commercial energy program: Sustainable Connections
		$4,000	√	Customer Service Resolution
		$97,000		Trade Ally Support

		$25,000		Professional Dues, e.g. AESP, WA Lodging and Restaurant associations, HBAs, etc.
		$10,800		Display materials & handouts
		$54,000		Outreach: Campaigns, Web, etc.
Other	*$150,131*	$108,500		Miscellaneous & General Operating Expenses
		$24,723		Travel
		$10,190		Professional Development
		$6,718		Office supplies
Portfolio Admin Total **(Included from above)**	**$2,211,028**	Non-Incentive/Admin Expenses		
Additional Expenses ***(excluded from DBtC)***	**$548,804**	NEEA Market Transformation		
Total Expenses	**$6,144,832**	Program Delivery + Incentives + NEEA		

Key	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
LO12Med	0%	0%	0%	9%	19%	28%	37%	47%	55%	62%	67%	71%	75%	78%	80%	82%	83%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LO5Med	0%	0%	0%	4%	8%	13%	20%	27%	35%	45%	54%	63%	71%	76%	81%	83%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LO1Slow	0%	0%	0%	0%	1%	1%	3%	5%	7%	11%	16%	22%	29%	37%	46%	54%	62%	69%	75%	79%	82%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LO50Fast	0%	0%	0%	38%	56%	68%	76%	81%	83%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LO20Fast	0%	0%	0%	19%	32%	42%	49%	55%	61%	65%	69%	72%	75%	78%	79%	81%	82%	83%	84%	84%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LOEven20	0%	0%	0%	4%	9%	13%	17%	21%	26%	30%	34%	38%	43%	47%	51%	55%	60%	64%	68%	72%	77%	81%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LOMax60	0%	0%	0%	1%	3%	5%	8%	12%	16%	20%	24%	28%	31%	34%	37%	40%	42%	45%	47%	49%	51%	53%	55%	55%	55%	55%	55%	55%	55%	55%	55%
LO3Slow	0%	0%	0%	0%	1%	3%	5%	9%	15%	22%	31%	40%	49%	57%	65%	71%	75%	79%	81%	83%	84%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Retro12Med	0%	0%	0%	11%	11%	11%	11%	11%	10%	8%	6%	5%	4%	3%	3%	2%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Retro5Med	0%	0%	0%	4%	5%	6%	7%	8%	10%	11%	11%	10%	9%	7%	5%	3%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Retro1Slow	0%	0%	0%	0%	1%	1%	1%	2%	3%	4%	6%	7%	8%	9%	10%	10%	9%	8%	7%	5%	3%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Retro50Fast	0%	0%	0%	45%	21%	14%	9%	6%	3%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Retro20Fast	0%	0%	0%	22%	16%	11%	8%	7%	6%	5%	5%	4%	3%	3%	2%	2%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Faucet_HB1444	0%	0%	0%	0.3%	0.5%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Shower_HB1444	0%	0%	0%	0%	0.5%	0.9%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RetroEven20	0%	0%	0%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RetroMax60	0%	0%	0%	1%	2%	3%	4%	5%	4.9%	4.6%	4.4%	4.1%	3.9%	3.7%	3.5%	3.3%	3.1%	2.9%	2.7%	2.6%	2.4%	2.3%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Retro3Slow	0%	0%	0%	1%	1%	2%	3%	5%	7%	8%	10%	11%	11%	10%	9%	7%	6%	4%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Ramp Rates from the NWPCC's 7th Plan





Appendix B

Residential DSM Forecast Highlights

Summary of Energy Savings (therms), Selected Years	2019	2020	2022	2028	2038
Baseline Forecast (therms)	123,231,862	124,383,448	125,348,545	133,277,265	147,015,422
Potential Forecasts (therms)					
UCT Achievable Economic Potential	122,697,566	123,508,348	123,518,476	126,176,968	125,900,144
TRC Achievable Economic Potential	122,245,436	122,856,398	122,441,274	122,803,981	127,193,059
Achievable Technical Potential	121,651,152	121,889,702	120,418,172	114,037,203	106,203,948
Technical Potential	119,986,713	119,596,742	117,021,626	109,447,511	100,249,525
Cumulative Savings (therms)					
UCT Achievable Economic Potential	534,297	875,100	1,830,069	7,100,297	21,115,278
TRC Achievable Economic Potential	986,426	1,527,050	2,907,271	10,473,284	19,822,364
Achievable Technical Potential	1,580,710	2,493,746	4,930,374	19,240,061	40,811,475
Technical Potential	3,245,150	4,786,706	8,326,919	23,829,753	46,765,897
Energy Savings (% of Baseline)					
UCT Achievable Economic Potential	0.4%	0.7%	1.5%	5.3%	14.4%
TRC Achievable Economic Potential	0.8%	1.2%	2.3%	7.9%	13.5%
Achievable Technical Potential	1.3%	2.0%	3.9%	14.4%	27.8%
Technical Potential	2.6%	3.8%	6.6%	17.9%	31.8%
Incremental Savings (therms)					
UCT Achievable Economic Potential	313,124	338,801	584,766	1,431,836	1,433,008
TRC Achievable Economic Potential	523,771	539,557	825,984	1,933,448	202,273
Achievable Technical Potential	874,897	912,394	1,480,908	3,376,881	1,926,889
Technical Potential	1,807,722	1,535,922	2,095,498	3,847,456	2,113,893

Appendix B

Commercial DSM Forecast Highlights

Summary of Energy Savings (therms), Selected Years	2019	2020	2022	2028	2038
Baseline Forecast (therms)	94,398,445	95,540,156	98,107,808	107,060,779	122,968,382
Potential Forecasts (therms)					
UCT Achievable Economic Potential	93,932,135	94,743,174	96,351,054	99,687,540	107,961,585
TRC Achievable Economic Potential	94,049,416	94,957,770	96,846,949	101,732,286	112,130,063
Achievable Technical Potential	92,760,712	93,017,687	93,545,676	94,544,917	101,496,930
Technical Potential	91,518,453	91,174,891	90,587,883	89,456,268	97,140,722
Cumulative Savings (therms)					
UCT Achievable Economic Potential	466,310	796,982	1,756,754	7,373,239	15,006,797
TRC Achievable Economic Potential	349,029	582,386	1,260,859	5,328,493	10,838,319
Achievable Technical Potential	1,637,733	2,522,469	4,562,133	12,515,863	21,471,451
Technical Potential	2,879,992	4,365,264	7,519,925	17,604,511	25,827,660
Energy Savings (% of Baseline)					
UCT Achievable Economic Potential	0.5%	0.8%	1.8%	6.9%	12.2%
TRC Achievable Economic Potential	0.4%	0.6%	1.3%	5.0%	8.8%
Achievable Technical Potential	1.7%	2.6%	4.7%	11.7%	17.5%
Technical Potential	3.1%	4.6%	7.7%	16.4%	21.0%
Incremental Savings (therms)					
UCT Achievable Economic Potential	247,573	329,694	546,157	1,082,655	785,929
TRC Achievable Economic Potential	186,983	232,619	386,356	788,869	577,031
Achievable Technical Potential	832,269	893,064	1,096,311	1,431,446	983,022
Technical Potential	1,450,966	1,493,682	1,635,337	1,715,038	1,186,783

Appendix B

Industrial DSM Forecast Highlights

Summary of Energy Savings (therms), Selected Years	2019	2020	2022	2028	2038
Baseline Forecast (therms)	24,381,631	24,375,659	25,175,975	26,532,309	29,963,645
Potential Forecasts (therms)					
UCT Achievable Economic Potential	24,266,785	24,204,548	24,873,784	25,692,836	28,577,616
TRC Achievable Economic Potential	24,265,009	24,200,680	24,862,567	25,637,047	28,547,066
RVT Achievable Economic Potential	24,279,497	24,222,866	24,899,836	25,719,051	28,648,060
Achievable Technical Potential	24,244,924	24,172,135	24,814,844	25,524,939	28,368,470
Technical Potential	24,194,340	24,098,874	24,695,516	25,280,045	28,080,681
Cumulative Savings (therms)					
UCT Achievable Economic Potential	114,846	171,111	302,191	839,473	1,386,029
TRC Achievable Economic Potential	116,622	174,979	313,408	895,262	1,416,579
RVT Achievable Economic Potential	102,134	152,793	276,138	813,258	1,315,585
Achievable Technical Potential	136,707	203,524	361,131	1,007,370	1,595,176
Technical Potential	187,291	276,784	480,459	1,252,264	1,882,965
Energy Savings (% of Baseline)					
UCT Achievable Economic Potential	0.5%	0.7%	1.2%	3.2%	4.6%
TRC Achievable Economic Potential	0.5%	0.7%	1.2%	3.4%	4.7%
RVT Achievable Economic Potential	0.4%	0.6%	1.1%	3.1%	4.4%
Achievable Technical Potential	0.6%	0.8%	1.4%	3.8%	5.3%
Technical Potential	0.8%	1.1%	1.9%	4.7%	6.3%
Incremental Savings (therms)					
UCT Achievable Economic Potential	57,496	58,110	70,534	93,728	23,893
TRC Achievable Economic Potential	58,806	60,254	75,575	98,288	21,331
RVT Achievable Economic Potential	51,136	52,294	67,822	89,328	23,854
Achievable Technical Potential	68,344	69,124	85,847	109,853	24,090
Technical Potential	93,164	92,682	109,430	129,563	28,584

Residential Equipment

Measure					Characteristics									Sources			Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	UOM Size	Units per Household	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ generator (therm)	Base Saturation	Applicability
CZ1 - Single Family	Existing	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	60.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 7.75	100.0%	88.50	85.1%	100.0%
CZ1 - Single Family	Existing	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	60.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 10.69	104.2%	72.19	1.9%	100.0%
CZ1 - Single Family	Existing	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.66	100.0%	23.38	32.9%	100.0%
CZ1 - Single Family	Existing	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	68.7%	98.0%
CZ1 - Single Family	Existing	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ1 - Single Family	Existing	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ1 - Single Family	Existing	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ1 - Single Family	Existing	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ1 - Single Family	Existing	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	27.4%	100.0%
CZ1 - Single Family	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ1 - Single Family	New	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	60.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 5.29	100.0%	58.20	94.2%	100.0%
CZ1 - Single Family	New	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	60.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 9.42	104.2%	61.80	1.5%	100.0%
CZ1 - Single Family	New	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.66	100.0%	23.38	65.7%	100.0%
CZ1 - Single Family	New	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	67.8%	98.0%
CZ1 - Single Family	New	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ1 - Single Family	New	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ1 - Single Family	New	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ1 - Single Family	New	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ1 - Single Family	New	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	26.2%	100.0%
CZ1 - Single Family	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ1 - Multi Family	Existing	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	36.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 7.06	100.0%	17.96	85.1%	100.0%
CZ1 - Multi Family	Existing	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	45.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 11.52	104.2%	17.54	1.9%	100.0%
CZ1 - Multi Family	Existing	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.42	100.0%	23.38	32.9%	100.0%
CZ1 - Multi Family	Existing	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	68.7%	98.0%
CZ1 - Multi Family	Existing	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ1 - Multi Family	Existing	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ1 - Multi Family	Existing	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ1 - Multi Family	Existing	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ1 - Multi Family	Existing	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	27.4%	100.0%
CZ1 - Multi Family	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ1 - Multi Family	New	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	36.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 4.79	100.0%	11.75	94.2%	100.0%
CZ1 - Multi Family	New	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	45.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 8.42	104.2%	12.45	1.5%	100.0%
CZ1 - Multi Family	New	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.42	100.0%	23.38	65.7%	100.0%
CZ1 - Multi Family	New	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	67.8%	98.0%
CZ1 - Multi Family	New	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ1 - Multi Family	New	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ1 - Multi Family	New	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ1 - Multi Family	New	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ1 - Multi Family	New	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	26.2%	100.0%
CZ1 - Multi Family	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	60.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 6.48	100.0%	76.00	85.1%	100.0%
CZ2 - Single Family	Existing	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	60.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 8.82	104.2%	62.05	1.9%	100.0%
CZ2 - Single Family	Existing	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.52	100.0%	23.38	32.9%	100.0%
CZ2 - Single Family	Existing	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	68.7%	98.0%
CZ2 - Single Family	Existing	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ2 - Single Family	Existing	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ2 - Single Family	Existing	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ2 - Single Family	Existing	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ2 - Single Family	Existing	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	27.4%	100.0%
CZ2 - Single Family	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ2 - Single Family	New	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	60.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 4.24	100.0%	48.00	94.2%	100.0%
CZ2 - Single Family	New	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	60.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 7.46	104.2%	51.00	1.5%	100.0%
CZ2 - Single Family	New	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.52	100.0%	23.38	65.7%	100.0%
CZ2 - Single Family	New	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	67.8%	98.0%
CZ2 - Single Family	New	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ2 - Single Family	New	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ2 - Single Family	New	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ2 - Single Family	New	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ2 - Single Family	New	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	26.2%	100.0%
CZ2 - Single Family	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ2 - Multi Family	Existing	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	36.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 5.09	100.0%	14.00	85.1%	100.0%
CZ2 - Multi Family	Existing	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	45.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 10.88	104.2%	13.65	1.9%	100.0%
CZ2 - Multi Family	Existing	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.33	100.0%	23.38	32.9%	100.0%
CZ2 - Multi Family	Existing	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	68.7%	98.0%
CZ2 - Multi Family	Existing	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ2 - Multi Family	Existing	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ2 - Multi Family	Existing	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ2 - Multi Family	Existing	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ2 - Multi Family	Existing	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	27.4%	100.0%
CZ2 - Multi Family	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ2 - Multi Family	New	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	36.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 3.11	100.0%	8.25	94.2%	100.0%
CZ2 - Multi Family	New	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	45.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 7.22	104.2%	8.80	1.5%	100.0%
CZ2 - Multi Family	New	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.33	100.0%	23.38	65.7%	100.0%
CZ2 - Multi Family	New	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	67.8%	98.0%
CZ2 - Multi Family	New	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ2 - Multi Family	New	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ2 - Multi Family	New	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ2 - Multi Family	New	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ2 - Multi Family	New	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	26.2%	100.0%
CZ2 - Multi Family	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ3 - Single Family	Existing	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	60.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 5.08	100.0%	103.50	85.1%	100.0%
CZ3 - Single Family	Existing	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	60.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 7.01	104.2%	83.27	1.9%	100.0%
CZ3 - Single Family	Existing	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.52	100.0%	23.38	32.9%	100.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	68.7%	98.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ3 - Single Family	Existing	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ3 - Single Family	Existing	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	27.4%	100.0%
CZ3 - Single Family	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ3 - Single Family	New	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	60.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 3.48	100.0%	68.40	94.2%	100.0%
CZ3 - Single Family	New	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	60.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 6.29	104.2%	72.60	1.5%	100.0%
CZ3 - Single Family	New	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.52	100.0%	23.38	65.7%	100.0%
CZ3 - Single Family	New	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	67.8%	98.0%
CZ3 - Single Family	New	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ3 - Single Family	New	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ3 - Single Family	New	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ3 - Single Family	New	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ3 - Single Family	New	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	26.2%	100.0%
CZ3 - Single Family	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	36.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 4.83	100.0%	20.46	85.1%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	45.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 3.84	104.2%	19.96	1.9%	100.0%
CZ3 - Multi Family	Existing	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.33	100.0%	23.38	32.9%	100.0%
CZ3 - Multi Family	Existing	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	68.7%	98.0%
CZ3 - Multi Family	Existing	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ3 - Multi Family	Existing	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ3 - Multi Family	Existing	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ3 - Multi Family	Existing	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ3 - Multi Family	Existing	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	27.4%	100.0%
CZ3 - Multi Family	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%
CZ3 - Multi Family	New	Space Heating	Furnace - Direct Fuel	AFUE 95%	Lost Opportunity	AFUE 80%	AFUE 95%	LO12Med	1	kBTU/hr	60.00	36.00	0.16%	GFURN-Heating-AEO15-178	CNGC Data	BEST	18	$ 1,488.00	$ 3.37	100.0%	13.75	94.2%	100.0%
CZ3 - Multi Family	New	Space Heating	Boiler - Direct Fuel	AFUE 96%	Lost Opportunity	AFUE 82%	AFUE 96%	LO12Med	0	kBTU/hr	105.00	45.00	0.16%	BLR-Heating-AEO15-126	BLR-Heating-AEO15-126	BEST	20	$ 2,775.00	$ 2.89	104.2%	14.60	1.5%	100.0%
CZ3 - Multi Family	New	Secondary Heating	Fireplace	Tier 1 (70% FE Rating)	Lost Opportunity	Baseline (50% to 60% FE Rating)	Tier 1 (70% FE Rating)	LO1Slow	3	unit	1.00	1.00	0.16%	CNGC Prior Study Database	CNGC Data	Calculated	20	$ 246.85	$ 0.33	100.0%	23.38	65.7%	100.0%
CZ3 - Multi Family	New	Water Heating	Water Heater <= 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Baseline (UEF 0.58)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-EIA14-2014 Ref. Case-24	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-20	19	$ 1,724.38	$ -	102.4%	50.36	67.8%	98.0%
CZ3 - Multi Family	New	Water Heating	Water Heater <= 55 gal.	ENERGY STAR (UEF 0.64)	Lost Opportunity	Baseline (UEF 0.58)	ENERGY STAR (UEF 0.64)	LO20Fast	4	unit	1.00	1.00	0.16%	DHW_WHsm-Water Heating-AEG-v1-6	CNGC Program Data	DHW_WHsm-Water Heating-AEG-v1-6	13	$ 292.75	$ -	100.0%	14.17	1.4%	2.0%
CZ3 - Multi Family	New	Water Heating	Water Heater > 55 gal.	Condensing (UEF 0.82)	Lost Opportunity	Standard (UEF 0.76)	Condensing (UEF 0.82)	LO12Med	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	13	$ 445.30	$ -	102.4%	49.34	0.0%	2.0%
CZ3 - Multi Family	New	Water Heating	Water Heater > 55 gal.	Instantaneous - ENERGY STAR (UEF 0.87)	Lost Opportunity	Standard (UEF 0.76)	Instantaneous - ENERGY STAR (UEF 0.87)	LO20Fast	4	unit	1.00	1.00	0.16%	Scaled from small	Scaled from small	Scaled from small	19	$ 1,983.04	$ -	102.4%	57.92	1.6%	98.0%
CZ3 - Multi Family	New	Appliances	Clothes Dryer	NEEA/ENERGY STAR (CE >60%)	Lost Opportunity	Standard	NEEA/ENERGY STAR (CE >60%)	LOMax60	4	units	1.00	1.00	0.16%	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	CDR-Appliances-AEO17-286	16	$ 150.00	$ -	104.2%	2.30	13.1%	100.0%
CZ3 - Multi Family	New	Appliances	Stove/Oven	EF 0.42	Lost Opportunity	EF 0.399	EF 0.42	LOMax60	4	units	1.00	1.00	0.16%	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	STV-Appliances-AEO17-58	19	$ 50.00	$ -	104.2%	2.67	26.2%	100.0%
CZ3 - Multi Family	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Lost Opportunity	Standard (EF .82)	Condensing (EF .90)	LOMax60	3	units	1.00	1.00	0.16%	AEG Research	BNNL	Energy.gov	10	$ 675.00	$ -	111.4%	28.60	1.0%	100.0%

Residential Non Equipment

Measure					Characteristics							Sources			Measure Assumptions in 2017				
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Input Units	Units per Household	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental Non-Energy Benefits ($)	Measure Savings @ generator (Therm) (NEM Only)	Base Saturation	Applicability
CZ1 - Single Family	Existing	Space Heating	Insulation - Ceiling, Installation	R-38 (Retro only)	Retrofit	R-0	R-38 (Retro only)	RetroSiever20	4	sqft roof	1.00	1,082.85	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data CZ1	BEST	45	$ 1.61	$ 17.26	0.14	0.0%	6.1%
CZ1 - Single Family	Existing	Space Heating	Insulation - Ceiling, Upgrade	R-49	Retrofit	R11+, up to R60	R-49	RetroSiever20	4	sqft roof	1.00	1,082.85	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data CZ1	BEST	45	$ 1.61	$ 4.38	0.04	19.7%	87.5%
CZ1 - Single Family	Existing	Space Heating	Insulation - Slab Foundation	R-11 (NC Only)	Retrofit	R-0	R-11 (NC Only)	RetroSiever	4	sqft floor	1.00	1,082.85	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	N/A	70	$ 0.95	$ -	-	5.2%	5.2%
CZ1 - Single Family	Existing	Space Heating	Insulation - Basement Sidewall	R-15	Retrofit	R-0	R-15	RetroSiever	0	sqft floor	1.00	1,082.85	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	BEST	70	$ 0.95	$ 4.51	0.04	6.0%	32.8%
CZ1 - Single Family	Existing	Space Heating	Insulation - Ducting	duct thermal losses reduced 50%	Retrofit	2° F duct loss	duct thermal losses reduced 50%	RetroSiever	-1	sqft home	1.00	2,165.69	0.16%	ResSFDuctSealing_v4_6	ResSFDuctSealing_v4_6	ResSFDuctSealing_v4_6	20	$ 0.29	$ 6.70	0.03	6.9%	25.0%
CZ1 - Single Family	Existing	Space Heating	Insulation - Infiltration Control (Air Sealing)	20% reduction in ACH50	Retrofit	ACH50 >= 5	20% reduction in ACH50	RetroSiever20	4	sqft home	1.00	2,165.69	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	BEST	15	$ 0.70	$ 2.36	0.01	11.0%	80.0%
CZ1 - Single Family	Existing	Space Heating	Insulation - Floor/Crawlspace	R-30	Retrofit	R-0	R-30	RetroSiever	0	sqft floor	1.00	1,082.85	0.16%	ResSFWx_v3_7	ResSFWx_v3_7	ResSFWx_v3_7	45	$ 1.39	$ 6.28	0.05	5.1%	52.8%
CZ1 - Single Family	Existing	Space Heating	Insulation - Wall Cavity, Upgrade	R-21	Retrofit	R-11+, up to R-20	R-21	RetroSiever	0	sqft wall	1.00	1,706.92	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	ORNL ZIP Code Insulation Program	BEST	45	$ 2.01	$ 3.46	0.02	32.2%	79.9%
CZ1 - Single Family	Existing	Space Heating	Insulation - Wall Cavity, Installation	R-11	Retrofit	R-0	R-11	RetroSiever	0	sqft wall	1.00	1,706.92	0.16%	ResSFWx_v3_7	ResSFWx_v3_7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	45	$ 1.47	$ 12.96	0.07	0.0%	15.1%
CZ1 - Single Family	Existing	Space Heating	Insulation - Wall Sheathing	R-5 (NC Only)	Retrofit	R-0	R-5 (NC Only)	RetroSiever	0	sqft wall	1.00	1,706.92	0.16%	ResSFWx_v3_7	ORNL Zip Code Insulation Program	BEST	45	$ 0.89	$ 2.55	0.01	0.0%	0.0%
CZ1 - Single Family	Existing	Space Heating	Ducting - Repair and Sealing	50% reduction in duct leakage	Retrofit	10% air leak to outside	50% reduction in duct leakage	RetroSiever	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	BEST	20	$ 793.95	$ 3.19	27.72	15.0%	50.0%
CZ1 - Single Family	Existing	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	5	sqft door	1.00	21.00	0.16%	ResWFWeatherization_v3_4	ResWFWeatherization_v3_4	BEST	45	$ 18.64	$ 0.58	0.24	55.0%	100.0%
CZ1 - Single Family	Existing	Space Heating	Windows - High Efficiency	Double Pane Low-E CL22	Retrofit	Single pane	Double Pane Low-E CL22	RetroSiever	-1	sqft window	1.00	203.03	0.16%	ResSFWx_v3_7	ResSFWx_v3_7	BEST	45	$ 23.09	$ 14.60	0.63	69.3%	100.0%
CZ1 - Single Family	Existing	Space Heating	Thermostat - Programmable	Programmed thermostat	Retrofit	Manual/no control	Programmed thermostat	RetroSiever	1	household	1.00	1.00	0.16%	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	15	$ 61.59	$ 2.89	25.14	16.5%	25.0%
CZ1 - Single Family	Existing	Space Heating	Thermostat - Wi-Fi/Interactive	Interactive/learning thermostat (ie, NEST)	Retrofit	Manual/no control	Interactive/learning thermostat (ie, NEST)	RetroSiever	-1	household	1.00	1.00	0.16%	ResConnectedTStats_v1.2	CNGC Program Data	ResConnectedTStats_v1.2	5	$ 254.58	$ 3.47	30.17	10.0%	75.0%
CZ1 - Single Family	Existing	Space Heating	Gas Furnace - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroSiever20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	BEST	2	$ 114.20	$ -	14.28	35.0%	90.0%
CZ1 - Single Family	Existing	Space Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No reset controls	Reset control installed	RetroSiMed	0	household	1.00	1.00	0.16%	IL TRM 5.3.14	IL TRM 5.3.14	IL TRM 5.3.14	20	$ 626.72	$ -	22.39	10.0%	100.0%
CZ1 - Single Family	Existing	Space Heating	Gas Boiler - Steam Trap Maintenance	Cleaned and restored	Retrofit	Degraded system	Cleaned and restored	RetroSiever20	0	household	1.00	1.00	0.16%	IL TRM 4.4.16 (pg226-231)	IL TRM 4.4.16 (pg226-231)	IL TRM 4.4.16 (pg226-231)	6	$ 81.56	$ -	44.77	0.0%	0.0%
CZ1 - Single Family	Existing	Space Heating	Gas Boiler - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroSven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	BEST	2	$ 114.20	$ -	12.69	35.0%	90.0%
CZ1 - Single Family	Existing	Space Heating	Gas Boiler - Pipe Insulation	Pipe insulated throughout home	No Insulation	R-0	Pipe insulated throughout home	Retro12Med	-1	boil pipe	100.00	85.35	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.82	$ -	0.30	6.9%	100.0%
CZ1 - Single Family	Existing	Space Heating	Insulation - Wall Sheathing	R-5 (NC Only)	Retrofit	R-0	R-5 (NC Only)	RetroSiever	0	sqft wall	1.00	1,706.92	0.16%	ResSFWx_v3_7	ORNL Zip Code Insulation Program	NWPCC 7th Plan: Res-SF_Wx-7P_v7	45	$ 0.89	$ 2.55	0.01	0.0%	0.0%
CZ1 - Single Family	Existing	Space Heating	Ducting - Repair and Sealing	50% reduction in duct leakage	Retrofit	10% air leak to outside	50% reduction in duct leakage	RetroSiever	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	BEST	20	$ 793.95	$ 1.08	9.07	50.0%	50.0%
CZ1 - Single Family	Existing	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	5	sqft door	1.00	21.00	0.16%	ResWFWeatherization_v3_4	ResWFWeatherization_v3_4	BEST	45	$ 0.89	$ 0.02	0.20	60.0%	100.0%
CZ1 - Single Family	Existing	Space Heating	Windows - High Efficiency	Double Pane Low-E CL22	Retrofit	Single pane	Double Pane Low-E CL22	RetroSiever	-1	sqft window	1.00	203.03	0.16%	ResSFWx_v3_7	ResSFWx_v3_7	BEST	45	$ 23.09	$ 12.28	0.52	100.0%	100.0%
CZ1 - Single Family	New	Space Heating	Thermostat - Programmable	Programmed thermostat	Retrofit	Manual/no control	Programmed thermostat	RetroSiever	1	household	1.00	1.00	0.16%	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	15	$ 61.59	$ 2.43	20.89	19.4%	25.0%
CZ1 - Single Family	New	Space Heating	Thermostat - Wi-Fi/Interactive	Interactive/learning thermostat (ie, NEST)	Retrofit	Manual/no control	Interactive/learning thermostat (ie, NEST)	RetroSiever	-1	household	1.00	1.00	0.16%	ResConnectedTStats_v1.2	CNGC Program Data	ResConnectedTStats_v1.2	5	$ 254.58	$ 2.92	25.06	10.0%	75.0%
CZ1 - Single Family	New	Space Heating	Gas Furnace - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroSven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	N/A	2	$ 114.20	$ -	-	0.0%	0.0%
CZ1 - Single Family	New	Space Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No reset controls	Reset control installed	RetroSiMed	0	household	1.00	1.00	0.16%	IL TRM 5.3.14	IL TRM 5.3.14	IL TRM 5.3.14	20	$ 626.72	$ -	-	10.0%	100.0%
CZ1 - Single Family	New	Space Heating	Gas Boiler - Steam Trap Maintenance	Cleaned and restored	Retrofit	Degraded system	Cleaned and restored	RetroSiever20	0	household	1.00	1.00	0.16%	IL TRM 4.4.16 (pg226-231)	IL TRM 4.4.16 (pg226-231)	N/A	6	$ 81.56	$ -	-	0.0%	0.0%
CZ1 - Single Family	New	Space Heating	Gas Boiler - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroSven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	N/A	2	$ 114.20	$ -	-	0.0%	0.0%
CZ1 - Single Family	New	Space Heating	Gas Boiler - Pipe Insulation	Pipe insulated throughout home	No Insulation	R-0	Pipe insulated throughout home	Retro12Med	-1	boil pipe	100.00	85.35	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.82	$ -	0.30	17.7%	100.0%
CZ1 - Single Family	New	Space Heating	Insulation - Slab Foundation	R-11 (NC Only)	Retrofit	R-0	R-11 (NC Only)	RetroSiever	-1	sqft floor	1.00	1,082.85	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	BEST	70	$ 0.95	$ 5.51	0.04	5.2%	8.9%
CZ1 - Single Family	New	Space Heating	Insulation - Basement Sidewall	R-15	Retrofit	R-0	R-15	RetroSiever	0	sqft floor	1.00	1,082.85	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	BEST	70	$ 0.95	$ 0.53	0.00	0.0%	5.0%
CZ1 - Single Family	New	Space Heating	Insulation - Ducting	duct thermal losses reduced 50%	Retrofit	2° F duct loss	duct thermal losses reduced 50%	RetroSiever	-1	sqft home	1.00	2,165.69	0.16%	ResSFDuctSealing_v4_6	ResSFDuctSealing_v4_6	ResSFDuctSealing_v4_6	20	$ 0.29	$ 4.41	0.02	17.7%	25.0%
CZ1 - Single Family	New	Space Heating	Insulation - Infiltration Control (Air Sealing)	20% reduction in ACH50	Retrofit	ACH50 >= 5	20% reduction in ACH50	RetroSven20	4	sqft home	1.00	2,165.69	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	BEST	15	$ 0.70	$ 3.97	0.02	23.4%	80.0%
CZ1 - Single Family	New	Space Heating	Insulation - Floor/Crawlspace	R-30	Retrofit	R-0	R-30	RetroSiever	0	sqft floor	1.00	1,082.85	0.16%	ResSFWx_v3_7	ResSFWx_v3_7	ResSFWx_v3_7	45	$ 1.39	$ 5.28	0.04	72.2%	72.2%
CZ1 - Single Family	New	Space Heating	Insulation - Wall Cavity, Upgrade	R-21	Retrofit	R-11+, up to R-20	R-21	RetroSiever	0	sqft wall	1.00	1,706.92	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	ORNL ZIP Code Insulation Program	BEST	45	$ 2.01	$ -	-	100.0%	100.0%
CZ1 - Single Family	New	Space Heating	Insulation - Wall Cavity, Installation	R-11	Retrofit	R-0	R-11	RetroSiever	0	sqft wall	1.00	1,706.92	0.16%	ResSFWx_v3_7	ResSFWx_v3_7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	45	$ 0.00	$ -	-	0.0%	0.0%
CZ1 - Single Family	New	Space Heating	Insulation - Wall Sheathing	R-5 (NC Only)	Retrofit	R-0	R-5 (NC Only)	RetroSiever	0	sqft wall	1.00	1,706.92	0.16%	ORNL Zip Code Insulation Program	ORNL Zip Code Insulation Program	BEST	45	$ 0.89	$ 2.22	0.01	65.0%	85.0%
CZ1 - Single Family	New	Space Heating	Ducting - Repair and Sealing	50% reduction in duct leakage	Retrofit	10% air leak to outside	50% reduction in duct leakage	RetroSiever	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	BEST	20	$ 793.95	$ 1.08	9.07	50.0%	50.0%
CZ1 - Single Family	New	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	5	sqft door	1.00	21.00	0.16%	ResWFWeatherization_v3_4	ResWFWeatherization_v3_4	BEST	45	$ 0.89	$ 0.02	0.20	60.0%	100.0%
CZ1 - Single Family	New

Measure					Characteristics								Sources			Measure Assumptions in 2017				
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Input Units	Units per Household	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental Non-Energy Benefits ($)	Measure Savings @ generator (Therm) (NEM Only)	Base Saturation	Applicability
CZ2 - Single Family	Existing	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	5	sqft door	1.00	21.00	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 18.64	$ 0.48	0.25	55.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	Windows - High Efficiency	Double Pane Low-E U1.22	Retrofit	Single pane	Double Pane Low-E U1.22	Retro1Slow	-1	sqft window	1.00	189.32	0.16%	RTSFWin_v3_7	RTSFWin_v3_7	BEST	45	$ 23.09	$ 12.42	0.71	89.3%	100.0%
CZ2 - Single Family	Existing	Space Heating	Thermostat - Programmable	Programmed thermostat	Retrofit	Manual/no control	Programmed thermostat	Retro1Slow	3	household	1.00	1.00	0.16%	RTF: ResSTElectronicTStats v3.1	RTF: ResSTElectronicTStats v3.1	RTF: ResSTElectronicTStats v3.1	15	$ 61.59	$ 2.44	26.51	16.5%	25.0%
CZ2 - Single Family	Existing	Space Heating	Thermostat - Wi-Fi/Interactive	Interactive/learning thermostat (ie, NEST)	Retrofit	Manual/no control	Interactive/learning thermostat (ie, NEST)	Retro1Slow	-1	household	1.00	1.00	0.16%	ResConnectedTstats_v3.2	CNGC Program Data	ResConnectedTstats_v3.2	5	$ 254.58	$ 2.93	31.81	10.0%	75.0%
CZ2 - Single Family	Existing	Space Heating	Gas Furnace - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	Retro5ven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	BEST	2	$ 114.20	$ -	15.51	35.0%	90.0%
CZ2 - Single Family	Existing	Space Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No reset controls	Reset control installed	Retro5Med	0	household	1.00	1.00	0.16%	IL TRM 5.3.14	IL TRM 5.3.14	IL TRM 5.3.14	20	$ 626.72	$ -	23.37	10.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	Gas Boiler - Steam Trap Maintenance	Cleaned and restored	Retrofit	Degraded system	Cleaned and restored	Retro5ven20	0	household	1.00	1.00	0.16%	IL TRM 4.4.16 (pp226-231)	IL TRM 4.4.16 (pp226-231)	IL TRM 4.4.16 (pp226-231)	6	$ 81.56	$ -	46.74	0.0%	0.0%
CZ2 - Single Family	Existing	Space Heating	Gas Boiler - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	Retro5ven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	BEST	2	$ 114.20	$ -	13.60	35.0%	90.0%
CZ2 - Single Family	Existing	Space Heating	Gas Boiler - Pipe Insulation	Pipe insulated throughout home	Retrofit	No insulation	Pipe insulated throughout home	Retro12Med	-1	boil pipe	1.00	82.75	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.82	$ -	0.30	6.9%	100.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Drainwater Heat Recovery	Drain equipped with heat recovery system	Retrofit	None	Drain equipped with heat recovery system	Retro1Slow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res: Res-GFX-7P_v3	NWPCC 7th Plan: Res: Res-GFX-7P_v3	NWPCC 7th Plan: Res: Res-GFX-7P_v3	40	$ 855.55	$ 10.87	0.00	0.0%	0.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Faucet Aerators	1.5 GPM faucet	Retrofit	2.5 GPM faucet	Retro1Slow	0	aerators	3.00	1.65	4.95	0.16%	NWPCC Seventh Plan: Res: Res-Aerator-7P_v5	NWPCC Seventh Plan: Res: Res-Aerator-7P_v5	NWPCC Seventh Plan: Res: Res-Aerator-7P_v5	15	$ 5.30	$ 66.61	5.11	40.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Low Flow Showerhead (2.0 GPM)	2.0 GPM showerhead	Retrofit	3.5 GPM showerhead	2.0 GPM showerhead	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 15.39	6.44	20.0%	50.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Low Flow Showerhead (1.5 GPM)	1.5 GPM showerhead	Retrofit	3.5 GPM showerhead	1.5 GPM showerhead	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 38.77	11.21	20.0%	50.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Temperature Setback	Setback to 120° F	Retrofit	135° F set point	Setback to 120° F	Retro1Slow	0	household	1.00	1.00	0.16%	IL TRM 5.4.6	IL TRM 5.4.6	IL TRM 5.4.6	2	$ 5.30	$ -	3.24	10.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Thermostatic Shower Restriction Valve	Restrictor installed, shutting off water when it is warm	Retrofit	No control	Restrictor installed, shutting off water when it is warm	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: ThermostaticShowerRestrictionValve_v3_3	RTF: ThermostaticShowerRestrictionValve_v3_3	RTF: ThermostaticShowerRestrictionValve_v3_3	10	$ 15.28	$ 9.07	2.39	10.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Pipe Insulation	Insulated 5' of pipe between unit and conditioned space	Retrofit	No insulation of water pipe in unconditioned space	Insulated 5' of pipe between unit and conditioned space	Retro1Slow	-1	feet pipe	1.00	5.00	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.86	$ -	1.62	6.9%	100.0%
CZ2 - Single Family	Existing	Space Heating	Water Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard tank water heater, baseline	40 sq ft supplemental solar system installed	RetroMed40	-1	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	95.00	2.0%	30.0%
CZ2 - Single Family	Miscellaneous	Pool Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard baseline pool heater	40 sq ft supplemental solar system installed	Retro5ven20	0	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	200.66	2.0%	30.0%
CZ2 - Single Family	Existing	Space Heating	ENERGY STAR Dishwashers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	Retro5ven20	1	household	1.00	1.00	0.16%	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	15	$ 76.22	$ 941.40	3.70	87.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	ENERGY STAR Clothes Washers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	Retro5ven20	1	household	1.00	1.00	0.16%	ResClothesWashers_v6_0	ResClothesWashers_v6_0	ResClothesWashers_v6_0	14	$ 63.06	$ 18.08	6.03	41.0%	100.0%
CZ2 - Single Family	Existing	Space Heating	Built Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO150Fast	6	household	1.00	1.00	0.16%	CNGC Program Data	N/A	N/A	30	$ 1.00	$ -	-	0.0%	0.0%
CZ2 - Single Family	Existing	Space Heating	Built Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO15Slow	2	household	1.00	1.00	0.16%	CNGC Program Data	N/A	N/A	30	$ 1.00	$ -	-	0.0%	0.0%
CZ2 - Single Family	Existing	Space Heating	Built Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO15Slow	2	household	1.00	1.00	0.16%	CNGC Program Data	N/A	N/A	30	$ 1.00	$ -	-	0.0%	0.0%
CZ2 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC Program Data	Calculated	21	$ 4,997.55	$ 7.30	85.44	1.0%	50.0%
CZ2 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 7.30	60.60	1.0%	50.0%
CZ2 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 7.30	85.44	1.0%	50.0%
CZ2 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 7.30	60.60	1.0%	50.0%
CZ2 - Single Family	New	Space Heating	Insulation - Ceiling, Installation	R-38 (Retro only)	Retrofit	R-0	sqft roof	1,009.71	0.16%	NWPCC 7th Plan: Res-Sel_Wx-7P_v7	CNGC Program Data CZ2	N/A	45	$ 1.12	$ -	-	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Insulation - Ceiling, Upgrade	R-49	Retrofit	R11+, up to R60	R-49	4	sqft roof	1,009.71	0.16%	NWPCC 7th Plan: Res-Sel_Wx-7P_v7	CNGC Program Data CZ2	BEST	45	$ 1.12	$ -	-	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Insulation - Slab Foundation	R-11 (NC Only)	Retrofit	R-0	sqft floor	1,009.71	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	BEST	70	$ 0.95	$ 4.82	0.05	5.2%	8.9%
CZ2 - Single Family	New	Space Heating	Insulation - Basement Sidewall	R-15	Retrofit	R-0	sqft floor	1,009.71	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	BEST	70	$ 0.95	$ 0.44	0.00	0.0%	5.0%
CZ2 - Single Family	New	Space Heating	Insulation - Ducting	duct thermal losses reduced 50%	Retrofit	2" f duct loss	duct thermal losses reduced 50%	Retro1Slow	-1	sqft home	2,019.42	1.65	0.16%	ResSFDuctSealing_v4_4	ResSFDuctSealing_v4_4	ResSFDuctSealing_v4_4	20	$ 0.29	$ 3.63	0.02	17.7%	25.0%
CZ2 - Single Family	New	Space Heating	Insulation - Infiltration Control (Air Sealing)	20% reduction in ACH50	Retrofit	ACH50 >= 5	20% reduction in ACH50	Retro5ven20	1	sqft home	2,019.42	1.65	0.16%	NWPCC 7th Plan: Res-Sel_Wx-7P_v7	NWPCC 7th Plan: Res-Sel_Wx-7P_v7	NWPCC 7th Plan: Res-Sel_Wx-7P_v7	15	$ 0.70	$ 2.52	0.01	23.4%	80.0%
CZ2 - Single Family	New	Space Heating	Insulation - Floor/Crawlspace	R-30	Retrofit	R-0	sqft floor	1,009.71	0.16%	RTSFWin_v3_7	RTSFWin_v3_7	BEST	45	$ 1.39	$ 3.74	0.04	7.2%	72.2%
CZ2 - Single Family	New	Space Heating	Insulation - Wall Cavity, Upgrade	R-21	Retrofit	R-11+, up to R-20	R11+, up to R60	Retro1Slow	0	sqft wall	1,655.00	0.16%	NWPCC 7th Plan: Res-Sel_Wx-7P_v7	ORNL ZIP Code Insulation Program	NWPCC 7th Plan: Res-Sel_Wx-7P_v7	BEST	45	$ 2.01	$ -	100.00	100.0%	100.0%
CZ2 - Single Family	New	Space Heating	Insulation - Wall Cavity, Installation	R-11	Retrofit	R-0	R-11	Retro1Slow	0	sqft wall	1,655.00	0.16%	RTSFWin_v3_7	RTSFWin_v3_7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	45	$ 0.00	$ -	-	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Insulation - Wall Sheathing	R-5 (NC Only)	Retrofit	R-0	R-5 (NC Only)	Retro1Slow	0	sqft wall	1,655.00	0.16%	ORNL Zip Code Insulation Program	ORNL Zip Code Insulation Program	ORNL Zip Code Insulation Program	BEST	45	$ 0.89	$ 2.07	0.01	65.0%	85.0%
CZ2 - Single Family	New	Space Heating	Ducting - Repair and Sealing	50% reduction in duct leakage	Retrofit	10% air leak to outside	50% reduction in duct leakage	Retro1Slow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	20	$ 793.95	$ 0.89	9.31	50.0%	50.0%
CZ2 - Single Family	New	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	5	sqft door	1.00	21.00	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 18.64	$ 0.02	0.19	60.0%	100.0%
CZ2 - Single Family	New	Space Heating	Windows - High Efficiency	Double Pane Low-E U1.22	Retrofit	Single pane	Double Pane Low-E U1.22	Retro1Slow	-1	sqft window	1.00	189.32	0.16%	RTSFWin_v3_7	RTSFWin_v3_7	BEST	45	$ 23.09	$ 9.92	0.56	100.0%	100.0%
CZ2 - Single Family	New	Space Heating	Thermostat - Programmable	Programmed thermostat	Retrofit	Manual/no control	Programmed thermostat	Retro1Slow	3	household	1.00	1.00	0.16%	RTF: ResSTElectronicTStats v3.1	RTF: ResSTElectronicTStats v3.1	RTF: ResSTElectronicTStats v3.1	15	$ 61.59	$ 1.95	20.77	16.4%	25.0%
CZ2 - Single Family	New	Space Heating	Thermostat - Wi-Fi/Interactive	Interactive/learning thermostat (ie, NEST)	Retrofit	Manual/no control	Interactive/learning thermostat (ie, NEST)	Retro1Slow	-1	household	1.00	1.00	0.16%	ResConnectedTstats_v3.2	CNGC Program Data	ResConnectedTstats_v3.2	5	$ 254.58	$ 2.34	24.93	10.0%	75.0%
CZ2 - Single Family	New	Space Heating	Gas Furnace - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	Retro5ven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	N/A	2	$ 114.20	$ -	-	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No reset controls	Reset control installed	Retro5Med	0	household	1.00	1.00	0.16%	IL TRM 5.3.14	IL TRM 5.3.14	IL TRM 5.3.14	20	$ 626.72	$ -	16.09	10.0%	100.0%
CZ2 - Single Family	New	Space Heating	Gas Boiler - Steam Trap Maintenance	Cleaned and restored	Retrofit	Degraded system	Cleaned and restored	Retro5ven20	0	household	1.00	1.00	0.16%	IL TRM 4.4.16 (pp226-231)	IL TRM 4.4.16 (pp226-231)	IL TRM 4.4.16 (pp226-231)	6	$ 81.56	$ -	-	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Gas Boiler - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	Retro5ven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	BEST	2	$ 114.20	$ -	-	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Gas Boiler - Pipe Insulation	Pipe insulated throughout home	Retrofit	No insulation	Pipe insulated throughout home	Retro12Med	-1	boil pipe	1.00	82.75	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.82	$ -	0.30	17.7%	100.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Drainwater Heat Recovery	Drain equipped with heat recovery system	Retrofit	None	Drain equipped with heat recovery system	Retro1Slow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res: Res-GFX-7P_v3	NWPCC 7th Plan: Res: Res-GFX-7P_v3	NWPCC 7th Plan: Res: Res-GFX-7P_v3	40	$ 855.55	$ 10.87	0.00	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Faucet Aerators	1.5 GPM faucet	Retrofit	2.5 GPM faucet	Retro1Slow	0	aerators	3.00	1.65	4.95	0.16%	NWPCC Seventh Plan: Res: Res-Aerator-7P_v5	NWPCC Seventh Plan: Res: Res-Aerator-7P_v5	NWPCC Seventh Plan: Res: Res-Aerator-7P_v5	15	$ 5.30	$ 66.61	5.11	35.0%	100.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Low Flow Showerhead (2.0 GPM)	2.0 GPM showerhead	Retrofit	3.5 GPM showerhead	2.0 GPM showerhead	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 15.39	6.44	18.0%	50.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Low Flow Showerhead (1.5 GPM)	1.5 GPM showerhead	Retrofit	3.5 GPM showerhead	1.5 GPM showerhead	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 38.77	11.21	18.0%	50.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Temperature Setback	Setback to 120° F	Retrofit	135° F set point	Setback to 120° F	Retro1Slow	0	household	1.00	1.00	0.16%	IL TRM 5.4.6	IL TRM 5.4.6	IL TRM 5.4.6	2	$ 5.30	$ -	3.24	15.0%	100.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Thermostatic Shower Restriction Valve	Restrictor installed, shutting off water when it is warm	Retrofit	No control	Restrictor installed, shutting off water when it is warm	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: ThermostaticShowerRestrictionValve_v3_3	RTF: ThermostaticShowerRestrictionValve_v3_3	RTF: ThermostaticShowerRestrictionValve_v3_3	10	$ 15.28	$ 9.07	2.39	10.0%	100.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Pipe Insulation	Insulated 5' of pipe between unit and conditioned space	Retrofit	No insulation of water pipe in unconditioned space	Insulated 5' of pipe between unit and conditioned space	Retro1Slow	-1	feet pipe	1.00	5.00	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.86	$ -	1.45	17.7%	100.0%
CZ2 - Single Family	New	Space Heating	Water Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard tank water heater, baseline	40 sq ft supplemental solar system installed	RetroMed40	-1	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	95.00	2.0%	30.0%
CZ2 - Single Family	Miscellaneous	Pool Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard baseline pool heater	40 sq ft supplemental solar system installed	Retro5ven20	0	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	230.56	2.0%	30.0%
CZ2 - Single Family	New	Space Heating	ENERGY STAR Dishwashers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	Retro5ven20	1	household	1.00	1.00	0.16%	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	15	$ 76.22	$ 941.40	3.70	77.1%	88.6%
CZ2 - Single Family	New	Space Heating	ENERGY STAR Clothes Washers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	Retro5ven20	1	household	1.00	1.00	0.16%	ResClothesWashers_v6_0	ResClothesWashers_v6_0	ResClothesWashers_v6_0	14	$ 63.06	$ 18.08	6.03	40.5%	98.7%
CZ2 - Single Family	New	Space Heating	ENERGY STAR Homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO150Fast	6	household	1.00	1.00	0.16%	CNGC Program Data	ENERGY STAR Certified Homes, Version 3 (Rev. 08)	CNGC Program Data 2015, scaled by UEC	30	$ 2,117.00	$ -	156.71	0.0%	0.0%
CZ2 - Single Family	New	Space Heating	Built Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO15Slow	2	household	1.00	1.00	0.16%	CNGC Program Data	ENERGY STAR Certified Homes, Version 3 (Rev. 08)	CNGC Program Data 2015	30	$ 2,117.00	$ -	76.58	20.0%	20.0%
CZ2 - Single Family	New	Space Heating	Built Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO15Slow	0	household	1.00	1.00	0.16%	CNGC Program Data	ENERGY STAR Certified Homes, Version 3 (Rev. 08)	CNGC Program Data 2015	30	$ 2,117.00	$ -	105.27	0.0%	20.0%
CZ2 - Single Family	New	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC Program Data	Calculated	21	$ 4,997.55	$ 7.30	85.44	1.0%	50.0%
CZ2 - Single Family	New	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC Program Data	Calculated	21	$ 4,997.55	$ 7.30	60.60	1.0%	50.0%
CZ2 - Single Family	New	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 7.30	85.44	1.0%	50.0%
CZ2 - Single Family	New	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO220Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 7.30	60.60	1.0%	50.0%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Ceiling, Installation	R-38 (Retro only)	Retrofit	R-0	sqft roof - mf	504.85	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data CZ2	BEST	45	$ 1.12	$ 7.15	0.16	0.0%	6.1%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Ceiling, Upgrade	R-49	Retrofit	R11+, up to R60	R-49	4	sqft roof - mf	504.85	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data CZ2	BEST	45	$ 1.12	$ 1.87	0.04	18.7%	87.5%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Slab Foundation	R-11 (NC Only)	Retrofit	R-0	sqft floor	1,009.71	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	N/A	70	$ 0.95	$ -	-	0.0%	0.0%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Basement Sidewall	R-15	Retrofit	R-0	sqft floor	1,009.71	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	N/A	70	$ 0.95	$ -	-	0.0%	0.0%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Ducting	duct thermal losses reduced 50%	Retrofit	2" f duct loss	duct thermal losses reduced 50%	Retro1Slow	-1	sqft home	1,009.71	1.65	0.16%	ResSFDuctSealing_v4_4	ResSFDuctSealing_v4_4	ResSFDuctSealing_v4_4	20	$ 0.29	$ 2.57	0.03	6.9%	25.0%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Infiltration Control (Air Sealing)	20% reduction in ACH50	Retrofit	ACH50 >= 5	20% reduction in ACH50	Retro5ven20	1	sqft home	1,009.71	1.65	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	15	$ 0.70	$ 0.71	0.01	11.0%	80.0%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Floor/Crawlspace	R-30	Retrofit	R-0	sqft floor	1,009.71	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 1.04	$ 2.20	0.02	5.1%	52.8%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Wall Cavity, Upgrade	R-21	Retrofit	R-11+, up to R-20	R11+, up to R60	Retro1Slow	0	sqft wall	1,087.72	0.16%	NWPCC 7th Plan: Res-MF_Wx-7P_v7	ORNL ZIP Code Insulation Program	NWPCC 7th Plan: Res-MF_Wx-7P_v7	BEST	45	$ 2.01	$ 1.46	0.02	12.2%	79.9%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Wall Cavity, Installation	R-11	Retrofit	R-0	R-11	Retro1Slow	0	sqft wall	1,087.72	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	NWPCC 7th Plan: Res-MF_Wx-7P_v7	NWPCC 7th Plan: Res-MF_Wx-7P_v7	45	$ 0.00	$ 5.47	0.06	0.0%	15.1%
CZ2 - Multi Family	Existing	Space Heating	Insulation - Wall Sheathing	R-5 (NC Only)	Retrofit	R-0	R-5 (NC Only)	Retro1Slow	0	sqft wall	1,087.72	0.16%	ResMFWeatherization_v3_4	ORNL Zip Code Insulation Program	ResMFWeatherization_v3_4	BEST	45	$ 0.89	$ 3.24	0.03	0.0%	0.0%
CZ2 - Multi Family	Existing	Space Heating	Ducting - Repair and Sealing	50% reduction in duct leakage	Retrofit	10% air leak to outside	50% reduction in duct leakage	Retro1Slow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	20	$ 793.95	$ 1.27	14.33	15.0%	50.0%
CZ2 - Multi Family	Existing	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	0	sqft door	1.00	21.00	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 18.64	$ 0.22	0.12	55.0%	100.0%
CZ2 - Multi Family	Existing	Space Heating	Windows - High Efficiency	Double Pane Low-E U1.22	Retrofit	Single pane	Double Pane Low-E U1.22	Retro1Slow	-1	sqft window	1.00	108.04	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 21.05	$ 5.84	0.61	89.3%	100.0%
CZ2 - Multi Family	Existing	Space Heating	Thermostat - Programmable	Programmed thermostat	Retrofit	Manual/no control	Programmed thermostat	Retro1Slow	3	household	1.00	1.00	0.16%	RTF: ResSTElectronicTStats v3.1	RTF: ResSTElectronicTStats v3.1	RTF: ResSTElectronicTStats v3.1	15	$ 61.59	$ 1.15	12.94	16.5%	25.0%
CZ2 - Multi Family	Existing	Space Heating	Thermostat - Wi-Fi/Interactive	Interactive/learning thermostat (ie, NEST)	Retrofit	Manual/no control	Interactive/learning thermostat (ie, NEST)	Retro1Slow	-1	household	1.00	1.00	0.16%	ResConnectedTstats_v3.2	CNGC Program Data	ResConnectedTstats_v3.2	5	$ 254.58	$ 1.38	15.53	10.0%	75.0%
CZ2 - Multi

Measure					Characteristics								Sources			Measure Assumptions in 2017				
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Input Units	Units per Household	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental Non-Energy Benefits ($)	Measure Savings @ generator (therm) (NEM Only)	Base Saturation	Applicability
CZ3 - Single Family	Existing	Water Heating	Water Heater - Low Flow Showerhead (2.0 GPM)	2.0 GPM showerhead	Retrofit	3.5 GPM showerhead	2.0 GPM showerhead	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 15.39	6.44	20.0%	50.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater - Low Flow Showerhead (1.5 GPM)	1.5 GPM showerhead	Retrofit	3.5 GPM showerhead	1.5 GPM showerhead	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 38.77	11.21	20.0%	50.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater - Temperature Setback	Setback to 120° F	Retrofit	135° F set point	Setback to 120° F	Retro1Slow	0	household	1.00	1.00	0.16%	IL TRM 5.4.6		IL TRM 5.4.6	2	$ 5.30	$ -	3.24	10.0%	100.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater - Thermostatic Shower Restriction Valve	Restrictor installed, shutting off water when it is warm	Retrofit	No control	Restrictor installed, shutting off water when it is warm	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: ThermostaticShowerRestrictionValve_v1_3	RTF: ThermostaticShowerRestrictionValve_v1_3	RTF: ThermostaticShowerRestrictionValve_v1_3	10	$ 15.28	$ 9.07	2.39	10.0%	100.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater - Pipe Insulation	Insulated 5' of pipe between unit and conditioned space	Retrofit	No insulation of water pipe in unconditioned space	Insulated 5' of pipe between unit and conditioned space	Retro1Slow	-1	feet pipe	1.00	5.00	0.16%	IL TRM 5.3.2	DEER	BEST	15	$ 5.86	$ -	1.69	6.9%	100.0%
CZ3 - Single Family	Existing	Water Heating	Water Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard tank water heater, baseline	40 sq ft supplemental solar system installed	RetroMaxSD	-1	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	95.00	2.0%	30.0%
CZ3 - Single Family	Existing	Miscellaneous	Pool Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard baseline pool heater	40 sq ft supplemental solar system installed	RetroEven20	0	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	202.35	2.0%	30.0%
CZ3 - Single Family	Existing	Water Heating	ENERGY STAR Dishwashers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	RetroEven20	1	household	1.00	1.00	0.16%	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	15	$ 76.22	$ 941.40	3.70	87.0%	100.0%
CZ3 - Single Family	Existing	Water Heating	ENERGY STAR Clothes Washers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	RetroEven20	1	household	1.00	1.00	0.16%	ResClothesWashers_v6_0	ResClothesWashers_v6_0	ResClothesWashers_v6_0	14	$ 63.06	$ 18.08	6.03	41.0%	100.0%
CZ3 - Single Family	Existing	Space Heating	ENERGY STAR Homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO50Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	N/A	N/A	30	$ 1.00	$ -	-	0.0%	0.0%
CZ3 - Single Family	Existing	Space Heating	Build Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO1Slow	0	household	1.00	1.00	0.16%	CNGC Program Data	N/A	N/A	30	$ 1.00	$ -	-	0.0%	0.0%
CZ3 - Single Family	Existing	Water Heating	Build Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO1Slow	0	household	1.00	1.00	0.16%	CNGC Program Data	N/A	N/A	30	$ 1.00	$ -	-	0.0%	0.0%
CZ3 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC Program Data	Calculated	21	$ 4,997.55	$ 6.50	76.08	1.0%	50.0%
CZ3 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC Program Data	Calculated	21	$ 4,997.55	$ 6.50	60.09	1.0%	50.0%
CZ3 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 6.50	76.08	1.0%	50.0%
CZ3 - Single Family	Existing	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 6.50	60.09	1.0%	50.0%
CZ3 - Single Family	New	Space Heating	Insulation - Ceiling, Installation	R-38 (Retro only)	Retrofit	R-0	sqft roof	Retro5Even20	4	sqft roof	1.00	1,232.43	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data Average	N/A	45	$ 1.29	$ -	-	0.0%	0.0%
CZ3 - Single Family	New	Space Heating	Insulation - Ceiling, Upgrade	R-49	Retrofit	R11+, up to R40	R-49	Retro5Even20	4	sqft roof	1.00	1,232.43	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data Average	BEST	45	$ 1.29	$ -	-	0.0%	0.0%
CZ3 - Single Family	New	Space Heating	Insulation - Slab Foundation	R-11 (NC Only)	Retrofit	R-0	R-11 (NC Only)	Retro1Slow	4	sqft floor	1.00	1,232.43	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	BEST	70	$ 0.95	$ 7.39	0.03	5.2%	8.9%
CZ3 - Single Family	New	Space Heating	Insulation - Basement Sidewall	R-15	Retrofit	R-0	R-15	Retro1Slow	0	sqft floor	1.00	1,232.43	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	BEST	70	$ 0.95	$ 0.60	0.00	0.0%	5.0%
CZ3 - Single Family	New	Space Heating	Insulation - Ducting	duct thermal losses reduced 50%	Retrofit	2° F duct loss	duct thermal losses reduced 50%	Retro1Slow	-1	sqft home	1.00	2,464.87	0.16%	ResSFDuctSealing_v4_4	RESMeans 2015	RESMeans 2015	20	$ 0.29	$ 6.56	0.01	17.7%	25.0%
CZ3 - Single Family	New	Space Heating	Insulation - Infiltration Control (Air Sealing)	20% reduction in ACH50	Retrofit	ACH50 >= 5	20% reduction in ACH50	RetroEven20	4	sqft home	1.00	2,464.87	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	BEST	15	$ 0.70	$ 4.82	0.01	23.4%	80.0%
CZ3 - Single Family	New	Space Heating	Insulation - Floor/Crawlspace	R-30	Retrofit	R-0	R-30	Retro1Slow	1	sqft floor	1.00	1,232.43	0.16%	RTFSFWx_v3_7	RTFSFWx_v3_7	RESFWx_v3_7	45	$ 1.39	$ 11.16	0.05	72.2%	72.2%
CZ3 - Single Family	New	Space Heating	Insulation - Wall Cavity, Upgrade	R-21	Retrofit	R-11+, up to R-20	R-21	Retro1Slow	0	sqft wall	1.00	1,806.53	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	ORNL ZIP Code Insulation Program	BEST	45	$ 2.01	$ -	-	100.0%	100.0%
CZ3 - Single Family	New	Space Heating	Insulation - Wall Cavity, Installation	R-11	Retrofit	R-0	R-11	Retro1Slow	0	sqft wall	1.00	1,806.53	0.16%	RTFSFWx_v3_7	RTFSFWx_v3_7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	45	$ 0.00	$ -	-	0.0%	0.0%
CZ3 - Single Family	New	Space Heating	Insulation - Wall Sheathing	R-5 (NC Only)	Retrofit	R-0	R-5 (NC Only)	Retro1Slow	0	sqft wall	1.00	1,806.53	0.16%	RTFSFWx_v3_7	ORNL Zip Code Insulation Program	BEST	45	$ 0.89	$ 3.10	0.01	65.0%	85.0%
CZ3 - Single Family	New	Space Heating	Ducting - Repair and Sealing	50% reduction in duct leakage	Retrofit	10% air leak to outside	50% reduction in duct leakage	Retro1Slow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	BEST	20	$ 793.95	$ 1.61	7.56	50.0%	50.0%
CZ3 - Single Family	New	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	1	sqft door	1.00	21.00	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 0.89	$ 0.03	0.17	60.0%	100.0%
CZ3 - Single Family	New	Space Heating	Windows - High Efficiency	Double Pane Low-E CL22	Retrofit	Single pane	Double Pane Low-E CL22	Retro1Slow	-1	sqft window	1.00	231.08	0.16%	RTFSFWx_v3_7	RTFSFWx_v3_7	BEST	45	$ 23.09	$ 16.82	0.40	100.0%	100.0%
CZ3 - Single Family	New	Space Heating	Thermostat - Programmable	Programmed thermostat	Retrofit	Manual/no control	Programmed thermostat	Retro1Slow	-1	household	1.00	1.00	0.16%	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	15	$ 61.59	$ 3.20	17.55	19.4%	25.0%
CZ3 - Single Family	New	Space Heating	Thermostat - Wi-Fi/Interactive	Interactive/learning thermostat (ie, NEST)	Retrofit	Manual/no control	Interactive/learning thermostat (ie, NEST)	Retro1Slow	-1	household	1.00	1.00	0.16%	ResConnectedTstats_v1.2	CNGC Program Data	ResConnectedTstats_v1.2	5	$ 254.58	$ 3.84	21.06	10.0%	75.0%
CZ3 - Single Family	New	Space Heating	Gas Furnace - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroEven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	N/A	2	$ 114.20	$ -	-	0.0%	0.0%
CZ3 - Single Family	New	Space Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No reset controls	Reset control installed	RetroSMed	0	household	1.00	1.00	0.16%	IL TRM 5.3.14		IL TRM 5.3.14	20	$ 626.72	$ -	13.48	10.0%	100.0%
CZ3 - Single Family	New	Space Heating	Gas Boiler - Steam Trap Maintenance	Cleaned and restored	Retrofit	Degraded system	Cleaned and restored	RetroEven20	0	household	1.00	1.00	0.16%	IL TRM 4.4.16 (pg226-231)		N/A	6	$ 81.56	$ -	-	0.0%	0.0%
CZ3 - Single Family	New	Space Heating	Gas Boiler - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroEven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	N/A	2	$ 114.20	$ -	-	0.0%	0.0%
CZ3 - Single Family	New	Space Heating	Gas Boiler - Pipe Insulation	Pipe insulated throughout home	Retrofit	No insulation	Pipe insulated throughout home	RetroL2Med	-1	boil pipe	1.00	90.33	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.82	$ -	0.30	17.7%	100.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Drainwater Heat Recovery	Drain equipped with heat recovery system	Retrofit	None	Drain equipped with heat recovery system	RetroSlow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Res-GFX-7P_v3	NWPCC 7th Plan: Res-Res-GFX-7P_v3	NWPCC 7th Plan: Res-Res-GFX-7P_v3	40	$ 855.55	$ -	10.87	0.0%	10.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Faucet Aerators	1.5 GPM faucet	Retrofit	R-11+, up to R-20	1.5 GPM faucet	Retro1Slow	0	aerators	1.00	3.00	0.16%	NWPCC Seventh Plan: Res Res-Aerator-7P_v5	NWPCC Seventh Plan: Res Res-Aerator-7P_v5	NWPCC Seventh Plan: Res Res-Aerator-7P_v5	15	$ 5.30	$ 66.61	5.11	35.0%	100.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Low Flow Showerhead (2.0 GPM)	2.0 GPM showerhead	Retrofit	3.5 GPM showerhead	2.0 GPM showerhead	Retro1Slow	0	showerheads	1.80	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 15.39	6.44	18.0%	50.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Low Flow Showerhead (1.5 GPM)	1.5 GPM showerhead	Retrofit	3.5 GPM showerhead	1.5 GPM showerhead	Retro1Slow	0	showerheads	1.80	1.80	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 38.77	11.21	18.0%	50.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Temperature Setback	Setback to 120° F	Retrofit	135° F set point	Setback to 120° F	Retro1Slow	0	household	1.00	1.00	0.16%	IL TRM 5.4.6		IL TRM 5.4.6	2	$ 5.30	$ -	3.24	15.0%	100.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Thermostatic Shower Restriction Valve	Restrictor installed, shutting off water when it is warm	Retrofit	No control	Restrictor installed, shutting off water when it is warm	Retro1Slow	0	showerheads	1.00	1.80	0.16%	RTF: ThermostaticShowerRestrictionValve_v1_3	RTF: ThermostaticShowerRestrictionValve_v1_3	RTF: ThermostaticShowerRestrictionValve_v1_3	10	$ 15.28	$ 9.07	2.39	0.0%	100.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Pipe Insulation	Insulated 5' of pipe between unit and conditioned space	Retrofit	No insulation of water pipe in unconditioned space	Insulated 5' of pipe between unit and conditioned space	Retro1Slow	-1	feet pipe	1.00	5.00	0.16%	IL TRM 5.3.2	DEER	BEST	15	$ 5.86	$ -	1.51	17.7%	100.0%
CZ3 - Single Family	New	Space Heating	Water Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard tank water heater, baseline	40 sq ft supplemental solar system installed	RetroMaxSD	-1	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	95.00	2.0%	30.0%
CZ3 - Single Family	New	Miscellaneous	Pool Heater - Solar System	40 sq ft supplemental solar system installed	Retrofit	Standard baseline pool heater	40 sq ft supplemental solar system installed	RetroEven20	0	household	1.00	1.00	0.16%	Michigan Energy Measure Database	Michigan Energy Measure Database	Michigan Energy Measure Database	20	$ 4,690.72	$ -	232.50	2.0%	30.0%
CZ3 - Single Family	New	Water Heating	ENERGY STAR Dishwashers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	RetroEven20	1	household	1.00	1.00	0.16%	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	DOE_Dishwasher_Res Technical Support Document	15	$ 76.22	$ 941.40	3.70	77.1%	88.8%
CZ3 - Single Family	New	Water Heating	ENERGY STAR Clothes Washers	ENERGY STAR unit	Lost Opportunity	Minimum standard unit	ENERGY STAR unit	RetroEven20	1	household	1.00	1.00	0.16%	ResClothesWashers_v6_0	ResClothesWashers_v6_0	ResClothesWashers_v6_0	14	$ 63.06	$ 18.08	6.03	40.5%	98.7%
CZ3 - Single Family	New	Space Heating	ENERGY STAR Homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO50Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	ENERGY STAR Certified Homes, Version 3 (Rev. 08)	CNGC Program Data 2016, scaled by UEC	30	$ 2,117.00	$ -	174.04	0.0%	0.0%
CZ3 - Single Family	New	Space Heating	Build Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO1Slow	0	household	1.00	1.00	0.16%	CNGC Program Data	ENERGY STAR Certified Homes, Version 3 (Rev. 08)	CNGC Program Data 2016	30	$ 2,117.00	$ -	85.00	3.0%	20.0%
CZ3 - Single Family	New	Water Heating	Build Green homes	Built Green spec (NC Only)	Retrofit	WA Building Code	Built Green spec (NC Only)	LO1Slow	0	household	1.00	1.00	0.16%	CNGC Program Data	ENERGY STAR Certified Homes, Version 3 (Rev. 08)	CNGC Program Data 2016	30	$ 2,117.00	$ -	108.90	3.0%	20.0%
CZ3 - Single Family	New	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC Program Data	Calculated	21	$ 4,997.55	$ 6.50	76.08	0.0%	50.0%
CZ3 - Single Family	New	Space Heating	Combined Boiler + DHW System (Storage Tank)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and water heating baseline storage tank 40 gal	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC Program Data	Calculated	21	$ 4,997.55	$ 6.50	60.09	0.0%	50.0%
CZ3 - Single Family	New	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 6.50	76.08	0.0%	50.0%
CZ3 - Single Family	New	Space Heating	Combined Boiler + DHW System (Tankless)	Combined tankless boiler unit for space and DHW	Lost Opportunity	Gas space heating AFUE 80% and separate water heating tankless unit	Combined tankless boiler unit for space and DHW	LO20Fast	0	household	1.00	1.00	0.16%	CNGC Program Data	CNGC: 2018 COMBO Data_10.2.17_Rev1	Calculated	21	$ 4,997.55	$ 6.50	60.09	0.0%	50.0%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Ceiling, Installation	R-38 (Retro only)	Retrofit	R-0	R-38 (Retro only)	RetroEven20	4	sqft roof - mf	1.00	616.22	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data Average	BEST	45	$ 1.29	$ 9.43	0.11	0.0%	4.1%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Ceiling, Upgrade	R-49	Retrofit	R11+, up to R40	R-49	RetroEven20	4	sqft roof - mf	1.00	616.22	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	CNGC Program Data Average	BEST	45	$ 1.29	$ 2.40	0.03	19.7%	87.5%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Slab Foundation	R-11 (NC Only)	Retrofit	R-0	R-11 (NC Only)	Retro1Slow	4	sqft floor	1.00	1,232.43	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	N/A	70	$ 0.95	$ -	-	0.0%	0.0%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Basement Sidewall	R-15	Retrofit	R-0	R-15	Retro1Slow	0	sqft floor	1.00	1,232.43	0.16%	ResNewSFSlabInsulation v3.1	ResNewSFSlabInsulation v3.1	N/A	70	$ 0.95	$ -	-	0.0%	0.0%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Ducting	duct thermal losses reduced 50%	Retrofit	2° F duct loss	duct thermal losses reduced 50%	Retro1Slow	-1	sqft home	1.00	2,464.87	0.16%	RESFDuctSealing_v4_4	RESFDuctSealing_v4_4	RESFDuctSealing_v4_4	20	$ 0.29	$ 3.75	0.02	6.9%	25.0%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Infiltration Control (Air Sealing)	20% reduction in ACH50	Retrofit	ACH50 >= 5	20% reduction in ACH50	RetroEven20	4	sqft home	1.00	2,464.87	0.16%	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-SF_Wx-7P_v7	NWPCC 7th Plan: Res-MF_Wx-7P_v7	15	$ 0.70	$ 1.22	0.01	11.0%	80.0%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Floor/Crawlspace	R-30	Retrofit	R-0	R-30	Retro1Slow	1	sqft floor	1.00	1,232.43	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	ResSFWx_v3_7	45	$ 1.04	$ 5.64	0.03	5.1%	52.8%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Wall Cavity, Upgrade	R-21	Retrofit	R-11+, up to R-20	R-21	Retro1Slow	0	sqft wall	1.00	1,189.21	0.16%	NWPCC 7th Plan: Res-MF_Wx-7P_v7	ORNL ZIP Code Insulation Program	BEST	45	$ 2.01	$ 1.99	0.01	12.2%	79.7%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Wall Cavity, Installation	R-11	Retrofit	R-0	R-11	Retro1Slow	0	sqft wall	1.00	1,189.21	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	NWPCC 7th Plan: Res-MF_Wx-7P_v7	45	$ 1.10	$ 7.48	0.05	0.0%	15.1%
CZ3 - Multi Family	Existing	Space Heating	Insulation - Wall Sheathing	R-5 (NC Only)	Retrofit	R-0	R-5 (NC Only)	Retro1Slow	0	sqft wall	1.00	1,189.21	0.16%	ResMFWeatherization_v3_4	ORNL Zip Code Insulation Program	BEST	45	$ 0.89	$ 4.12	0.03	0.0%	0.0%
CZ3 - Multi Family	Existing	Space Heating	Ducting - Repair and Sealing	50% reduction in duct leakage	Retrofit	10% air leak to outside	50% reduction in duct leakage	Retro1Slow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	NWPCC 7th Plan: Res-Duct_Seal-7P_v4	BEST	20	$ 793.95	$ 1.81	13.29	15.0%	50.0%
CZ3 - Multi Family	Existing	Space Heating	Doors - Storm and Thermal	R-5 door	Retrofit	R-2.5 door	R-5 door	Retro12Med	1	sqft door	1.00	21.00	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 18.64	$ 0.32	0.11	55.0%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Windows - High Efficiency	Double Pane Low-E CL22	Retrofit	Single pane	Double Pane Low-E CL22	Retro1Slow	-1	sqft window	1.00	131.87	0.16%	ResMFWeatherization_v3_4	ResMFWeatherization_v3_4	BEST	45	$ 21.05	$ 8.50	0.47	83.3%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Thermostat - Programmable	Programmed thermostat	Retrofit	Manual/no control	Programmed thermostat	Retro1Slow	-1	household	1.00	1.00	0.16%	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	RTF: ResSFElectronicTStats v3.1	15	$ 61.59	$ 1.62	11.90	16.5%	25.0%
CZ3 - Multi Family	Existing	Space Heating	Thermostat - Wi-Fi/Interactive	Interactive/learning thermostat (ie, NEST)	Retrofit	Manual/no control	Interactive/learning thermostat (ie, NEST)	Retro1Slow	-1	household	1.00	1.00	0.16%	ResConnectedTstats_v1.2	CNGC Program Data	ResConnectedTstats_v1.2	5	$ 254.58	$ 1.94	14.28	10.0%	75.0%
CZ3 - Multi Family	Existing	Space Heating	Gas Furnace - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroEven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	BEST	2	$ 114.20	$ -	6.87	35.0%	90.0%
CZ3 - Multi Family	Existing	Space Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No reset controls	Reset control installed	RetroSMed	0	household	1.00	1.00	0.16%	IL TRM 5.3.14		IL TRM 5.3.14	20	$ 626.72	$ -	7.63	10.0%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Gas Boiler - Steam Trap Maintenance	Cleaned and restored	Retrofit	Degraded system	Cleaned and restored	RetroEven20	0	household	1.00	1.00	0.16%	IL TRM 4.4.16 (pg226-231)		IL TRM 4.4.16 (pg226-231)	6	$ 81.56	$ -	15.27	0.0%	0.0%
CZ3 - Multi Family	Existing	Space Heating	Gas Boiler - Maintenance	Restored to nameplate 80% AFUE	Retrofit	Degraded efficiency 10% below nameplate	Restored to nameplate 80% AFUE	RetroEven20	0	household	1.00	1.00	0.16%	IL TRM 5.3.13	RSMeans 2015	BEST	2	$ 114.20	$ -	-	35.0%	90.0%
CZ3 - Multi Family	Existing	Space Heating	Gas Boiler - Pipe Insulation	Pipe insulated throughout home	Retrofit	No insulation	Pipe insulated throughout home	RetroL2Med	-1	boil pipe	1.00	59.46	0.16%	IL TRM 5.3.2	DEER	IL TRM 5.3.2	15	$ 5.82	$ -	0.30	6.9%	100.0%
CZ3 - Multi Family	Existing	Water Heating	Water Heater - Drainwater Heat Recovery	Drain equipped with heat recovery system	Retrofit	None	Drain equipped with heat recovery system	RetroSlow	-1	household	1.00	1.00	0.16%	NWPCC 7th Plan: Res-Res-GFX-7P_v3	NWPCC 7th Plan: Res-Res-GFX-7P_v3	NWPCC 7th Plan: Res-Res-GFX-7P_v3	40	$ 682.79	$ -	10.87	0.0%	0.0%
CZ3 - Multi Family	Existing	Space Heating	Water Heater - Faucet Aerators	1.5 GPM faucet	Retrofit	2.5 GPM faucet	1.5 GPM faucet	Retro1Slow	0	aerators	1.00	2.00	0.16%	NWPCC Seventh Plan: Res Res-Aerator-7P_v5	NWPCC Seventh Plan: Res Res-Aerator-7P_v5	NWPCC Seventh Plan: Res Res-Aerator-7P_v5	15	$ 5.30	$ 31.35	3.61	40.0%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Water Heater - Low Flow Showerhead (2.0 GPM)	2.0 GPM showerhead	Retrofit	3.5 GPM showerhead	2.0 GPM showerhead	Retro1Slow	0	showerheads	1.30	1.30	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 11.12	6.44	20.0%	50.0%
CZ3 - Multi Family	Existing	Space Heating	Water Heater - Low Flow Showerhead (1.5 GPM)	1.5 GPM showerhead	Retrofit	3.5 GPM showerhead	1.5 GPM showerhead	Retro1Slow	0	showerheads	1.30	1.30	0.16%	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	RTF: Showerheads_v3.1	10	$ 18.22	$ 28.00	11.21	20.0%	50.0%
CZ3 - Multi Family	Existing	Space Heating	Water Heater - Temperature Setback	Setback to 120° F	Retrofit	135° F set point	Setback to 120° F	Retro1Slow	0	household	1.00	1.00	0.16%	IL TRM 5.4.6		IL TRM 5.4.6	2	$ 5.30	$ -	3.24	10.0%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Water Heater - Thermostatic Shower Restriction Valve	Restrictor installed, shutting off water when it is warm	Retrofit	No control	Restrictor installed, shutting off water when it is warm	Retro1Slow	0	showerheads	1.00	1.30	0.16%	RTF: ThermostaticShowerRestrictionValve_v1_3	RTF: ThermostaticShowerRestrictionValve_v1_3	RTF: ThermostaticShowerRestrictionValve_v1_3	10	$ 15.28	$ 6.55	2.39	10.0%	100.0%
CZ3 - Multi Family	Existing	Space Heating	Water Heater - Pipe Insulation	Insulated 5' of pipe between

Measure					Characteristics								Sources			Measure Assumptions in 2017							
Segment	Vintage	End Use	Measure	Efficient Definition in 2018	Replacement Type	Baseline Definition	Efficient Definition / Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Input Units	Units per Square Foot	Transmission Losses	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ meter (kWh) (NEM Only)	Base Saturation	Applicability
Office	Existing	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.04	0.16%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	2.54	74.5%	50.0%
Office	Existing	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO92Fast	1	1 kBtu/hr	1.00	0.03	0.16%	GBLR-Heating-AEO13-3	GBLR-Heating-E1A14-2014 Ref. Case-6	GBLR-Heating-E1A14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	6.47	16.7%	100.0%
Office	Existing	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	0.02	0.16%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	9.1%	100.0%
Office	Existing	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.00	0.16%	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	5.04	31.1%	100.0%
Office	Existing	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	0.9%	100.0%
Office	Existing	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	0.4%	100.0%
Office	Existing	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	0.4%	100.0%
Office	Existing	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	1.8%	100.0%
Office	Existing	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	0.4%	100.0%
Office	Existing	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-E1A14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	1.0%	100.0%
Office	Existing	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	5.3%	100.0%
Office	Existing	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	0.4%	100.0%
Office	Existing	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	0.8%	100.0%
Office	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO35low	0	1 unit	1.00	0.00	0.16%	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	1.0%	100.0%
Office	Existing	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO35low	0	1 unit	1.00	0.01	0.16%	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Office	New	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.03	0.16%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	2.67	74.5%	50.0%
Office	New	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO92Fast	1	1 kBtu/hr	1.00	0.03	0.16%	GBLR-Heating-AEO13-3	GBLR-Heating-E1A14-2014 Ref. Case-6	GBLR-Heating-E1A14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	4.57	16.7%	100.0%
Office	New	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	0.02	0.16%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	9.1%	100.0%
Office	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.00	0.16%	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	6.53	34.3%	100.0%
Office	New	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	0.9%	100.0%
Office	New	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	0.4%	100.0%
Office	New	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	0.4%	100.0%
Office	New	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	1.8%	100.0%
Office	New	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	0.4%	100.0%
Office	New	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-E1A14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	1.0%	100.0%
Office	New	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	5.3%	100.0%
Office	New	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	0.4%	100.0%
Office	New	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	0.8%	100.0%
Office	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO35low	0	1 unit	1.00	0.00	0.16%	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	1.0%	100.0%
Office	New	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO35low	0	1 unit	1.00	0.01	0.16%	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Office	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	5.62	32.7%	100.0%
Retail	Existing	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	3.8%	100.0%
Retail	Existing	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	1.9%	100.0%
Retail	Existing	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	1.9%	100.0%
Retail	Existing	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	6.6%	100.0%
Retail	Existing	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	1.2%	100.0%
Retail	Existing	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-E1A14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	4.3%	100.0%
Retail	Existing	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	5.8%	100.0%
Retail	Existing	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	1.1%	100.0%
Retail	Existing	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	1.1%	100.0%
Retail	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO35low	0	1 unit	1.00	0.00	0.16%	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	0.3%	100.0%
Retail	Existing	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO35low	0	1 unit	1.00	0.01	0.16%	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Retail	New	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.05	0.16%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	1.95	79.6%	45.0%
Retail	New	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO92Fast	1	1 kBtu/hr	1.00	0.05	0.16%	GBLR-Heating-AEO13-3	GBLR-Heating-E1A14-2014 Ref. Case-6	GBLR-Heating-E1A14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	4.16	4.7%	100.0%
Retail	New	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	0.02	0.16%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	35.6%	100.0%
Retail	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	5.62	32.7%	100.0%
Retail	New	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	3.8%	100.0%
Retail	New	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	1.9%	100.0%
Retail	New	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	1.9%	100.0%
Retail	New	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	6.6%	100.0%
Retail	New	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	1.2%	100.0%
Retail	New	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-E1A14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	4.3%	100.0%
Retail	New	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	5.8%	100.0%
Retail	New	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	1.1%	100.0%
Retail	New	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	1.1%	100.0%
Retail	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO35low	0	1 unit	1.00	0.00	0.16%	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	0.3%	100.0%
Retail	New	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO35low	0	1 unit	1.00	0.01	0.16%	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Restaurant	Existing	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.07	0.16%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	0.95	74.3%	30.0%
Restaurant	Existing	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO92Fast	1	1 kBtu/hr	1.00	0.07	0.16%	GBLR-Heating-AEO13-3	GBLR-Heating-E1A14-2014 Ref. Case-6	GBLR-Heating-E1A14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	2.46	2.9%	100.0%
Restaurant	Existing	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	0.02	0.16%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	12.3%	100.0%
Restaurant	Existing	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.02	0.16%	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	5.15	73.3%	100.0%
Restaurant	Existing	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	14.6%	100.0%
Restaurant	Existing	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	7.3%	100.0%
Restaurant	Existing	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	7.3%	100.0%
Restaurant	Existing	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	58.4%	100.0%
Restaurant	Existing	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	23.1%	100.0%
Restaurant	Existing	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-E1A14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	33.7%	100.0%
Restaurant	Existing	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	51.5%	100.0%
Restaurant	Existing	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	6.7%	100.0%
Restaurant	Existing	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	6.7%	100.0%
Restaurant	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO35low	0	1 unit	1.00	0.00	0.16%	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	0.6%	100.0%
Restaurant	Existing	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO35low	0	1 unit	1.00	0.05	0.16%	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Restaurant	New	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.07	0.16%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	0.95	74.3%	30.0%
Restaurant	New	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO92Fast	1	1 kBtu/hr	1.00	0.07	0.16%	GBLR-Heating-AEO13-3	GBLR-Heating-E1A14-2014 Ref. Case-6	GBLR-Heating-E1A14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	2.49	2.9%	100.0%
Restaurant	New	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	0.02	0.16%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	12.3%	100.0%
Restaurant	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	6.68	80.7%	100.0%
Restaurant	New	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	14.6%

Measure					Characteristics								
Segment	Vintage	End Use	Measure	Efficient Definition in 2018	Replacement Type	Baseline Definition	Efficient Definition / Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Input Units	Units per Square Foot	Transmission Losses
Healthcare	Existing	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.04	0.16%
Healthcare	Existing	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.02	0.16%
Healthcare	Existing	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%
Healthcare	Existing	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Healthcare	Existing	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	0.04	0.16%
Healthcare	New	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.04	0.16%
Healthcare	New	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.04	0.16%
Healthcare	New	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.02	0.16%
Healthcare	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%
Healthcare	New	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	New	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Healthcare	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Healthcare	New	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	1.00	0.16%
Lodging	Existing	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.03	0.16%
Lodging	Existing	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.03	0.16%
Lodging	Existing	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.02	0.16%
Lodging	Existing	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.02	0.16%
Lodging	Existing	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	Existing	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Lodging	Existing	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	0.01	0.16%
Lodging	New	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.03	0.16%
Lodging	New	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.03	0.16%
Lodging	New	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.02	0.16%
Lodging	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%
Lodging	New	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	New	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Lodging	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Lodging	New	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	1.00	0.16%
Warehouse	Existing	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.02	0.16%
Warehouse	Existing	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.02	0.16%
Warehouse	Existing	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.02	0.16%
Warehouse	Existing	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Warehouse	Existing	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	0.01	0.16%
Warehouse	New	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.02	0.16%
Warehouse	New	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.02	0.16%
Warehouse	New	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.02	0.16%
Warehouse	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	New	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Warehouse	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Warehouse	New	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	1.00	0.16%
Miscellaneous	Existing	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.07	0.16%
Miscellaneous	Existing	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.07	0.16%
Miscellaneous	Existing	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.03	0.16%
Miscellaneous	Existing	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%
Miscellaneous	Existing	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Miscellaneous	Existing	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	0.03	0.16%
Miscellaneous	New	Heating	Furnace	AFUE 95%	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	0.07	0.16%
Miscellaneous	New	Heating	Boiler	AFUE 98%	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	1	1 kBtu/hr	1.00	0.07	0.16%
Miscellaneous	New	Heating	Unit Heater	Infrared Radiant	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/Hr	1.00	0.03	0.16%
Miscellaneous	New	Water Heating	Water Heater	TE 0.94	Turnover	TE 0.80	TE 0.94	LO20Fast	0	1 kBtu/hr	1.00	0.01	0.16%
Miscellaneous	New	Food Preparation	Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Conveyor Oven	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	Turnover	Standard	ENERGY STAR (EF ≥ 44%) Convection Oven utilizing ASTM Std F1496	LO5Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Double Rack Oven	FTSC Qualified (>50% Cooking Efficiency)	Turnover	Standard	FTSC Qualified (>50% Cooking Efficiency)	LO5Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Fryer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO12Med	2	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Broiler	Infrared Burners	Turnover	Standard	Infrared Burners	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Griddle	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Range	High Efficiency	Turnover	Standard	High Efficiency	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Steamer	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Food Preparation	Food Prep Other	ENERGY STAR	Turnover	Standard	ENERGY STAR	LO5Med	0	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Miscellaneous	Pool Heater	Condensing (EF .90)	Turnover	Standard (EF .82)	Condensing (EF .90)	LO3Slow	0	1 unit	1.00	0.00	0.16%
Miscellaneous	New	Miscellaneous	Miscellaneous	Standard	Turnover	Standard	Standard	LO3Slow	0	1 unit	1.00	1.00	0.16%

			Sources			Measure Assumptions in 2017						
Segment	Vintage	Measure	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ meter (kWh) (NEM Only)	Base Saturation	Applicability
Healthcare	Existing	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	2.83	34.0%	100.0%
Healthcare	Existing	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	9.7%	100.0%
Healthcare	Existing	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	8.92	75.1%	100.0%
Healthcare	Existing	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	7.9%	100.0%
Healthcare	Existing	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	4.0%	100.0%
Healthcare	Existing	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	4.0%	100.0%
Healthcare	Existing	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	4.6%	100.0%
Healthcare	Existing	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	2.5%	100.0%
Healthcare	Existing	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	6.1%	100.0%
Healthcare	Existing	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	35.8%	100.0%
Healthcare	Existing	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	5.2%	100.0%
Healthcare	Existing	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	5.2%	100.0%
Healthcare	Existing	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	1.4%	100.0%
Healthcare	Existing	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Healthcare	New	Furnace	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	1.23	61.7%	65.0%
Healthcare	New	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	2.76	34.0%	100.0%
Healthcare	New	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	9.7%	100.0%
Healthcare	New	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	11.57	82.6%	100.0%
Healthcare	New	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	7.9%	100.0%
Healthcare	New	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	4.0%	100.0%
Healthcare	New	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	4.0%	100.0%
Healthcare	New	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	4.6%	100.0%
Healthcare	New	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	2.5%	100.0%
Healthcare	New	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	6.1%	100.0%
Healthcare	New	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	35.8%	100.0%
Healthcare	New	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	5.2%	100.0%
Healthcare	New	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	5.2%	100.0%
Healthcare	New	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	1.4%	100.0%
Healthcare	New	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Lodging	Existing	Furnace	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	1.61	51.9%	80.0%
Lodging	Existing	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	3.77	21.9%	100.0%
Lodging	Existing	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	8.1%	100.0%
Lodging	Existing	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	2.99	80.8%	100.0%
Lodging	Existing	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	8.0%	100.0%
Lodging	Existing	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	4.0%	100.0%
Lodging	Existing	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	4.0%	100.0%
Lodging	Existing	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	10.6%	100.0%
Lodging	Existing	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	6.9%	100.0%
Lodging	Existing	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	10.0%	100.0%
Lodging	Existing	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	28.5%	100.0%
Lodging	Existing	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	5.0%	100.0%
Lodging	Existing	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	5.0%	100.0%
Lodging	Existing	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	42.9%	100.0%
Lodging	Existing	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Lodging	New	Furnace	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	1.61	51.9%	80.0%
Lodging	New	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	3.79	21.9%	100.0%
Lodging	New	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	8.1%	100.0%
Lodging	New	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	3.88	88.9%	100.0%
Lodging	New	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	8.0%	100.0%
Lodging	New	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	4.0%	100.0%
Lodging	New	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	4.0%	100.0%
Lodging	New	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	10.6%	100.0%
Lodging	New	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	6.9%	100.0%
Lodging	New	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	10.0%	100.0%
Lodging	New	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	28.5%	100.0%
Lodging	New	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	5.0%	100.0%
Lodging	New	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	5.0%	100.0%
Lodging	New	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	42.9%	100.0%
Lodging	New	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Warehouse	Existing	Furnace	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	3.42	42.9%	90.0%
Warehouse	Existing	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	8.16	6.0%	100.0%
Warehouse	Existing	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	53.4%	100.0%
Warehouse	Existing	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	5.16	51.4%	100.0%
Warehouse	Existing	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	0.0%	100.0%
Warehouse	Existing	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	0.0%	100.0%
Warehouse	Existing	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	0.0%	100.0%
Warehouse	Existing	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	0.7%	100.0%
Warehouse	Existing	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	0.0%	100.0%
Warehouse	Existing	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	0.0%	100.0%
Warehouse	Existing	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	1.4%	100.0%
Warehouse	Existing	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	0.0%	100.0%
Warehouse	Existing	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	0.0%	100.0%
Warehouse	Existing	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	0.0%	100.0%
Warehouse	Existing	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Warehouse	New	Furnace	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	3.42	42.9%	90.0%
Warehouse	New	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	8.16	6.0%	100.0%
Warehouse	New	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	53.4%	100.0%
Warehouse	New	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	6.69	56.5%	100.0%
Warehouse	New	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	0.0%	100.0%
Warehouse	New	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	0.0%	100.0%
Warehouse	New	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	0.0%	100.0%
Warehouse	New	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	0.7%	100.0%
Warehouse	New	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	0.0%	100.0%
Warehouse	New	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	0.0%	100.0%
Warehouse	New	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	1.4%	100.0%
Warehouse	New	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	0.0%	100.0%
Warehouse	New	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	0.0%	100.0%
Warehouse	New	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	0.0%	100.0%
Warehouse	New	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Miscellaneous	Existing	Furnace	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	1.47	74.1%	55.0%
Miscellaneous	Existing	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	3.12	18.2%	100.0%
Miscellaneous	Existing	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	15.6%	100.0%
Miscellaneous	Existing	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	4.68	57.5%	100.0%
Miscellaneous	Existing	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	3.0%	100.0%
Miscellaneous	Existing	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	1.5%	100.0%
Miscellaneous	Existing	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	1.5%	100.0%
Miscellaneous	Existing	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	4.8%	100.0%
Miscellaneous	Existing	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	3.4%	100.0%
Miscellaneous	Existing	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	4.2%	100.0%
Miscellaneous	Existing	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	16.1%	100.0%
Miscellaneous	Existing	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	1.2%	100.0%
Miscellaneous	Existing	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	1.2%	100.0%
Miscellaneous	Existing	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	7.0%	100.0%
Miscellaneous	Existing	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%
Miscellaneous	New	Furnace	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	$ -	100.0%	1.47	74.1%	55.0%
Miscellaneous	New	Boiler	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	$ -	104.2%	3.25	18.2%	100.0%
Miscellaneous	New	Unit Heater	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	$ -	100.0%	3.20	15.6%	100.0%
Miscellaneous	New	Water Heater	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	DHW_WH-Water Heating-NMTRM-2016-7	15	$ 8.96	$ -	105.9%	6.07	63.2%	100.0%
Miscellaneous	New	Oven	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-AEO17-3	COOK_OVN-Food Preparation-ILTRM-v5.0-23	10	$ 177.71	$ 5.73	104.2%	304.67	3.0%	100.0%
Miscellaneous	New	Conveyor Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	COOK_OVN-Food Preparation-ILTRM-v5.0-24	17	$ 1,743.88	$ -	107.9%	733.00	1.5%	100.0%
Miscellaneous	New	Double Rack Oven	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	COOK_OVN-Food Preparation-ILTRM-v5.0-25	12	$ 8,560.74	$ -	107.9%	2,064.00	1.5%	100.0%
Miscellaneous	New	Fryer	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	COOK_FRY-Food Preparation-ILTRM-v4.0-1	15	$ 1,200.00	$ -	110.1%	505.23	4.8%	100.0%
Miscellaneous	New	Broiler	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	COOK_BRL-Food Preparation-ILTRM-v4.0-2	12	$ 1,000.00	$ -	107.9%	239.00	3.4%	100.0%
Miscellaneous	New	Griddle	COOK_GRD-Food Preparation-ILTRM-v5.0-1	COOK_GRD-Food Preparation-EIA14-2014 Ref. Case-5	COOK_GRD-Food Preparation-ILTRM-v5.0-1	12	$ 360.00	$ -	104.2%	148.41	4.2%	100.0%
Miscellaneous	New	Range	COOK_OVN-Food Preparation-AEO17-1	DOE Commercial R&D 2016 - Table 2-10	DOE Commercial R&D 2016 - Table 2-18	10	$ 400.00	$ -	110.1%	735.00	16.1%	100.0%
Miscellaneous	New	Steamer	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	COOK_STM-Food Preparation-ILTRM-v4.0-32	12	$ 998.00	$ 2.63	105.9%	1,007.26	1.2%	100.0%
Miscellaneous	New	Food Prep Other	N/A	N/A	N/A	10	$ 1.00	$ -	110.1%	0.01	1.2%	100.0%
Miscellaneous	New	Pool Heater	DOE Commercial R&D 2016 - Table 7-6	DOE Commercial R&D 2016 - Table 7-7	DOE Commercial R&D 2016 - Table 7-9	6	$ 11,506.00	$ -	102.4%	2,233.50	7.0%	100.0%
Miscellaneous	New	Miscellaneous	N/A	N/A	N/A	5	$ -	$ -	100.0%	-	100.0%	100.0%

Commercial Non Equipment

Measure					Characteristics								Sources		Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Bldg Sq Ft	UDH Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ generator (kWh) (NEM Only)	Base Saturation	Applicability
Office	Existing	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro35low	2	sqft roof	10,000	10,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.02	1.18	0.10	60.0%	85.0%
Office	Existing	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro35low	2	sqft wall	10,000	3,675.46	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 1.61	$ -	$ 0.04	1.18	0.26	60.0%	85.0%
Office	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	"2"F thermal losses	50% reduction in thermal losses	Retro05Med	0	sqft	10,000	10,000.00	0.16%	INS_DCT-AII-DEER-1	INS_DCT-AII-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ -	1.12	-	40.0%	60.0%
Office	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro05med	0	sqft	10,000	10,000.00	0.16%	DCT_RPR-AII-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ -	1.18	-	15.0%	50.0%
Office	Existing	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro15low	0	sqft window	10,000	1,223.93	0.16%	WIND_HE-Heating-RTF-v2.1-46	WIND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 24.31	$ -	$ 0.05	1.18	0.28	45.0%	100.0%
Office	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	10,000	0.25	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	636.10	20.0%	30.0%
Office	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	10,000	0.25	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	469.63	20.0%	30.0%
Office	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	10,000	0.63	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	1,130.84	35.0%	55.0%
Office	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro35low	0	kBtuh heat	10,000	253.97	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-MEMD-2018-1	18	$ 0.87	$ -	$ -	1.02	0.31	5.0%	85.0%
Office	Existing	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	10,000	0.63	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 96.63	$ -	1.02	104.36	0.0%	75.0%
Office	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.25	$ -	$ 0.00	1.18	0.02	55.0%	75.0%
Office	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	10,000	0.63	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	188.47	15.0%	55.0%
Office	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35low	0	sqft	10,000	10,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Office	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	Retro20Fast	0	boiler pipe	10,000	400.00	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	30.0%	40.0%
Office	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	Retro20Fast	0	boiler pipe	10,000	400.00	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	30.0%	40.0%
Office	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	Retro20Fast	0	CFM	10,000	900.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	15	$ 7.05	$ -	$ -	1.18	0.20	5.0%	25.0%
Office	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	Retro20Fast	0	Stat Unit	10,000	10.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 3.62	1.04	21.35	10.0%	25.0%
Office	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	STAT_WIFI-AII-7PLN-v2-1	STAT_WIFI-AII-7PLN-v2-1	STAT_WIFI-AII-7PLN-v2-1	5	$ 0.75	$ -	$ 0.03	1.18	0.07	0.0%	50.0%
Office	Existing	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	10,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 8,439.88	$ 205.79	$ -	1.02	148.78	0.0%	0.0%
Office	Existing	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35low	2	ClothesWashers	10,000	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	0.0%	0.0%
Office	Existing	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro05Med	0	perBldg	10,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	25.0%	65.0%
Office	Existing	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	10,000	12.00	0.16%	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	4.13	0.0%	0.0%
Office	Existing	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35low	1	perBldg	10,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	44.0%	80.0%
Office	Existing	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	10,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Office	Existing	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	10,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	240.45	5.0%	5.0%
Office	Existing	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	10,000	572.33	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-DOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Office	Existing	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	Retro20Fast	0	Strat Fan	10,000	0.86	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 129.87	1.18	766.59	15.0%	20.0%
Office	Existing	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.16	$ -	$ 0.01	1.02	0.05	10.0%	10.0%
Office	Miscellaneous	Heating	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	Retro20Fast	0	sqft pool	10,000	1,875.00	0.16%	PL_CCV-Water Heating-SCG-RD-1	PL_CCV-Water Heating-SCG-RD-1	PL_CCV-Water Heating-SCG-RD-1	5	$ 2.37	$ -	$ -	1.06	0.00	50.0%	100.0%
Office	Existing	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15low	0	sqft	10,000	10,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.36	$ -	$ 0.02	1.00	0.07	10.0%	25.0%
Office	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	No control system	Automation system installed and programmed	Retro15low	0	sqft	10,000	10,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.36	$ -	$ 0.02	1.00	0.02	10.0%	25.0%
Office	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro15low	0	sqft	10,000	10,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Office	Existing	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	10,000	10,000.00	0.16%	COM_CX-All-AEG-5	COM_CX-All-AEG-5	N/A	3	$ 1.11	$ -	$ 0.03	1.11	0.09	0.0%	0.0%
Office	Existing	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	COM_RCX-Heating-7PLN-v5-6	COM_RCX-Heating-7PLN-v5-6	7th Power Flat Calculation	5	$ 0.31	$ -	$ 0.02	1.18	0.05	20.0%	45.0%
Office	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.08	$ -	$ 0.01	1.00	0.02	5.0%	25.0%
Office	New	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro35low	2	sqft roof	10,000	10,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
New	New	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro35low	2	sqft wall	10,000	3,675.46	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
New	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	"2"F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	10,000	10,000.00	0.16%	INS_DCT-AII-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ -	1.12	-	0.0%	0.0%
New	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro5Med	0	sqft	10,000	10,000.00	0.16%	DCT_RPR-AII-DEER-1	N/A	N/A	18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
New	New	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro15low	0	sqft window	10,000	1,223.93	0.16%	WIND_HE-Heating-RTF-v2.1-46	N/A	N/A	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
New	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	10,000	0.25	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	604.22	5.0%	10.0%
New	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	10,000	0.25	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	410.98	5.0%	10.0%
New	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	10,000	0.63	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	1,074.17	100.0%	100.0%
New	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.03	0.0%	10.0%
New	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro35low	0	kBtuh heat	10,000	253.97	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-MEMD-2018-1	18	$ 0.87	$ -	$ -	1.02	0.29	5.0%	85.0%
New	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.16	$ -	$ 0.00	1.18	0.02	100.0%	100.0%
New	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	10,000	0.63	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	179.03	15.0%	55.0%
New	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35low	0	sqft	10,000	10,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
New	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	Retro20Fast	0	boiler pipe	10,000	400.00	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	100.0%	100.0%
New	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	Retro20Fast	0	boiler pipe	10,000	400.00	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	100.0%	100.0%
New	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	Retro20Fast	0	CFM	10,000	900.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	15	$ 7.05	$ -	$ -	1.18	0.20	100.0%	100.0%
New	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	Retro20Fast	0	Stat Unit	10,000	10.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 3.81	1.04	24.11	0.0%	0.0%
New	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	STAT_WIFI-AII-7PLN-v2-1	STAT_WIFI-AII-7PLN-v2-1	STAT_WIFI-AII-7PLN-v2-1	5	$ 0.75	$ -	$ 0.02	1.18	0.07	10.0%	75.0%
New	New	Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	10,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 20,798.30	$ 205.79	$ -	1.02	148.86	0.0%	0.0%
New	New	Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35low	2	ClothesWashers	10,000	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	0.0%	0.0%
New	New	Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro05Med	0	perBldg	10,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	0.0%	0.0%
New	New	Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	10,000	12.00	0.16%	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	3.19	0.0%	0.0%
New	New	Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35low	1	perBldg	10,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	44.0%	80.0%
New	New	Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	10,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
New	New	Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	10,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	240.45	5.0%	5.0%
New	New	Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	10,000	6,123.55	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-DOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
New	New	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	Retro20Fast	0	Strat Fan	10,000	8.62	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 115.89	1.18	739.56	15.0%	20.0%
New	New	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.16	$ -	$ 0.01	1.02	0.06	10.0%	10.0%
New	Miscellaneous	Heating	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	Retro20Fast	0	sqft pool	10,000	1,875.00	0.16%	PL_CCV-Water Heating-SCG-RD-1	PL_CCV-Water Heating-SCG-RD-1	PL_CCV-Water Heating-SCG-RD-1	5	$ 2.37	$ -	$ -	1.06	0.00	100.0%	100.0%
New	New	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15low	0	sqft	10,000	10,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.40	$ -	$ 0.02	1.00	0.08	10.0%	25.0%
New	New	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro15low	0	sqft	10,000	10,000.00	0.16%	n/a	n/a	n/a	5	$ 0.39	$ -	$ 0.02	1.08	-	30.0%	60.0%
New	New	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	10,000	10,000.00	0.16%	COM_CX-All-AEG-5	COM_CX-All-AEG-5	COM_CX-All-AEG-5	3	$ 1.29	$ -	$ 0.03	1.11	0.10	100.0%	100.0%
New	New	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	n/a	N/A	7th Power Flat Calculation	5	$ 1.18	$ -	$ 0.02	1.18	0.05	0.0%	0.0%
New	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	Retro20Fast	0	sqft	10,000	10,000.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.09	$ -	$ 0.01	1.00	0.02	5.0%	25.0%
Retail	Existing	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro35low	2	sqft roof	100,000	33,333.33	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.05	1.18	0.31	60.0%	85.0%
Retail	Existing	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro35low	2	sqft wall	100,000	32,863.35	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 1.61	$ -	$ 0.05	1.18	0.31	60.0%	85.0%
Retail	Existing	Heating	Insulation - Ducting	"2"F thermal losses	Discretionary	"2"F thermal losses	50% reduction in thermal losses	Retro05Med	0	sqft	100,000	100,000.00	0.16%	INS_DCT-AII-DEER-1	INS_DCT-AII-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ -	1.12	-	40.0%	60.0%
Retail	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro05med	0	sqft	100,000	100,000.00	0.16%	DCT_RPR-AII-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ 0.00	1.18	0.01	15.0%	50.0%
Retail	Existing	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro15low	0	sqft window	100,000	1,643.17	0.16%	WIND_HE-Heating-RTF-v2.1-46	WIND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 24.31	$ -	$ 0.35	1.18	2.08	45.0%	100.0%
Retail	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	100,000	3.56	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	582.73	20.0%	30.0%
Retail	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	100,000	3.56	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	342.89	20.0%	30.0%
Retail	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	Boiler

Commercial Non Equipment

Measure					Characteristics									Sources			Measure Assumptions in 2017							
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Bldg Sq Ft	UOM Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ generator (kWh) (NEM Only)	Base Saturation	Applicability
Restaurant	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	5,500	5,500.00	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ -	1.18	-	15.0%	50.0%
Restaurant	Existing	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft window	5,500	989.24	0.16%	WND_HE-Heating-RTF-v2.1-46	WND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 24.31	$ -	$ 0.03	1.18	0.14	45.0%	100.0%
Restaurant	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	5,500	0.28	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	359.63	20.0%	30.0%
Restaurant	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	5,500	0.28	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	167.23	20.0%	30.0%
Restaurant	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	5,500	0.70	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	639.34	35.0%	55.0%
Restaurant	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	5,500	5,500.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.04	73.0%	100.0%
Restaurant	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	5,500	279.37	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.60	25.0%	50.0%
Restaurant	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro3Slow	0	kBtuh heat	5,500	279.37	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-MEMD-2018-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.17	5.0%	85.0%
Restaurant	Existing	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	5,500	0.70	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 106.71	$ -	1.02	37.16	0.0%	75.0%
Restaurant	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	RetroEven20	0	sqft	5,500	5,500.00	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.25	$ -	$ 0.02	1.18	0.09	55.0%	75.0%
Restaurant	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	5,500	0.70	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	106.56	15.0%	55.0%
Restaurant	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro3Slow	0	sqft	5,500	5,500.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Restaurant	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condenstate tank insulated	Discretionary	No insulation	Lines and condenstate tank insulated	RetroEven20	0	boiler pipe	5,500	296.65	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	30.0%	40.0%
Restaurant	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	RetroEven20	0	boiler pipe	5,500	296.65	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	30.0%	40.0%
Restaurant	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	RetroEven20	0	CFM	5,500	3,850.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.36	5.0%	15.0%
Restaurant	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	RetroEven20	0	Stat Unit	5,500	5.50	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 3.82	1.04	18.54	20.0%	25.0%
Restaurant	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	5,500	5,500.00	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ 0.02	1.18	0.05	0.0%	75.0%
Restaurant	Existing	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	5,500	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 30,831.28	$ 205.79	$ -	1.02	298.93	0.0%	0.0%
Restaurant	Existing	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro3Slow	2	ClothesWashers	5,500	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	0.0%	0.0%
Restaurant	Existing	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	5,500	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	25.0%	65.0%
Restaurant	Existing	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	5,500	12.00	0.16%	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	8.29	10.0%	40.0%
Restaurant	Existing	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro3Slow	1	perBldg	5,500	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	55.0%	100.0%
Restaurant	Existing	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	5,500	2.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Restaurant	Existing	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	5,500	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	483.11	5.0%	5.0%
Restaurant	Existing	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	5,500	1,149.92	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-DOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Restaurant	Existing	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	RetroEven20	0	Strat Fan	5,500	0.47	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 115.57	1.18	561.53	15.0%	15.0%
Restaurant	Existing	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	RetroEven20	0	sqft	5,500	5,500.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.12	$ -	$ 0.01	1.02	0.04	10.0%	50.0%
Restaurant	Existing	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	RetroEven20	0	sqft pool	5,500	1,875.00	0.16%	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-SCG-R0-1	5	$ 2.37	$ -	$ -	1.06	0.01	50.0%	100.0%
Restaurant	Existing	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	5,500	5,500.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.50	$ -	$ 0.02	1.00	0.05	0.0%	0.0%
Restaurant	Existing	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	5,500	5,500.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.50	$ -	$ 0.02	1.00	0.07	0.0%	0.0%
Restaurant	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro1Slow	0	sqft	5,500	5,500.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Restaurant	Existing	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	5,500	5,500.00	0.16%	COM_CX-All-AEG-5	N/A	COM_CX-All-AEG-5	3	$ 1.11	$ -	$ 0.03	1.11	0.07	0.0%	0.0%
Restaurant	Existing	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	sqft	5,500	5,500.00	0.16%	COM_RCX-Heating-7PLN-v5-13	COM_RCX-Heating-7PLN-v5-13	7th Power Plan Calculation	5	$ 0.31	$ -	$ 0.02	1.18	0.04	25.0%	35.0%
Restaurant	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	RetroEven20	0	sqft	5,500	5,500.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.06	$ -	$ 0.01	1.00	0.02	0.0%	0.0%
Restaurant	New	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro3Slow	2	sqft roof	5,500	5,500.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Restaurant	New	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro3Slow	2	sqft wall	5,500	3,297.46	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Restaurant	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	5,500	5,500.00	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ -	1.12	-	0.0%	0.0%
Restaurant	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	5,500	5,500.00	0.16%	DCT_RPR-All-DEER-1	N/A	n/a	18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Restaurant	New	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft window	5,500	989.24	0.16%	WND_HE-Heating-RTF-v2.1-46	N/A	n/a	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Restaurant	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	5,500	0.28	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	328.94	5.0%	10.0%
Restaurant	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	5,500	0.28	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	146.34	5.0%	10.0%
Restaurant	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	5,500	0.70	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	584.79	100.0%	100.0%
Restaurant	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	5,500	5,500.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.03	0.0%	10.0%
Restaurant	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	5,500	279.37	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.55	100.0%	100.0%
Restaurant	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro3Slow	0	kBtuh heat	5,500	279.37	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-MEMD-2018-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.16	5.0%	85.0%
Restaurant	New	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	5,500	0.70	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 107.03	$ -	1.02	32.52	0.0%	75.0%
Restaurant	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	RetroEven20	0	sqft	5,500	5,500.00	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.16	$ -	$ 0.02	1.18	0.09	100.0%	100.0%
Restaurant	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	5,500	0.70	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	97.46	15.0%	55.0%
Restaurant	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro3Slow	0	sqft	5,500	5,500.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Restaurant	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condenstate tank insulated	Discretionary	No insulation	Lines and condenstate tank insulated	RetroEven20	0	boiler pipe	5,500	296.65	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	100.0%	100.0%
Restaurant	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	RetroEven20	0	boiler pipe	5,500	296.65	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	100.0%	100.0%
Restaurant	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	RetroEven20	0	CFM	5,500	3,850.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.36	100.0%	100.0%
Restaurant	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	RetroEven20	0	Stat Unit	5,500	5.50	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 3.63	1.04	19.04	0.0%	0.0%
Restaurant	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	5,500	5,500.00	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ 0.02	1.18	0.06	20.0%	100.0%
Restaurant	New	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	5,500	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 20,798.30	$ 205.79	$ -	1.02	298.84	0.0%	0.0%
Restaurant	New	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro3Slow	2	ClothesWashers	5,500	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	0.0%	0.0%
Restaurant	New	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	5,500	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	0.0%	0.0%
Restaurant	New	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	5,500	12.00	0.16%	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	6.40	10.0%	40.0%
Restaurant	New	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro3Slow	1	perBldg	5,500	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	55.0%	100.0%
Restaurant	New	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	5,500	2.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Restaurant	New	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	5,500	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	482.97	5.0%	5.0%
Restaurant	New	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	5,500	886.86	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-DOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Restaurant	New	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	RetroEven20	0	Strat Fan	5,500	0.47	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 101.43	1.18	532.19	15.0%	15.0%
Restaurant	New	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	RetroEven20	0	sqft	5,500	5,500.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.12	$ -	$ 0.01	1.02	0.05	10.0%	50.0%
Restaurant	New	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	RetroEven20	0	sqft pool	5,500	1,875.00	0.16%	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-ILTRM-v4.0-5	5	$ 2.37	$ -	$ -	1.06	0.01	100.0%	100.0%
Restaurant	New	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	5,500	5,500.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.49	$ -	$ 0.02	1.00	0.06	0.0%	0.0%
Restaurant	New	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	5,500	5,500.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.49	$ -	$ 0.02	1.00	0.06	0.0%	0.0%
Restaurant	New	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro1Slow	0	sqft	5,500	5,500.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Restaurant	New	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	5,500	5,500.00	0.16%	COM_CX-All-AEG-5	COM_CX-All-AEG-5	COM_CX-All-AEG-5	3	$ 1.29	$ -	$ 0.03	1.11	0.07	100.0%	100.0%
Restaurant	New	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	sqft	5,500	5,500.00	0.16%	N/A	N/A	7th Power Plan Calculation	5	$ 1.18	$ -	$ 0.02	1.18	0.04	0.0%	0.0%
Restaurant	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	RetroEven20	0	sqft	5,500	5,500.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.06	$ -	$ 0.01	1.00	0.02	0.0%	0.0%
Grocery	Existing	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro3Slow	2	sqft roof	20,000	20,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.00	1.18	0.01	60.0%	85.0%
Grocery	Existing	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro3Slow	2	sqft wall	20,000	11,294.42	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 1.61	$ -	$ 0.00	1.18	0.03	60.0%	85.0%
Grocery	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	20,000	20,000.00	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ -	1.12	-	40.0%	60.0%
Grocery	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	20,000	20,000.00	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ 0.00	1.18	0.00	15.0%	50.0%
Grocery	Existing	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft window	20,000	3,761.04	0.16%	WND_HE-Heating-RTF-v2.1-46	WND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 24.31	$ -	$ 0.02	1.18	0.12	45.0%	100.0%
Grocery	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	20,000	0.59	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	724.28	20.0%	30.0%
Grocery	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	20,000	0.59	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	426.18	20.0%	30.0%
Grocery	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	20,000	1.48	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	1,287.61	35.0%	55.0%
Grocery	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	20,000	20,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.04	73.0%	100.0%
Grocery	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	20,000	592.59	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	1.21	25.0%	50.0%
Grocery	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro3Slow	0	kBtuh heat	20,000	592.59	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-MEMD-2018-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.35	5.0%	85.0%
Grocery	Existing	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	20,000	1.48	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 98.84	$ -	1.02	94.71	0.0%	75.0%
Grocery	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	RetroEven20	0	sqft	20,000	20,000.00	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.25	$ -	$ 0.00	1.18	0.02	55.0%	75.0%
Grocery	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	20,000	1.48	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	214.60	15.0%	55.0%
Grocery	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro3Slow	0	sqft	20,000	20,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Grocery	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condenstate tank insulated	Discretionary	No insulation	Lines and condenstate tank insulated	RetroEven20	0	boiler pipe	20,000	565.69	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	30.0%	40.0%
Grocery	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	RetroEven20	0	boiler pipe	20,000	565.69	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	30.0%	40.0%
Grocery	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	RetroEven20	0	CFM	20,000	2,400.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.43	5.0%	10.0%
Grocery	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	RetroEven20	0	Stat Unit	20,000	20.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 4.14	1.04	24.71	10.0%	20.0%
Grocery	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	20,000	20,000.00	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ 0.03	1.18	0.07	0.0%	30.0%
Grocery	Existing	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	20,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 12,860.96	$ 205.79	$ -	1.02	453.44	0.0%	0.0%
Grocery	Existing	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro3Slow	2	ClothesWashers	20,000	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	0.0%	0.0%
Grocery	Existing	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	20,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	25.0%	65.0%
Grocery	Existing	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	20,000	12.00	0.16%	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	12.58	0.0%	0.0%
Grocery	Existing	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro3Slow	1	perBldg	20,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	55.0%	100.0%
Grocery	Existing	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	20,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Grocery	Existing	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	20,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	732.81	5.0%	5.0%
Grocery	Existing	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	20,000	1,744.28	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-DOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Grocery	Existing	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	RetroEven20	0	Strat Fan	20,000	1.72	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 130.84	1.18	780.47	15.0%	20.0%
Grocery	Existing	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	RetroEven20	0	sqft	20,000	20,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.16	$ -	$ 0.01	1.02	0.06	10.0%	20.0%
Grocery	Existing	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	RetroEven20	0	sqft pool	20,000	1,875.00	0.16%	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-SCG-R0-1	5	$ 2.37	$ -	$ -	1.06	0.01	50.0%	100.0%
Grocery	Existing	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	20,000	20,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.41	$ -	$ 0.02	1.00	0.07	10.0%	50.0%
Grocery	Existing	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	20,000	20,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.41	$ -	$ 0.02	1.00	0.03	10.0%	50.0%
Grocery	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro1Slow	0	sqft	20,000	20,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Grocery	Existing	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	20,000	20,000.00	0.16%	COM_CX-All-AEG-5	N/A	COM_CX-All-AEG-5	3	$ 1.11	$ -	$ 0.03	1.11	0.09	0.0%	0.0%
Grocery	Existing	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	sqft	20,000	20,000.00	0.16%	COM_RCX-Heating-7PLN-v5-11	COM_RCX-Heating-7PLN-v5-11	7th Power Plan Calculation	5	$ 0.19	$ -	$ 0.02	1.18	0.05	15.0%	45.0%
Grocery	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	RetroEven20	0	sqft	20,000	20,000.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.08	$ -	$ 0.01	1.00	0.02	0.0%	0.0%
Grocery	New	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro3Slow	2	sqft roof	35,000	35,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Grocery	New	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro3Slow	2	sqft wall	35,000	14,941.11	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Grocery	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	35,000	35,000.00	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ -	1.12	-	0.0%	0.0%
Grocery	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	35,000	35,000.00	0.16%	DCT_RPR-All-DEER-1	N/A	n/a	18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Grocery	New	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft window	35,000	4,975.39	0.16%	WND_HE-Heating-RTF-v2.1-46	N/A	n/a	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Grocery	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	35,000	1.04	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	617.30	5.0%	10.0%
Grocery	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	35,000	1.04	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	372.91	5.0%	10.0%
Grocery	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	35,000	2.59	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	1,097.43	100.0%	100.0%
Grocery	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	35,000	35,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.04	0.0%	10.0%
Grocery	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	35,000	1,037.04	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	1.03	100.0%	100.0%
Grocery	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro3Slow	0	kBtuh heat	35,000	1,037.04	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-MEMD-2018-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.30	5.0%	85.0%
Grocery	New	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	35,000	2.59	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 99.67	$ -	1.02	82.87	0.0%	75.0%
Grocery	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	RetroEven20	0	sqft	35,000	35,000.00	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.16	$ -	$ 0.02	1.18	0.09	100.0%	100.0%
Grocery	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	35,000	2.59	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	182.90	15.0%	55.0%
Grocery	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro3Slow	0	sqft	35,000	35,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Grocery	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condenstate tank insulated	Discretionary	No insulation	Lines and condenstate tank insulated	RetroEven20	0	boiler pipe	35,000	748.33	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	100.0%	100.0%
Grocery	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	RetroEven20	0	boiler pipe	35,000	748.33	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	100.0%	100.0%
Grocery	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	RetroEven20	0	CFM	35,000	4,200.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.43	100.0%	100.0%
Grocery	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	RetroEven20	0	Stat Unit	35,000	35.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 4.59	1.04	29.69	0.0%	0.0%
Grocery	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	35,000	35,000.00	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ 0.03	1.18	0.09	10.0%	50.0%
Grocery	New	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	35,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 20,798.30	$ 205.79	$ -	1.02	793.43	0.0%	0.0%
Grocery	New	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro3Slow	2	ClothesWashers	35,000	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	0.0%	0.0%
Grocery	New	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	35,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	0.0%	0.0%
Grocery	New	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	35,000	12.00	0.16%	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	16.98	0.0%	0.0%
Grocery	New	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro3Slow	1	perBldg	35,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	55.0%	100.0%
Grocery	New	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	35,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Grocery	New	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	35,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	1,282.28	5.0%	5.0%
Grocery	New	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	35,000	2,354.60	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-DOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Grocery	New	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	RetroEven20	0	Strat Fan	35,000	3.02	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 117.08	1.18	756.57	15.0%	20.0%
Grocery	New	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	RetroEven20	0	sqft	35,000	35,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.16	$ -	$ 0.01	1.02	0.06	10.0%	20.0%
Grocery	New	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	RetroEven20	0	sqft pool	35,000	1,875.00	0.16%	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-SCG-R0-1	PL_COV-Water Heating-ILTRM-v4.0-5	5	$ 2.37	$ -	$ -	1.06	0.01	100.0%	100.0%
Grocery	New	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	35,000	35,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.44	$ -	$ 0.02	1.00	0.08	10.0%	50.0%
Grocery	New	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	35,000	35,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.44	$ -	$ 0.02	1.00	0.03	10.0%	50.0%
Grocery	New	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro1Slow	0	sqft	35,000	35,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Grocery	New	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	35,000	35,000.00	0.16%	COM_CX-All-AEG-5	COM_CX-All-AEG-5	COM_CX-All-AEG-5	3	$ 1.29	$ -	$ 0.03	1.11	0.10	100.0%	100.0%
Grocery	New	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	sqft	35,000	35,000.00	0.16%	N/A	N/A	7th Power Plan Calculation	5	$ 1.18	$ -	$ 0.02	1.18	0.06	0.0%	0.0%
Grocery	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	RetroEven20	0	sqft	35,000	35,000.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.09	$ -	$ 0.01	1.00	0.02	0.0%	0.0%
Education	Existing	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro3Slow	2	sqft roof	30,000	30,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.01	1.18	0.02	60.0%	85.0%
Education	Existing	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro3Slow	2	sqft wall	30,000	9,332.56	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 1.61	$ -	$ 0.01	1.18	0.02	60.0%	85.0%
Education	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	30,000	30,000.00	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ -	1.12	-	40.0%	60.0%
Education	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	30,000	30,000.00	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ -	1.18	-	15.0%	50.0%
Education	Existing	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft window	30,000	2,333.14	0.16%	WND_HE-Heating-RTF-v2.1-46	WND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 24.31	$ -	$ 0.05	1.18	0.13	45.0%	100.0%
Education	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	30,000	1.07	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	120.19	20.0%	30.0%

Measure					Characteristics								Sources			Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Bldg Sq Ft	UDH Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ generator (kWh) (NEM Only)	Base Saturation	Applicability
Education	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	30,000	1.07	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	99.30	20.0%	30.0%
Education	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	30,000	2.67	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	213.67	15.0%	55.0%
Education	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.00	$ -	$ -	1.08	0.01	73.0%	100.0%
Education	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	30,000	1,066.67	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.20	25.0%	50.0%
Education	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro35Low	0	kBtuh heat	30,000	1,066.67	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.06	5.0%	85.0%
Education	Existing	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	30,000	2.67	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 105.45	$ -	1.02	22.07	0.0%	75.0%
Education	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.25	$ -	0.01	1.18	0.02	55.0%	75.0%
Education	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	30,000	2.67	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	35.61	15.0%	55.0%
Education	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35Low	0	sqft	30,000	30,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.06	-	0.0%	0.0%
Education	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	Retro20Fast	0	boiler pipe	30,000	692.82	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	30.0%	40.0%
Education	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	Retro20Fast	0	boiler pipe	30,000	692.82	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	30.0%	40.0%
Education	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	Retro20Fast	0	CFM	30,000	14,100.00	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.16	5.0%	20.0%
Education	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	Retro20Fast	0	Stat Unit	30,000	30.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 0.78	1.04	1.94	10.0%	20.0%
Education	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	5	$ 0.75	$ -	$ 0.02	1.18	0.02	0.0%	40.0%
Education	Existing	Water Heating	Water Heater - Clothes Washer - Laundry	Standard laundry machine	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	30,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 6,688.98	$ 205.79	$ -	1.02	353.75	0.0%	0.0%
Education	Existing	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35Low	2	ClothesWashers	30,000	5.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	8.0%	20.0%
Education	Existing	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	30,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	25.0%	65.0%
Education	Existing	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	30,000	12.00	0.16%	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	9.81	0.0%	0.0%
Education	Existing	Heating	Gas Boiler - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35Low	1	perBldg	30,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	55.0%	100.0%
Education	Existing	Heating	Gas Boiler - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	30,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Education	Existing	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	30,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	571.70	5.0%	5.0%
Education	Existing	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	30,000	1,360.80	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-ODE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Education	Existing	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	Retro20Fast	0	Strat Fan	30,000	2.59	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 92.44	1.18	226.88	15.0%	25.0%
Education	Existing	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/MUA vent hood	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.05	$ -	$ 0.01	1.02	0.02	10.0%	20.0%
Education	Existing	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	Retro20Fast	0	sqft pool	30,000	1,875.00	0.16%	PL_CCV-Water Heating-SCG-RD-1	PL_CCV-Water Heating-SCG-RD-1	PL_CCV-Water Heating-ILTRM-v4.0-5	5	$ 2.37	$ -	$ -	1.06	0.01	50.0%	100.0%
Education	Existing	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro35Low	0	sqft	30,000	30,000.00	0.16%	BEMAV_EIS-All-CPUC-2018_PG-2	BEMAV_EIS-All-CPUC-2018_PG-2	BEMAV_EIS-All-CPUC-2018_PG-2	15	$ 0.15	$ -	$ 0.02	1.00	0.02	10.0%	40.0%
Education	Existing	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15Low	0	sqft	30,000	30,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEMAV_EIS-All-CPUC-2018_PG-2	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.15	$ -	$ 0.02	1.00	0.02	10.0%	40.0%
Education	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro15Low	0	sqft	30,000	30,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	60.0%	60.0%
Education	Existing	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	30,000	30,000.00	0.16%	COM_CX-All-AEG-5	N/A	N/A	3	$ 1.11	$ -	$ 0.03	1.11	0.03	0.0%	0.0%
Education	Existing	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	COM_RCX-Heating-7PUN-v5-8	COM_RCX-Heating-7PUN-v5-8	7th Power Plan Calculation	5	$ 0.16	$ -	$ 0.01	1.18	0.01	25.0%	60.0%
Education	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	BEMAV_SEM-All-CPUC-2018_PG-2	BEMAV_SEM-All-CPUC-2018_PG-2	BEMAV_SEM-All-CPUC-2018_PG-2	5	$ 0.02	$ -	$ 0.01	1.00	0.01	5.0%	45.0%
Education	New	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-11 or less	R-38	Retro35Low	2	sqft roof	30,000	30,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	N/A	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Education	New	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro35Low	2	sqft wall	30,000	9,332.56	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	N/A	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Education	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	"2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	30,000	30,000.00	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ -	1.12	-	0.0%	0.0%
Education	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	DCT_RPR-All-DEER-1	N/A	N/A	18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Education	New	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro35Low	0	sqft window	30,000	2,333.14	0.16%	WIND_HE-Heating-RTF-v2.1-46	N/A	N/A	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Education	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	30,000	1.07	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	114.18	5.0%	10.0%
Education	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	30,000	1.07	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	86.88	5.0%	10.0%
Education	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	30,000	2.67	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	202.99	100.0%	100.0%
Education	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.00	$ -	$ -	1.08	0.01	0.0%	10.0%
Education	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	30,000	1,066.67	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.19	100.0%	100.0%
Education	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro35Low	0	kBtuh heat	30,000	1,066.67	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.06	5.0%	85.0%
Education	New	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	30,000	2.67	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 105.64	$ -	1.02	19.31	0.0%	75.0%
Education	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.16	$ -	$ 0.01	1.18	0.02	100.0%	100.0%
Education	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	30,000	2.67	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	33.83	15.0%	55.0%
Education	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35Low	0	sqft	30,000	30,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Education	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	Retro20Fast	0	boiler pipe	30,000	692.82	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	100.0%	100.0%
Education	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	Retro20Fast	0	boiler pipe	30,000	692.82	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	100.0%	100.0%
Education	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	Retro20Fast	0	CFM	30,000	14,100.00	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.16	100.0%	100.0%
Education	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	Retro20Fast	0	Stat Unit	30,000	30.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 2.25	0.04	0.01	0.0%	0.0%
Education	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	5	$ 0.75	$ -	$ 0.02	1.18	0.02	100.0%	100.0%
Education	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	DCT_RPR-All-DEER-1	N/A	N/A	18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Education	New	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro35Low	0	sqft window	30,000	2,333.14	0.16%	WIND_HE-Heating-RTF-v2.1-46	N/A	N/A	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Education	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	30,000	1.07	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	114.18	5.0%	10.0%
Education	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	30,000	1.07	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	86.88	5.0%	10.0%
Education	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	30,000	2.67	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	202.99	100.0%	100.0%
Education	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.00	$ -	$ -	1.08	0.01	0.0%	10.0%
Education	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	30,000	1,066.67	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.19	100.0%	100.0%
Education	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro35Low	0	kBtuh heat	30,000	1,066.67	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.06	5.0%	85.0%
Education	New	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	30,000	2.67	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 105.64	$ -	1.02	19.31	0.0%	75.0%
Education	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.16	$ -	$ 0.01	1.18	0.02	100.0%	100.0%
Education	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	30,000	2.67	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	33.83	15.0%	55.0%
Education	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35Low	0	sqft	30,000	30,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Education	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	Retro20Fast	0	boiler pipe	30,000	692.82	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	100.0%	100.0%
Education	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	Retro20Fast	0	boiler pipe	30,000	692.82	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	100.0%	100.0%
Education	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	Retro20Fast	0	CFM	30,000	7,500.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.69	100.0%	100.0%
Education	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	Retro20Fast	0	Stat Unit	30,000	30.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 2.53	1.04	13.33	0.0%	0.0%
Education	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	Retro20Fast	0	sqft	30,000	30,000.00	0.16%	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	5	$ 0.75	$ -	$ 0.02	1.18	0.02	0.0%	50.0%
Healthcare	New	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	30,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 20,798.30	$ 205.79	$ -	1.02	1,833.20	10.0%	20.0%
Healthcare	New	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35Low	2	ClothesWashers	30,000	10.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	8.0%	20.0%
Healthcare	New	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	30,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	0.0%	0.0%
Healthcare	New	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	30,000	24.00	0.16%	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	13.56	5.0%	10.0%
Healthcare	New	Heating	Gas Boiler - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35Low	1	perBldg	30,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	55.0%	100.0%
Healthcare	New	Heating	Gas Boiler - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	30,000	2.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Healthcare	New	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	30,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	2,048

Measure					Characteristics								Sources		Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Bldg Sq Ft	UDH Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ generator (kWh) (NEM Only)	Base Saturation	Applicability
Lodging	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kBtuh heat	50,000	1,226.05	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.96	25.0%	50.0%
Lodging	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro15Slow	0	kBtuh heat	50,000	1,226.05	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.28	5.0%	85.0%
Lodging	Existing	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	50,000	3.07	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 99.12	$ -	1.02	63.00	0.0%	75.0%
Lodging	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.25	$ -	$ 0.01	1.18	0.02	55.0%	75.0%
Lodging	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	50,000	3.07	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	170.82	15.0%	55.0%
Lodging	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35Sow	0	sqft	50,000	50,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Lodging	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	Retro0ven20	0	boiler pipe	50,000	894.43	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	30.0%	40.0%
Lodging	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	Retro0ven20	0	boiler pipe	50,000	894.43	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	30.0%	40.0%
Lodging	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	Retro0ven20	0	CFM	50,000	10,000.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	15	$ 7.05	$ -	$ -	1.18	0.87	5.0%	20.0%
Lodging	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	Retro0ven20	0	Stat Unit	50,000	50.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 6.15	1.04	29.67	10.0%	30.0%
Lodging	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	5	$ 0.75	$ -	$ 0.03	1.18	0.07	0.0%	55.0%
Lodging	Existing	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	50,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 20,798.30	$ 205.79	$ -	1.02	1,833.20	15.0%	45.0%
Lodging	Existing	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35Sow	2	ClothesWashers	50,000	20.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	40.0%	100.0%
Lodging	Existing	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	50,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	25.0%	65.0%
Lodging	Existing	Water Heating	Water Heater - Drain HX system installed	Drain HX system installed	Discretionary	None	Drain HX system installed	Retro12Med	0	faucet	50,000	12.00	0.16%	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	50.86	0.0%	0.0%
Lodging	Existing	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35Sow	1	perBldg	50,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	27.5%	50.0%
Lodging	Existing	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	50,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Lodging	Existing	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	50,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	2,962.70	65.0%	65.0%
Lodging	Existing	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	50,000	7,051.96	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-ODE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Lodging	Existing	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	Retro0ven20	0	Strat Fan	50,000	4.31	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 115.19	1.18	556.03	15.0%	20.0%
Lodging	Existing	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/MUA vent hood	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.11	$ -	$ 0.01	1.02	0.04	10.0%	20.0%
Lodging	Existing	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	Retro0ven20	0	sqft pool	50,000	1,875.00	0.16%	PL_CCV-Water Heating-SCG-R0-1	PL_CCV-Water Heating-SCG-R0-1	PL_CCV-Water Heating-SCG-R0-1	5	$ 2.37	$ -	$ -	1.06	0.04	50.0%	100.0%
Lodging	New	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	50,000	50,000.00	0.16%	BEMAY_ESI-All-CPUC-2018_PG-10	BEMAY_ESI-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.40	$ -	$ 0.02	1.00	0.05	5.0%	15.0%
Lodging	Existing	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	50,000	50,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEMAY_ESI-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.40	$ -	$ 0.02	1.00	0.05	5.0%	15.0%
Lodging	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro15Slow	0	sqft	50,000	50,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Lodging	Existing	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	50,000	50,000.00	0.16%	COM_CX-All-AEG-5	COM_CX-All-AEG-5	COM_CX-All-AEG-5	3	$ 1.11	$ -	$ 0.03	1.11	0.06	0.0%	0.0%
Lodging	Existing	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	COM_RCX-Heating-7PUN-v5-16	COM_RCX-Heating-7PUN-v5-16	7th Power Plan Calculation	5	$ 0.16	$ -	$ 0.02	1.18	0.03	25.0%	40.0%
Lodging	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	BEMAY_SEM-All-CPUC-2018_PG-2	BEMAY_SEM-All-CPUC-2018_PG-2	BEMAY_SEM-All-CPUC-2018_PG-2	5	$ 0.05	$ -	$ 0.01	1.00	0.01	0.0%	0.0%
Lodging	New	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro35Sow	2	sqft roof	50,000	16,666.67	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Lodging	New	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro35Sow	2	sqft wall	50,000	19,335.27	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Lodging	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	"2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	50,000	50,000.00	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ -	1.12	-	0.0%	0.0%
Lodging	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro0ven20	0	sqft pool	50,000	1,875.00	0.16%	DCT_RPR-All-DEER-1	N/A	n/a	18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Lodging	New	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro15Slow	0	sqft window	50,000	7,734.11	0.16%	WIND_HE-Heating-RTF-v2.1-46	N/A	n/a	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Lodging	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	50,000	1.23	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	501.54	5.0%	10.0%
Lodging	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	50,000	1.23	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	248.07	5.0%	10.0%
Lodging	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	50,000	3.07	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	891.63	100.0%	100.0%
Lodging	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.02	0.0%	10.0%
Lodging	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kBtuh heat	50,000	1,226.05	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.84	100.0%	100.0%
Lodging	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	Retro15Slow	0	kBtuh heat	50,000	1,226.05	0.16%	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-ILTRM-v4.0-1	GBLR_O2TRM-Heating-MEMD-2018-1	18	$ 0.87	$ -	$ -	1.02	0.24	5.0%	85.0%
Lodging	New	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	50,000	3.07	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 99.67	$ -	1.02	55.13	0.0%	75.0%
Lodging	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.16	$ -	$ -	1.02	0.02	100.0%	100.0%
Lodging	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	50,000	3.07	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	148.60	15.0%	55.0%
Lodging	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35Sow	0	sqft	50,000	50,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Lodging	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	Retro0ven20	0	boiler pipe	50,000	894.43	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	100.0%	100.0%
Lodging	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	Retro0ven20	0	boiler pipe	50,000	894.43	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	100.0%	100.0%
Lodging	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	Retro0ven20	0	CFM	50,000	10,000.00	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-1	15	$ 7.05	$ -	$ -	1.18	0.87	100.0%	100.0%
Lodging	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	Retro0ven20	0	Stat Unit	50,000	50.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 6.25	1.04	32.09	0.0%	0.0%
Lodging	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	5	$ 0.75	$ -	$ 0.03	1.18	0.07	10.0%	85.0%
Lodging	New	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	50,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 20,798.30	$ 205.79	$ -	1.02	684.75	0.0%	0.0%
Lodging	New	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35Sow	2	ClothesWashers	50,000	20.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	0.0%	0.0%
Lodging	New	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	50,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	0.0%	0.0%
Lodging	New	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HX system installed	Discretionary	None	Drain HX system installed	Retro12Med	0	faucet	50,000	12.00	0.16%	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-CPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1.0-7	40	$ 880.81	$ -	$ -	1.10	14.65	0.0%	0.0%
Lodging	New	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35Sow	1	perBldg	50,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	0.0%	0.0%
Lodging	New	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	50,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Lodging	New	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	50,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	2,962.70	65.0%	65.0%
Lodging	New	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	50,000	5,440.28	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-ODE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Lodging	New	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	Retro0ven20	0	Strat Fan	50,000	4.31	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 100.21	1.18	514.75	15.0%	20.0%
Lodging	New	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/MUA vent hood	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.11	$ -	$ 0.01	1.02	0.04	10.0%	20.0%
Lodging	New	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	Retro0ven20	0	sqft pool	50,000	1,875.00	0.16%	PL_CCV-Water Heating-SCG-R0-1	PL_CCV-Water Heating-SCG-R0-1	PL_CCV-Water Heating-SCG-R0-1	5	$ 2.37	$ -	$ -	1.06	0.04	100.0%	100.0%
Lodging	New	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	50,000	50,000.00	0.16%	BEMAY_ESI-All-CPUC-2018_PG-10	BEMAY_ESI-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.40	$ -	$ 0.02	1.00	0.05	5.0%	15.0%
Lodging	New	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	50,000	50,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEMAY_ESI-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.40	$ -	$ 0.02	1.00	0.04	5.0%	15.0%
Lodging	New	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro15Slow	0	sqft	50,000	50,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Lodging	New	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	50,000	50,000.00	0.16%	COM_CX-All-AEG-5	COM_CX-All-AEG-5	COM_CX-All-AEG-5	3	$ 1.29	$ -	$ 0.03	1.11	0.07	100.0%	100.0%
Lodging	New	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	N/A	N/A	N/A	5	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Lodging	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	Retro0ven20	0	sqft	50,000	50,000.00	0.16%	BEMAY_SEM-All-CPUC-2018_PG-2	BEMAY_SEM-All-CPUC-2018_PG-2	BEMAY_SEM-All-CPUC-2018_PG-2	5	$ 0.08	$ -	$ 0.01	1.00	0.02	0.0%	0.0%
Miscellaneous	Existing	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	Retro35Sow	2	sqft roof	15,000	15,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.02	1.18	0.12	60.0%	85.0%
Miscellaneous	Existing	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	Retro35Sow	2	sqft wall	15,000	4,500.00	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 1.61	$ -	$ 0.05	1.18	0.32	60.0%	85.0%
Miscellaneous	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	"2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	15,000	15,000.00	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ 1.12	-	-	40.0%	60.0%
Miscellaneous	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro0ven20	0	sqft	15,000	15,000.00	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ -	1.18	-	15.0%	50.0%
Miscellaneous	Existing	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro15Slow	0	sqft window	15,000	2,250.00	0.16%	WIND_HE-Heating-RTF-v2.1-46	WIND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 24.31	$ -	$ 0.04	1.18	0.27	45.0%	100.0%
Miscellaneous	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	15,000	0.76	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	454.60	20.0%	30.0%
Miscellaneous	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	15,000	0.76	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	258.38	20.0%	30.0%
Miscellaneous	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	Retro5Med	0	BoilerCtrl	15,000	1.90	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	808.18	35.0%	55.0%
Miscellaneous	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	Retro0ven20	0	sqft	15,000	15,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.05	73.0%	100.0%
Miscellaneous	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kBtuh heat	15,000	761.90	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TR

Measure					Characteristics								Sources			Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Bldg Sq Ft	UOM Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scalar	Measure Savings @ generator (kWh) (NEM Only)	Base Saturation	Applicability
Miscellaneous	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	RetroSven20	0	sqft	15,000	15,000.00	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.25	$ -	$ 0.00	1.18	0.02	55.0%	75.0%
Miscellaneous	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	15,000	1.90	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	134.70	15.0%	55.0%
Miscellaneous	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35low	0	sqft	15,000	15,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.18	-	0.0%	0.0%
Miscellaneous	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	RetroSven20	0	boiler pipe	15,000	489.90	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	30.0%	40.0%
Miscellaneous	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	RetroSven20	0	boiler pipe	15,000	489.90	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	30.0%	40.0%
Miscellaneous	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	RetroSven20	0	CFM	15,000	1,350.00	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.40	5.0%	15.0%
Miscellaneous	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	RetroSven20	0	Stat Unit	15,000	15.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 3.91	1.04	25.52	10.0%	25.0%
Miscellaneous	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	RetroSven20	0	sqft	15,000	15,000.00	0.16%	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	5	$ 0.75	$ -	$ 0.03	1.18	0.09	0.0%	35.0%
Miscellaneous	Existing	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	15,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 15,594.36	$ 205.79	$ -	1.02	412.16	0.0%	0.0%
Miscellaneous	Existing	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35low	2	ClothesWashers	15,000	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	4.0%	10.0%
Miscellaneous	Existing	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	15,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	25.0%	65.0%
Miscellaneous	Existing	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	15,000	12.00	0.16%	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1-0-7	40	$ 880.81	$ -	$ -	1.10	11.44	5.0%	10.0%
Miscellaneous	Existing	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35low	1	perBldg	15,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	11.0%	20.0%
Miscellaneous	Existing	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	15,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Miscellaneous	Existing	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	15,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	666.42	5.0%	15.0%
Miscellaneous	Existing	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	15,000	1,586.25	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-OOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Miscellaneous	Existing	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	RetroSven20	0	Strat Fan	15,000	1.29	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 140.32	1.18	916.37	15.0%	20.0%
Miscellaneous	Existing	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	RetroSven20	0	sqft	15,000	15,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.19	$ -	$ 0.01	1.02	0.07	10.0%	10.0%
Miscellaneous	Existing	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	RetroSven20	0	sqft pool	15,000	1,875.00	0.16%	PL_CCN-Water Heating-SCG-RD-1	PL_CCN-Water Heating-SCG-RD-1	PL_CCN-Water Heating-SCG-RD-1	5	$ 2.37	$ -	$ -	1.06	0.01	50.0%	100.0%
Miscellaneous	Existing	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15low	0	sqft	15,000	15,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_ES-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.48	$ -	$ 0.02	1.00	0.08	10.0%	40.0%
Miscellaneous	Existing	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15low	0	sqft	15,000	15,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_ES-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.48	$ -	$ 0.02	1.00	0.04	10.0%	40.0%
Miscellaneous	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro15low	0	sqft	15,000	15,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Miscellaneous	Existing	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	15,000	15,000.00	0.16%	COM_CX-All-AEG-5	N/A	COM_CX-All-AEG-5	5	$ 1.11	$ -	$ 0.03	1.11	0.11	0.0%	0.0%
Miscellaneous	Existing	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	RetroSven20	0	sqft	15,000	15,000.00	0.16%	COM_RCX-Heating-7PUN-v5-18	7th Power Plan Calculation		5	$ 0.14	$ -	$ 0.02	1.18	0.06	25.0%	40.0%
Miscellaneous	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	RetroSven20	0	sqft	15,000	15,000.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.09	$ -	$ 0.01	1.00	0.02	0.0%	0.0%
Miscellaneous	New	Heating	Insulation - Roof/Ceiling	R-38	Discretionary	R-13	R-38	RetroSven20	2	sqft roof	15,000	15,000.00	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Miscellaneous	New	Heating	Insulation - Wall Cavity	R-21	Discretionary	R-11 or less	R-21	RetroSven20	2	sqft wall	15,000	4,500.00	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Miscellaneous	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Discretionary	"2"F thermal losses	50% reduction in thermal losses	RetroSven20	0	sqft	15,000	15,000.00	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ 0.01	1.12	0.03	0.0%	0.0%
Miscellaneous	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Discretionary	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroSven20	0	sqft	15,000	15,000.00	0.16%	DCT_RPR-All-DEER-1	N/A	n/a	18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Miscellaneous	New	Heating	Windows - High Efficiency	U-.22 or better	Discretionary	U-.5 or worse	U-.22 or better	Retro15low	0	sqft window	15,000	2,250.00	0.16%	WIND_HE-Heating-RTF-v2.1-46	N/A	n/a	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Miscellaneous	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	15,000	0.76	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.88	$ -	$ -	1.06	429.43	5.0%	10.0%
Miscellaneous	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Discretionary	Degrade performance	General cleaning and maintenance	Retro20Fast	0	1000 kBtuh Heat	15,000	0.76	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.88	$ -	$ -	1.06	226.13	5.0%	10.0%
Miscellaneous	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Discretionary	No control	Reset control installed	RetroSMed	0	BoilerCtrl	15,000	1.90	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 719.34	$ -	$ -	1.18	763.43	100.0%	100.0%
Miscellaneous	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Discretionary	Degrade performance	Cleaning and maintenance	RetroSven20	0	sqft	15,000	15,000.00	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 0.01	$ -	$ -	1.08	0.04	0.0%	10.0%
Miscellaneous	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Discretionary	No control	Turndown control installed	Retro12Med	0	kbtuh heat	15,000	761.90	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 2.59	$ -	$ -	1.02	0.72	100.0%	100.0%
Miscellaneous	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Discretionary	Average performance	Optimized burner controls	RetroSven20	0	kBtuh heat	15,000	761.90	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 0.87	$ -	$ -	1.02	0.21	5.0%	85.0%
Miscellaneous	New	Heating	HVAC - Shut Off Damper	Damper installed	Discretionary	No damper	Damper installed	Retro12Med	0	BoilerCtrl	15,000	1.90	0.16%	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	HVAC_DMPROFF-Heating-ILTRM-v4.0-1	15	$ 1,536.09	$ 105.79	$ -	1.02	50.25	0.0%	75.0%
Miscellaneous	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Discretionary	Constant ventilation	DCV enabled	RetroSven20	0	sqft	15,000	15,000.00	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.16	$ -	$ 0.00	1.18	0.02	100.0%	100.0%
Miscellaneous	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Discretionary	None	Economizer installed	Retro12Med	0	BoilerCtrl	15,000	1.90	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 587.69	$ -	$ -	1.18	127.24	15.0%	55.0%
Miscellaneous	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Discretionary	None	Tube inserts installed	Retro35low	0	sqft	15,000	15,000.00	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Miscellaneous	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Discretionary	No insulation	Lines and condensate tank insulated	RetroSven20	0	boiler pipe	15,000	489.90	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 12.90	$ -	$ -	1.06	5.99	100.0%	100.0%
Miscellaneous	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Discretionary	No insulation	Insulated water lines	RetroSven20	0	boiler pipe	15,000	489.90	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.10	$ -	$ -	1.06	4.01	100.0%	100.0%
Miscellaneous	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Discretionary	None	HRV installed	RetroSven20	0	CFM	15,000	1,350.00	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 7.05	$ -	$ -	1.18	0.40	100.0%	100.0%
Miscellaneous	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Discretionary	Manual control	Programmable thermostat installed	RetroSven20	0	Stat Unit	15,000	15.00	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 188.67	$ -	$ 3.47	1.04	24.25	0.0%	0.0%
Miscellaneous	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Discretionary	Manual control	Wi-Fi/interactive thermostat installed	RetroSven20	0	sqft	15,000	15,000.00	0.16%	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	STAT_WIFI-All-7PUN-v2-1	5	$ 0.75	$ -	$ 0.03	1.18	0.10	10.0%	60.0%
Miscellaneous	New	Water Heating	Water Heater - Ozone Laundry	Ozone laundry system	Discretionary	Standard laundry machine	Ozone laundry system	Retro12Med	0	perBldg	15,000	1.00	0.16%	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	CW_OZON-Water Heating-ILTRM-v4.0-4	10	$ 20,788.30	$ 205.79	$ -	1.02	412.41	0.0%	0.0%
Miscellaneous	New	Water Heating	Water Heater - High MEF Commercial Laundry Washers	ESTAR/High MEF unit installed	Discretionary	Standard laundry machine	ESTAR/High MEF unit installed	Retro35low	2	ClothesWashers	15,000	1.00	0.16%	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	CW-Miscellaneous-RTF-PreQCv5.0-8	11	$ 489.42	$ -	$ 125.05	1.06	35.51	4.0%	10.0%
Miscellaneous	New	Water Heating	Water Heater - Motion Control Faucet	Motion activated faucet	Discretionary	Standard faucet	Motion activated faucet	Retro12Med	0	perBldg	15,000	1.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.02	-	0.0%	0.0%
Miscellaneous	New	Water Heating	Water Heater - Drainwater Heat Recovery	Drain HR system installed	Discretionary	None	Drain HR system installed	Retro12Med	0	faucet	15,000	12.00	0.16%	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-OPATRM-v1-1	DHW_DWHR-Water Heating-MNTRM-v1-0-7	40	$ 880.81	$ -	$ -	1.10	8.83	5.0%	10.0%
Miscellaneous	New	Water Heating	Water Heater - Efficient Dishwasher	ESTAR unit	Discretionary	Standard unit	ESTAR unit	Retro35low	1	perBldg	15,000	1.00	0.16%	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	DW-Food Preparation-CMUATRM-2016-3	10	$ 122.89	$ -	$ 31.72	1.02	71.00	11.0%	20.0%
Miscellaneous	New	Water Heating	Water Heater - Pre-Rinse Spray Valve	2 GPM sprayer nozzle	Discretionary	3.5 GPM kitchen sprayer	2 GPM sprayer nozzle	Retro12Med	0	KitchenFaucet	15,000	1.00	0.16%	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	DHW_SPR-Water Heating-RTF-v2.0-3	4	$ 127.84	$ -	$ 136.94	1.18	23.08	25.0%	65.0%
Miscellaneous	New	Water Heating	Water Heater - Central Controls	Central water boiler controls installed	Discretionary	No central controls	Central water boiler controls installed	Retro12Med	0	perBldg	15,000	1.00	0.16%	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	DHWBLR_CNTRL-Water Heating-ILTRM-v4.0-2	15	$ 1,410.47	$ -	$ -	1.18	666.50	5.0%	15.0%
Miscellaneous	New	Water Heating	Water Heater - Solar System	Solar system installed	Discretionary	None	Solar system installed	Retro12Med	0	DHW kbtuh	15,000	1,223.87	0.16%	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-AEO17-6	DHW_WH-Water Heating-OOE-PTool2014-1	20	$ 326.36	$ 0.81	$ -	1.04	2.11	1.0%	30.0%
Miscellaneous	New	Heating	Destratification Fans (HVLS)	Fans Installed	Discretionary	None/Standard ventilation	Fans Installed	RetroSven20	0	Strat Fan	15,000	1.29	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 7,757.57	$ -	$ 125.43	1.18	876.23	15.0%	20.0%
Miscellaneous	New	Heating	Kitchen Hood - DCV/MUA	DCV/HUA vent hood	Discretionary	Standard kitchen hood	DCV/HUA vent hood	RetroSven20	0	sqft	15,000	15,000.00	0.16%	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	COOK_EXHD-Ventilation-XCELCO-2017-18-2	20	$ 0.19	$ -	$ 0.01	1.02	0.07	10.0%	10.0%
Miscellaneous	New	Miscellaneous	Pool Heater - Night Covers	Night cover in place	Discretionary	No cover	Night cover in place	RetroSven20	0	sqft pool	15,000	1,875.00	0.16%	PL_CCN-Water Heating-SCG-RD-1	PL_CCN-Water Heating-SCG-RD-1	PL_CCN-Water Heating-ILTRM-v4.0-5	5	$ 2.37	$ -	$ -	1.06	0.01	100.0%	100.0%
Miscellaneous	New	Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15low	0	sqft	15,000	15,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_ES-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.51	$ -	$ 0.02	1.00	0.09	10.0%	40.0%
Miscellaneous	New	Water Heating	Building Automation System	Automation system installed and programmed	Discretionary	No control system	Automation system installed and programmed	Retro15low	0	sqft	15,000	15,000.00	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_ES-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.51	$ -	$ 0.02	1.00	0.03	10.0%	40.0%
Miscellaneous	New	Heating	Steam System Efficiency Improvements	Optimized system	Discretionary	Average system efficiency	Optimized system	Retro15low	0	sqft	15,000	15,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Miscellaneous	New	Heating	Commissioning - HVAC	Optimized HVAC design and controls	Discretionary	New construction code	Optimized HVAC design and controls	Retro12Med	0	sqft	15,000	15,000.00	0.16%	COM_CX-All-AEG-5	COM_CX-All-AEG-5	COM_CX-All-AEG-5	5	$ 1.29	$ -	$ 0.03	1.11	0.12	100.0%	100.0%
Miscellaneous	New	Heating	Retrocommissioning - HVAC	Optimized HVAC flow and controls	Discretionary	Vintage/existing building	Optimized HVAC flow and controls	RetroSven20	0	sqft	15,000	15,000.00	0.16%	N/A	7th Power Plan Calculation		5	$ 1.18	$ -	$ 0.02	1.18	0.07	0.0%	0.0%
Miscellaneous	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Discretionary	No energy management system	Energy management system installed and programmed	RetroSven20	0	sqft	15,000	15,000.00	0.16%	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	BEHAV_SEM-All-CPUC-2018_PG-2	5	$ 0.10	$ -	$ 0.01	1.00	0.03	0.0%	0.0%
Office	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	10,000	10,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Office	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	10,000	10,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Retail	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	100,000	100,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Retail	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	100,000	100,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Restaurant	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	5,500	5,500.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Restaurant	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	5,500	5,500.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Grocery	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	20,000	20,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Grocery	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	35,000	35,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Education	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	30,000	30,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Education	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	30,000	30,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Healthcare	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	30,000	30,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Healthcare	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	30,000	30,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Lodging	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	50,000	50,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Lodging	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	50,000	50,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Warehouse	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	100,000	100,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Warehouse	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	100,000	100,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Miscellaneous	Existing	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	Retro5Med	0	sqft	15,000	15,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Miscellaneous	New	Heating	Condensing RTU	TBD	Discretionary	TBD	TBD	RetroSMed	0	sqft	15,000	15,000.00	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.00	-	0.0%	0.0%

Industrial Measures

Measure					Characteristics										Sources			Measure Assumptions in 2017					
Segment	Vintage	End Use	Measure	Efficient Definition in 2018	Measure Identifier	Replacement Type	Baseline Definition	Efficient Definition / Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Input Units	Units per Square Foot	Transmission Losses	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Cost Scalar	Measure Savings @ meter (kWh) (NEM Only)	Base Saturation	Applicability
Food Products	Existing	Heating	Furnace	AFUE 95%	IE1	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	7.59	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	37.0%	30.0%
Food Products	Existing	Heating	Boiler	AFUE 98%	IE2	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	0.74	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	52.6%	100.0%
Food Products	Existing	Heating	Unit Heater	Infrared Radiant	IE3	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	18.49	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	18.0%	100.0%
Food Products	New	Heating	Furnace	AFUE 95%	IE4	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	7.59	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	37.0%	30.0%
Food Products	New	Heating	Boiler	AFUE 98%	IE5	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	0.74	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	52.6%	100.0%
Food Products	New	Heating	Unit Heater	Infrared Radiant	IE6	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	18.49	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	18.0%	100.0%
Agriculture	Existing	Heating	Furnace	AFUE 95%	IE7	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	2.83	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	35.1%	30.0%
Agriculture	Existing	Heating	Boiler	AFUE 98%	IE8	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	1.86	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	7.4%	100.0%
Agriculture	Existing	Heating	Unit Heater	Infrared Radiant	IE9	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	3.58	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	32.8%	100.0%
Agriculture	New	Heating	Furnace	AFUE 95%	IE10	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	2.83	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	35.1%	30.0%
Agriculture	New	Heating	Boiler	AFUE 98%	IE11	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	1.86	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	7.4%	100.0%
Agriculture	New	Heating	Unit Heater	Infrared Radiant	IE12	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	3.58	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	32.8%	100.0%
Primary Metals	Existing	Heating	Furnace	AFUE 95%	IE13	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	6.02	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	94.3%	30.0%
Primary Metals	Existing	Heating	Boiler	AFUE 98%	IE14	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	0.79	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	0.0%	100.0%
Primary Metals	Existing	Heating	Unit Heater	Infrared Radiant	IE15	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	51.23	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	13.1%	100.0%
Primary Metals	New	Heating	Furnace	AFUE 95%	IE16	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	6.02	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	94.3%	30.0%
Primary Metals	New	Heating	Boiler	AFUE 98%	IE17	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	0.79	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	0.0%	100.0%
Primary Metals	New	Heating	Unit Heater	Infrared Radiant	IE18	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	51.23	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	13.1%	100.0%
Stone, Clay, and Glass	Existing	Heating	Furnace	AFUE 95%	IE19	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	8.34	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	54.1%	30.0%
Stone, Clay, and Glass	Existing	Heating	Boiler	AFUE 98%	IE20	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	8.91	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	7.0%	100.0%
Stone, Clay, and Glass	Existing	Heating	Unit Heater	Infrared Radiant	IE21	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	16.81	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	31.7%	100.0%
Stone, Clay, and Glass	New	Heating	Furnace	AFUE 95%	IE22	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	8.34	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	54.1%	30.0%
Stone, Clay, and Glass	New	Heating	Boiler	AFUE 98%	IE23	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	8.91	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	7.0%	100.0%
Stone, Clay, and Glass	New	Heating	Unit Heater	Infrared Radiant	IE24	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	16.81	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	31.7%	100.0%
Petroleum	Existing	Heating	Furnace	AFUE 95%	IE25	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	293.12	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	3.2%	30.0%
Petroleum	Existing	Heating	Boiler	AFUE 98%	IE26	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	33.37	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	3.9%	100.0%
Petroleum	Existing	Heating	Unit Heater	Infrared Radiant	IE27	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	1,074.92	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	1.0%	100.0%
Petroleum	New	Heating	Furnace	AFUE 95%	IE28	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	293.12	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	3.2%	30.0%
Petroleum	New	Heating	Boiler	AFUE 98%	IE29	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	33.37	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	3.9%	100.0%
Petroleum	New	Heating	Unit Heater	Infrared Radiant	IE30	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	1,074.92	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	1.0%	100.0%
Paper and Printing	Existing	Heating	Furnace	AFUE 95%	IE31	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	21.33	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	83.7%	30.0%
Paper and Printing	Existing	Heating	Boiler	AFUE 98%	IE32	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	32.62	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	7.6%	100.0%
Paper and Printing	Existing	Heating	Unit Heater	Infrared Radiant	IE33	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	85.91	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	24.6%	100.0%
Paper and Printing	New	Heating	Furnace	AFUE 95%	IE34	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	21.33	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	83.7%	30.0%
Paper and Printing	New	Heating	Boiler	AFUE 98%	IE35	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	32.62	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	7.6%	100.0%
Paper and Printing	New	Heating	Unit Heater	Infrared Radiant	IE36	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	85.91	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	24.6%	100.0%
Instruments	Existing	Heating	Furnace	AFUE 95%	IE37	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	1.41	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	68.2%	30.0%
Instruments	Existing	Heating	Boiler	AFUE 98%	IE38	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	1.97	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	6.8%	100.0%
Instruments	Existing	Heating	Unit Heater	Infrared Radiant	IE39	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	2.60	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	43.6%	100.0%
Instruments	New	Heating	Furnace	AFUE 95%	IE40	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	1.41	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	68.2%	30.0%
Instruments	New	Heating	Boiler	AFUE 98%	IE41	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	1.97	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	6.8%	100.0%
Instruments	New	Heating	Unit Heater	Infrared Radiant	IE42	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	2.60	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	43.6%	100.0%
Wood and Lumber Products	Existing	Heating	Furnace	AFUE 95%	IE43	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	3.14	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	58.5%	30.0%
Wood and Lumber Products	Existing	Heating	Boiler	AFUE 98%	IE44	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	47.66	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	0.5%	100.0%
Wood and Lumber Products	Existing	Heating	Unit Heater	Infrared Radiant	IE45	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	4.59	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	47.2%	100.0%
Wood and Lumber Products	New	Heating	Furnace	AFUE 95%	IE46	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	3.14	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	58.5%	30.0%
Wood and Lumber Products	New	Heating	Boiler	AFUE 98%	IE47	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	47.66	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	0.5%	100.0%
Wood and Lumber Products	New	Heating	Unit Heater	Infrared Radiant	IE48	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	4.59	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	47.2%	100.0%
Other Industrial	Existing	Heating	Furnace	AFUE 95%	IE49	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	2.32	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	42.9%	30.0%
Other Industrial	Existing	Heating	Boiler	AFUE 98%	IE50	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	2.32	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	6.0%	100.0%
Other Industrial	Existing	Heating	Unit Heater	Infrared Radiant	IE51	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	2.20	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	53.4%	100.0%
Other Industrial	New	Heating	Furnace	AFUE 95%	IE52	Turnover	AFUE 80% (Standard)	AFUE 95%	LO12Med	0	1 kBtu/hr	1.00	2.32	0.20%	GFURN-Heating-AEO15-178	CNGC Res Program	AEG BEST	18	$ 24.80	100.0%	3.61	42.9%	30.0%
Other Industrial	New	Heating	Boiler	AFUE 98%	IE53	Turnover	AFUE 80% (Standard)	AFUE 98%	LO50Fast	0	1 kBtu/hr	1.00	2.32	0.20%	GBLR-Heating-AEO13-3	GBLR-Heating-EIA14-2014 Ref. Case-6	GBLR-Heating-EIA14-2014 Ref. Case-6	25	$ 6.38	104.4%	7.78	6.0%	100.0%
Other Industrial	New	Heating	Unit Heater	Infrared Radiant	IE54	Turnover	Standard	Infrared Radiant	LO12Med	0	1 kBtu/hr	1.00	2.20	0.20%	UNITHT-Heating-XCELCO-2017-18-4	CNGC Program Data	UNITHT-Heating-XCELCO-2017-18-4	15	$ 5.54	100.0%	3.20	53.4%	100.0%

Measure					Characteristics								Sources			Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Employees per facility	UOM Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scaler	Measure Savings @ meter (Therm) (NEM Only)	Base Saturation	Applicability
Food Products	Existing	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro35low	2	sqft	1	260	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ -	$ 0.03	1.18	0.10	60.0%	100.0%
Food Products	Existing	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro35low	2	sqft	1	260	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 0.31	$ -	$ -	$ 0.02	1.18	0.07	60.0%	100.0%
Food Products	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	Retro45Med	0	sqft	1	316	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ -	$ 0.00	1.12	0.00	40.0%	60.0%
Food Products	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro45ven20	0	sqft	1	316	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ -	$ 0.00	1.18	0.00	15.0%	50.0%
Food Products	Existing	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro15low	0	sqft	1	260	0.16%	WND_HE-Heating-RTF-v2.1-46	WND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 0.23	$ -	$ -	$ 0.01	1.18	0.03	45.0%	100.0%
Food Products	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	employee	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.02	$ -	$ -	$ -	1.06	0.62	20.0%	30.0%
Food Products	Existing	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.02	$ -	$ -	$ -	1.06	28.43	20.0%	30.0%
Food Products	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	$ -	1.18	0.01	20.0%	30.0%
Food Products	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro45Med	0	employee	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 46.00	$ -	$ -	$ -	1.18	2.78	20.0%	45.0%
Food Products	Existing	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro45Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 46.00	$ -	$ -	$ -	1.18	126.36	20.0%	45.0%
Food Products	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro4ven20	0	employee	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 15.62	$ -	$ -	$ -	1.08	1.24	73.0%	85.0%
Food Products	Existing	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro4ven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 15.62	$ -	$ -	$ -	1.08	56.66	73.0%	85.0%
Food Products	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	employee	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 66.27	$ -	$ -	$ -	1.02	1.24	73.0%	85.0%
Food Products	Existing	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 66.27	$ -	$ -	$ -	1.02	47.39	35.0%	50.0%
Food Products	Existing	Heating	Gas Boiler - Boiler Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30low	0	employee	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MNTRM-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 22.26	$ -	$ -	$ -	1.02	0.30	5.0%	85.0%
Food Products	Existing	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30low	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MNTRM-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 22.26	$ -	$ -	$ -	1.02	13.74	5.0%	85.0%
Food Products	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro4ven20	0	sqft	1	316	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.25	$ -	$ -	$ 0.01	1.18	0.02	55.0%	75.0%
Food Products	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	employee	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 37.58	$ -	$ -	$ -	1.18	0.46	15.0%	55.0%
Food Products	Existing	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 37.58	$ -	$ -	$ -	1.18	21.06	15.0%	55.0%
Food Products	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro35low	0	sqft	1	316	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	$ -	1.00	-	0.0%	0.0%
Food Products	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	Retro4ven20	0	sqft	1	260	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	$ -	1.18	0.02	5.0%	10.0%
Food Products	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	Retro4ven20	0	sqft	1	260	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ -	$ 0.01	1.04	0.03	25.0%	40.0%
Food Products	Existing	Heating	Thermostat - Wifi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	Retro4ven20	0	sqft	1	260	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ -	$ 0.03	1.18	0.07	5.0%	20.0%
Food Products	Existing	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	Retro4ven20	0	sqft	1	260	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ -	$ 0.02	1.18	0.06	15.0%	30.0%
Food Products	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro4ven20	0	employee	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 117.39	$ -	$ -	$ -	1.06	1.17	40.0%	50.0%
Food Products	Existing	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro4ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 117.39	$ -	$ -	$ -	1.06	53.34	40.0%	50.0%
Food Products	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro4ven20	0	employee	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 219.27	$ -	$ -	$ -	1.06	0.78	40.0%	50.0%
Food Products	Existing	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro4ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 219.27	$ -	$ -	$ -	1.06	35.71	40.0%	50.0%
Food Products	Existing	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	$ -	1.00	-	15.0%	65.0%
Food Products	Existing	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	$ -	1.00	-	5.0%	50.0%
Food Products	New	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	Retro35low	0	sqft	1	260	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.30	$ -	$ 0.39	$ 1.00	0.06	5.0%	65.0%
Food Products	New	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15low	0	sqft	1	31	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	$ 1.08	-	30.0%	60.0%
Food Products	New	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15low	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	$ 1.08	-	30.0%	60.0%
Food Products	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro4ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 54.32	$ -	$ 41.72	$ 1.00	7.20	5.0%	50.0%
Food Products	New	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro4ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 54.32	$ -	$ 41.72	$ 1.00	30.21	5.0%	50.0%
Food Products	Existing	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro4ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 54.32	$ -	$ 41.72	$ 1.00	2.79	5.0%	50.0%
Food Products	Existing	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	$ 1.04	-	0.0%	0.0%
Food Products	Existing	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	sqft	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	$ 1.04	-	0.0%	0.0%
Food Products	Existing	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	Retro4ven20	0	employee	1	1	0.16%	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	AEG Estimate	5	$ 166.04	$ -	$ 47.94	$ 1.04	7.60	15.0%	50.0%
Food Products	Existing	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	Retro4ven20	0	employee	1	1	0.16%	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	AEG Estimate	5	$ 166.04	$ -	$ 47.94	$ 1.04	118.55	15.0%	50.0%
Food Products	New	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro35low	2	sqft	1	260	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Food Products	New	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro35low	2	sqft	1	260	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 0.22	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Food Products	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	Retro45Med	0	sqft	1	316	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ 0.00	1.12	0.00	0.0%	0.0%
Food Products	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro45ven20	0	sqft	1	316	0.16%	DCT_RPR-All-DEER-1	N/A	Building Energy Simulation Tool	18	$ -	$ -	$ 0.00	$ 1.18	0.00	0.0%	0.0%
Food Products	New	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro15low	0	sqft	1	260	0.16%	WND_HE-Heating-RTF-v2.1-46	N/A	Building Energy Simulation Tool	45	$ -	$ -	$ -	$ 1.18	-	0.0%	0.0%
Food Products	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.02	$ -	$ -	$ 1.06	0.62	5.0%	10.0%
Food Products	New	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.02	$ -	$ -	$ 1.06	28.43	5.0%	10.0%
Food Products	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	$ 1.06	0.01	5.0%	10.0%
Food Products	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro45Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 45.95	$ -	$ 1.18	$ 1.18	2.64	20.0%	45.0%
Food Products	New	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro45Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 45.95	$ -	$ 1.18	$ 1.18	126.36	20.0%	45.0%
Food Products	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro4ven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 14.82	$ -	$ 1.08	$ 1.08	1.18	0.0%	0.0%
Food Products	New	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro4ven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 14.82	$ -	$ 1.08	$ 1.08	56.66	0.0%	0.0%
Food Products	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 66.20	$ -	$ 1.02	$ 1.02	0.99	35.0%	50.0%
Food Products	New	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 219.04	$ -	$ 1.02	$ 1.02	47.39	35.0%	50.0%
Food Products	New	Heating	Gas Boiler - Boiler Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30low	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 22.24	$ -	$ 1.02	$ 1.02	0.29	5.0%	85.0%
Food Products	New	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30low	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MNTRM-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 22.24	$ -	$ 1.02	$ 1.02	13.74	5.0%	85.0%
Food Products	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro4ven20	0	sqft	1	316	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.16	$ -	$ 0.01	$ 1.18	0.02	55.0%	75.0%
Food Products	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 37.54	$ -	$ 1.18	$ 1.18	0.46	15.0%	55.0%
Food Products	New	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 37.54	$ -	$ 1.18	$ 1.18	21.06	15.0%	55.0%
Food Products	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro35low	0	sqft	1	316	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	$ 1.00	-	0.0%	0.0%
Food Products	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	Retro4ven20	0	sqft	1	260	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	$ 1.18	-	5.0%	10.0%
Food Products	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	Retro4ven20	0	sqft	1	260	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ -	$ 1.04	-	25.0%	40.0%
Food Products	New	Heating	Thermostat - Wifi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	Retro4ven20	0	sqft	1	260	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ 0.01	$ 1.18	-	5.0%	20.0%
Food Products	New	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	Retro4ven20	0	sqft	1	260	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ -	$ 1.06	1.11	45.0%	50.0%
Food Products	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro4ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 117.27	$ -	$ 1.06	$ 1.06	53.34	45.0%	50.0%
Food Products	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro4ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 219.04	$ -	$ 1.06	$ 1.06	0.75	45.0%	50.0%
Food Products	New	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	$ 1.00	-	15.0%	65.0%
Food Products	New	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	$ 1.00	-	5.0%	50.0%
Food Products	New	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	Retro35low	0	sqft	1	260	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.34	$ -	$ -	$ 1.00	-	5.0%	65.0%
Agriculture	Existing	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro35low	2	sqft	131	131	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.05	$ 1.18	0.10	60.0%	100.0%
Agriculture	Existing	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro35low	2	sqft	131	131	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 0.31	$ -	$ 0.04	$ 1.18	0.07	60.0%	100.0%
Agriculture	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	Retro45Med	0	sqft	1	118	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ 0.00	$ 1.12	0.00	40.0%	60.0%
Agriculture	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro45ven20	0	sqft	1	118	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ 0.00	$ 1.18	0.00	15.0%	50.0%
Agriculture	Existing	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro15low	0	sqft	131	131	0.16%	WND_HE-Heating-RTF-v2.1-46	WND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 0.23	$ -	$ 0.02	$ 1.18	0.03	45.0%	100.0%
Agriculture	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	employee	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ -	$ 1.06	1.56	20.0%	30.0%
Agriculture	Existing	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ -	$ 1.06	1.27	20.0%	30.0%
Agriculture	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	$ 1.06	0.01	20.0%	30.0%
Agriculture	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro45Med	0	employee	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 4.49	$ -	$ 1.18	$ 1.18	6.95	20.0%	45.0%
Agriculture	Existing	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro45Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v

Measure					Characteristics									Sources			Measure Assumptions in 2017					
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Employees per facility	UOM Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scaler	Measure Savings @ meter (Interm) (NEM Only)	Base Saturation	Applicability
Agriculture	New	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro1Slow	0	sqft	1	77	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Agriculture	New	Process	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro1Slow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Agriculture	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 8.02	$ 0.19	$ -	1.00	-	5.0%	50.0%
Agriculture	New	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 8.02	$ 0.19	$ -	1.00	-	5.0%	50.0%
Agriculture	New	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 8.02	$ 0.19	$ -	1.00	-	5.0%	50.0%
Agriculture	New	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Agriculture	New	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Agriculture	New	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PVN-v5-18	COM_RCK-Heating-7PVN-v5-18	n/a	5	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Agriculture	New	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PVN-v5-18	COM_RCK-Heating-7PVN-v5-18	n/a	5	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Primary Metals	Existing	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro3Slow	2	sqft	1	472	0.16%	ING_CLG-Heating-RTF-v2.1-55	ING_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.02	1.18	0.02	60.0%	100.0%
Primary Metals	Existing	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro3Slow	2	sqft	1	472	0.16%	ING_WC-Heating-RTF-v2.1-1	ING_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 0.31	$ -	$ 0.01	1.18	0.07	60.0%	100.0%
Primary Metals	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	RetroSMed	0	sqft	1	251	0.16%	ING_DCT-All-DEER-1	ING_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ 0.00	1.12	0.00	40.0%	60.0%
Primary Metals	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	1	251	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ 0.00	1.18	0.00	15.0%	35.0%
Primary Metals	Existing	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft	1	472	0.16%	WND_HE-Heating-RTF-v2.1-46	WND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 0.23	$ -	$ 0.01	1.18	0.03	45.0%	100.0%
Primary Metals	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	employee	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.02	$ -	$ -	1.06	0.66	20.0%	30.0%
Primary Metals	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.02	$ -	$ -	1.06	22.94	20.0%	30.0%
Primary Metals	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	1.06	0.01	20.0%	30.0%
Primary Metals	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	employee	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 37.36	$ -	$ -	1.18	2.94	20.0%	45.0%
Primary Metals	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 37.36	$ -	$ -	1.18	101.93	20.0%	45.0%
Primary Metals	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	employee	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 12.68	$ -	$ -	1.08	1.32	73.0%	85.0%
Primary Metals	Existing	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 12.68	$ -	$ -	1.08	45.71	73.0%	85.0%
Primary Metals	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	employee	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 53.82	$ -	$ 1.02	1.10	35.0%	50.0%
Primary Metals	Existing	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 53.82	$ -	$ 1.02	38.23	35.0%	50.0%
Primary Metals	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro3Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-MEMD-2018-1	18	$ 18.08	$ -	$ 1.02	0.32	5.0%	85.0%
Primary Metals	Existing	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro3Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-MEMD-2018-1	18	$ 18.08	$ -	$ 1.02	11.09	5.0%	85.0%
Primary Metals	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro3Slow	0	sqft	1	251	0.16%	VENT_DCV-Heating-7PVN-v5-8	VENT_DCV-Heating-7PVN-v5-8	VENT_DCV-Heating-7PVN-v5-8	15	$ 0.25	$ -	$ 0.01	1.18	0.02	55.0%	75.0%
Primary Metals	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	employee	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 30.52	$ -	$ -	1.18	0.49	15.0%	55.0%
Primary Metals	Existing	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 30.52	$ -	$ -	1.18	16.99	15.0%	55.0%
Primary Metals	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro3Slow	0	sqft	1	251	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Primary Metals	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	RetroEven20	0	sqft	1	472	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	1.18	0.02	5.0%	10.0%
Primary Metals	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	RetroEven20	0	sqft	1	472	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ 0.01	1.04	0.03	25.0%	40.0%
Primary Metals	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	1	472	0.16%	STAT_WIFI-All-7PVN-v2-1	STAT_WIFI-All-7PVN-v2-1	STAT_WIFI-All-7PVN-v2-1	5	$ 0.75	$ -	$ 0.02	1.18	0.07	5.0%	20.0%
Primary Metals	Existing	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	RetroEven20	0	sqft	1	472	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ 0.01	1.18	0.06	15.0%	30.0%
Primary Metals	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	RetroEven20	0	employee	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 95.34	$ -	$ 1.06	1.24	40.0%	50.0%
Primary Metals	Existing	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank installed	Retrofit	No insulation	Lines and condensate tank installed	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 95.34	$ -	$ 1.06	43.02	40.0%	50.0%
Primary Metals	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	employee	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 178.08	$ -	$ 1.06	0.83	40.0%	50.0%
Primary Metals	Existing	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 178.08	$ -	$ 1.06	28.80	40.0%	50.0%
Primary Metals	Existing	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	15.0%	65.0%
Primary Metals	Existing	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	5.0%	50.0%
Primary Metals	Existing	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	Retro1Slow	0	sqft	1	472	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.30	$ -	$ 0.21	1.00	0.06	5.0%	65.0%
Primary Metals	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro1Slow	0	sqft	1	33	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Primary Metals	Existing	Process	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro1Slow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Primary Metals	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 179.01	$ 39.17	1.00	13.07	5.0%	50.0%
Primary Metals	Existing	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	sqft	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 179.01	$ 39.17	1.00	100.79	5.0%	50.0%
Primary Metals	Existing	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 179.01	$ 39.17	1.00	18.60	5.0%	50.0%
Primary Metals	Existing	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Primary Metals	Existing	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Primary Metals	Existing	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PVN-v5-18	COM_RCK-Heating-7PVN-v5-18	AEG Estimate	5	$ 538.76	$ -	$ 48.35	1.04	13.78	15.0%	50.0%
Primary Metals	Existing	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PVN-v5-18	COM_RCK-Heating-7PVN-v5-18	AEG Estimate	5	$ 538.76	$ -	$ 48.35	1.04	395.55	15.0%	50.0%
Primary Metals	New	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro3Slow	2	sqft	1	472	0.16%	ING_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Primary Metals	New	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro3Slow	2	sqft	1	472	0.16%	ING_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 0.22	$ -	$ -	1.18	-	0.0%	0.0%
Primary Metals	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	ReferMed	0	sqft	1	251	0.16%	ING_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ 0.00	1.12	0.00	0.0%	0.0%
Primary Metals	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	1	251	0.16%	DCT_RPR-All-DEER-1	N/A	Building Energy Simulation Tool	18	$ -	$ -	$ 0.00	1.18	0.00	0.0%	0.0%
Primary Metals	New	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft	1	472	0.16%	WND_HE-Heating-RTF-v2.1-46	N/A	Building Energy Simulation Tool	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Primary Metals	New	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro3Slow	2	sqft	1	472	0.16%	ING_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 0.22	$ -	$ -	1.18	-	0.0%	0.0%
Primary Metals	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	ReferMed	0	sqft	1	251	0.16%	ING_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ 0.00	1.12	0.00	0.0%	0.0%
Primary Metals	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	1	251	0.16%	DCT_RPR-All-DEER-1	N/A	Building Energy Simulation Tool	18	$ -	$ -	$ 0.00	1.18	0.00	0.0%	0.0%
Primary Metals	New	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro1Slow	0	sqft	1	472	0.16%	WND_HE-Heating-RTF-v2.1-46	N/A	Building Energy Simulation Tool	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Primary Metals	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.02	$ -	$ -	1.06	22.94	5.0%	10.0%
Primary Metals	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	1.06	0.01	5.0%	10.0%
Primary Metals	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 37.30	$ -	$ -	1.18	2.80	20.0%	45.0%
Primary Metals	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 37.30	$ -	$ -	1.18	101.93	20.0%	45.0%
Primary Metals	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 12.03	$ -	$ -	1.08	1.25	0.0%	0.0%
Primary Metals	New	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 12.03	$ -	$ -	1.08	45.71	0.0%	0.0%
Primary Metals	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	employee	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 53.74	$ -	$ 1.02	1.05	35.0%	50.0%
Primary Metals	New	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 53.74	$ -	$ 1.02	38.23	35.0%	50.0%
Primary Metals	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro3Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-MEMD-2018-1	18	$ 18.06	$ -	$ 1.02	0.30	5.0%	85.0%
Primary Metals	New	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro3Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-MEMD-2018-1	18	$ 18.06	$ -	$ 1.02	11.09	5.0%	85.0%
Primary Metals	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro3Slow	0	sqft	1	251	0.16%	VENT_DCV-Heating-7PVN-v5-8	VENT_DCV-Heating-7PVN-v5-8	VENT_DCV-Heating-7PVN-v5-8	15	$ 0.16	$ -	$ 0.01	1.18	0.02	55.0%	75.0%
Primary Metals	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 30.48	$ -	$ -	1.18	0.47	15.0%	55.0%
Primary Metals	New	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 30.48	$ -	$ -	1.18	16.99	15.0%	55.0%
Primary Metals	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro3Slow	0	sqft	1	251	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Primary Metals	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	RetroEven20	0	sqft	1	472	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	1.18	-	5.0%	10.0%
Primary Metals	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	RetroEven20	0	sqft	1	472	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ -	1.04	-	25.0%	40.0%
Primary Metals	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	1	472	0.16%	STAT_WIFI-All-7PVN-v2-1	STAT_WIFI-All-7PVN-v2-1	STAT_WIFI-All-7PVN-v2-1	5	$ 0.75	$ -	$ 0.01	1.18	-	5.0%	20.0%
Primary Metals	New	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	RetroEven20	0	sqft	1	472	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ -	1.18	-	15.0%	30.0%
Primary Metals	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank installed	RetroEven20	0	employee	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 95.34	$ -	$ -	1.18	-	40.0%	50.0%
Primary Metals	New	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank installed	Retrofit	No insulation	Lines and condensate tank installed	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 95.34	$ -	$ -	1.18	-	40.0%	50.0%
Primary Metals	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	employee	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 177.83	$ -	$ -	1.18	-	45.0%	50.0%
Primary Metals	New	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 177.83	$ -	$ -	1.18	-	45.0%	50.0%
Primary Metals	New	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	15.0%	65.0%
Primary Metals	New	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	5.0%	50.0%

Measure					Characteristics								Sources			Measure Assumptions in 2017					
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Employees per facility	UOM Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scaler	Measure Savings @ meter (therm) (NEM Only)	Base Saturation	Applicability
Stone, Clay, and Glass	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	1	483	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ -	0.01	1.18	-	5.0%	20.0%
Stone, Clay, and Glass	New	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	RetroEven20	0	sqft	1	483	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ -	-	1.18	-	15.0%	30.0%
Stone, Clay, and Glass	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 42.70	$ -	$ -	-	1.06	13.37	45.0%	50.0%
Stone, Clay, and Glass	New	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 42.70	$ -	$ -	-	1.06	6.46	45.0%	50.0%
Stone, Clay, and Glass	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 79.76	$ -	$ -	-	1.06	8.95	45.0%	50.0%
Stone, Clay, and Glass	New	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 79.76	$ -	$ -	-	1.06	4.33	45.0%	50.0%
Stone, Clay, and Glass	New	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	RetroEven12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	-	1.00	-	15.0%	65.0%
Stone, Clay, and Glass	New	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	RetroEven12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	-	1.00	-	5.0%	50.0%
Stone, Clay, and Glass	New	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	RetroEven20	0	sqft	1	483	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.34	$ -	$ -	-	1.00	-	5.0%	65.0%
Stone, Clay, and Glass	New	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	RetroEven20	0	sqft	1	371	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	-	1.08	-	30.0%	60.0%
Stone, Clay, and Glass	New	Process	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	RetroSlow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	-	1.08	-	30.0%	60.0%
Stone, Clay, and Glass	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 121.86	$ 2.90	$ -	-	1.00	-	5.0%	50.0%
Stone, Clay, and Glass	New	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 121.86	$ 2.90	$ -	-	1.00	-	5.0%	50.0%
Stone, Clay, and Glass	New	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 121.86	$ 2.90	$ -	-	1.00	-	5.0%	50.0%
Stone, Clay, and Glass	New	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	RetroEven12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	-	1.04	-	0.0%	0.0%
Stone, Clay, and Glass	New	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	RetroEven12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	-	1.04	-	0.0%	0.0%
Stone, Clay, and Glass	New	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PLN-v5-18	COM_RCK-Heating-7PLN-v5-18	n/a	5	$ -	$ -	$ -	-	1.04	-	0.0%	0.0%
Stone, Clay, and Glass	New	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PLN-v5-18	COM_RCK-Heating-7PLN-v5-18	n/a	5	$ -	$ -	$ -	-	1.04	-	0.0%	0.0%
Petroleum	Existing	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	RetroSlow	2	sqft	1	11,459	0.16%	INS_CLG-Heating-RTF-v2-1-55	INS_CLG-Heating-RTF-v2-1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ -	0.01	1.18	0.10	60.0%	100.0%
Petroleum	Existing	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	RetroSlow	2	sqft	1	11,459	0.16%	INS_WC-Heating-RTF-v2-1-1	INS_WC-Heating-RTF-v2-1-1	Building Energy Simulation Tool	45	$ 0.31	$ -	$ -	0.01	1.18	0.07	60.0%	100.0%
Petroleum	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	"2°F thermal losses	50% reduction in thermal losses	RetroSMed	0	sqft	1	12,213	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ -	0.00	1.12	0.00	40.0%	60.0%
Petroleum	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	1	12,213	0.16%	DCT_RPR-Cooling-RTF-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ -	0.00	1.18	0.00	15.0%	50.0%
Petroleum	Existing	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	RetroSlow	2	sqft	1	11,459	0.16%	WIND_HE-Heating-RTF-v2-1-46	WIND_HE-Heating-RTF-v2-1-46	WIND_HE-Heating-RTF-v2-1-46	45	$ 0.23	$ -	$ -	0.00	1.18	0.03	45.0%	100.0%
Petroleum	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	RetroSmall	0	employee	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.36	$ -	$ -	-	1.06	28.08	20.0%	30.0%
Petroleum	Existing	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	RetroSmall	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.36	$ -	$ -	-	1.06	439.17	20.0%	30.0%
Petroleum	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	RetroSmall	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.19	$ -	$ -	-	1.06	0.01	20.0%	30.0%
Petroleum	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	employee	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 739.70	$ -	$ -	-	1.18	124.81	20.0%	45.0%
Petroleum	Existing	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 739.70	$ -	$ -	-	1.18	1,951.87	20.0%	45.0%
Petroleum	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 251.13	$ -	$ -	-	1.08	55.97	73.0%	85.0%
Petroleum	Existing	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 251.13	$ -	$ -	-	1.08	875.23	73.0%	85.0%
Petroleum	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	RetroEven12Med	0	employee	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 1,065.68	$ -	$ -	-	1.02	46.80	35.0%	50.0%
Petroleum	Existing	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	RetroEven12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 1,065.68	$ -	$ -	-	1.02	731.95	35.0%	50.0%
Petroleum	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	RetroSlow	0	employee	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMOD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 358.04	$ -	$ -	-	1.02	13.57	5.0%	85.0%
Petroleum	Existing	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	RetroSlow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMOD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 358.04	$ -	$ -	-	1.02	212.27	5.0%	85.0%
Petroleum	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	RetroEven20	0	sqft	1	12,213	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.25	$ -	$ -	0.00	1.18	0.02	55.0%	75.0%
Petroleum	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	RetroEven12Med	0	employee	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 604.33	$ -	$ -	-	1.18	20.80	15.0%	55.0%
Petroleum	Existing	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	RetroEven12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 604.33	$ -	$ -	-	1.18	325.31	15.0%	55.0%
Petroleum	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	RetroSlow	0	sqft	1	12,213	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	-	1.00	-	0.0%	0.0%
Petroleum	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	RetroEven20	0	sqft	1	11,459	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	-	1.18	0.02	5.0%	10.0%
Petroleum	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	RetroEven20	0	sqft	1	11,459	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ -	0.00	1.04	0.03	25.0%	40.0%
Petroleum	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	1	11,459	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ -	0.01	1.18	0.07	5.0%	20.0%
Petroleum	Existing	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	RetroEven20	0	sqft	1	11,459	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ -	0.00	1.18	0.06	15.0%	30.0%
Petroleum	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	RetroEven20	0	employee	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 1,887.81	$ -	$ -	-	1.06	52.68	40.0%	50.0%
Petroleum	Existing	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 1,887.81	$ -	$ -	-	1.06	823.84	40.0%	50.0%
Petroleum	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	employee	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 3,526.09	$ -	$ -	-	1.06	35.27	40.0%	50.0%
Petroleum	Existing	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	RetroEven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 3,526.09	$ -	$ -	-	1.06	551.52	40.0%	50.0%
Petroleum	Existing	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	RetroSMed	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	-	1.00	-	15.0%	65.0%
Petroleum	Existing	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	RetroSMed	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	-	1.00	-	5.0%	50.0%
Petroleum	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	RetroSlow	0	sqft	1	1,391	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	-	1.08	-	30.0%	60.0%
Petroleum	Existing	Process	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	RetroSlow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	-	1.08	-	30.0%	60.0%
Petroleum	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 1,667.82	$ 39.72	$ -	-	1.00	-	5.0%	50.0%
Petroleum	Existing	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 1,667.82	$ 39.72	$ -	-	1.00	-	5.0%	50.0%
Petroleum	Existing	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	RetroEven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 1,667.82	$ 39.72	$ -	-	1.00	-	5.0%	50.0%
Petroleum	Existing	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	RetroEven12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	-	1.04	-	0.0%	0.0%
Petroleum	Existing	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	RetroEven12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	-	1.04	-	0.0%	0.0%
Petroleum	Existing	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PLN-v5-18	COM_RCK-Heating-7PLN-v5-18	AEG Estimate	5	$ 4,006.09	$ -	$ 49.14	1.04	25.54	15.0%	50.0%
Petroleum	Existing	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	RetroEven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PLN-v5-18	COM_RCK-Heating-7PLN-v5-18	AEG Estimate	5	$ 4,006.09	$ -	$ 49.14	1.04	3,018.11	15.0%	50.0%
Petroleum	New	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	RetroSlow	2	sqft	1	11,459	0.16%	INS_CLG-Heating-RTF-v2-1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	-	1.18	-	0.0%	0.0%
Petroleum	New	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	RetroSlow	2	sqft	1	11,459	0.16%	INS_WC-Heating-RTF-v2-1-1	N/A	Building Energy Simulation Tool	45	$ 0.22	$ -	$ -	-	1.18	-	0.0%	0.0%
Petroleum	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	"2°F thermal losses	50% reduction in thermal losses	RetroSMed	0	sqft	1	12,213	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ -	0.00	1.12	0.00	0.0%	0.0%
Petroleum	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	RetroEven20	0	sqft	1	12,213	0.16%	DCT_RPR-All-DEER-1	N/A	Building Energy Simulation Tool	18	$ -	$ -	$ -	0.00	1.18	0.00	0.0%	0.0%
Petroleum	New	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	RetroSlow	2	sqft	1	11,459	0.16%	WIND_HE-Heating-RTF-v2-1-46	N/A	Building Energy Simulation Tool	45	$ -	$ -	$ -	-	1.18	-	0.0%	0.0%
Petroleum	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.36	$ -	$ -	-	1.06	26.68	5.0%	10.0%
Petroleum	New	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.36	$ -	$ -	-	1.06	439.17	5.0%	10.0%
Petroleum	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	RetroSmall	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.17	$ -	$ -	-	1.06	0.01	5.0%	10.0%
Petroleum	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 737.48	$ -	$ -	-	1.18	118.56	20.0%	45.0%
Petroleum	New	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	RetroSMed	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 737.48	$ -	$ -	-	1.18	1,951.87	20.0%	45.0%
Petroleum	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 237.84	$ -	$ -	-	1.08	53.16	0.0%	0.0%
Petroleum	New	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	RetroEven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 237.84	$ -	$ -	-	1.08	875.23	0.0%	0.0%
Petroleum	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	RetroEven12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 1,062.48	$ -	$ -	-	1.02	44.46	35.0%	50.0%
Petroleum	New	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	RetroEven12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 1,062.48	$ -	$ -	-	1.02	731.95	35.0%	50.0%
Petroleum	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	RetroSlow	0	employee	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMOD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 356.96	$ -	$ -	-	1.02	12.89	5.0%	85.0%
Petroleum	New	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	RetroSlow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMOD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 356.96	$ -	$ -	-	1.02	212.27	5.0%	85.0%
Petroleum	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	RetroEven20	0	sqft	1	12,213	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.16	$ -	$ -	0.00	1.18	0.02	55.0%	75.0%
Petroleum	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	RetroEven12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 602.51	$ -	$ -	-	1.18	19.76	15.0%	55.0%
Petroleum	New	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	RetroEven12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 602.51	$ -	$ -	-	1.18	325.31	15.0%	55.0%
Petroleum	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	RetroSlow	0	sqft	1	12,213	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	-	1.00	-	0.0%	0.0%
Petroleum	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	RetroEven20	0	sqft	1	11,459	0.16%	HRV-Heating-ILTRM-v5.0-1	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	-	1.18	-	5.0%	10.0%
Petroleum	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	RetroEven20	0	sqft	1	11,459	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ -	-	1.04	-	25.0%	40.0%
Petroleum	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	RetroEven20	0	sqft	1	11,459	0.16%	STAT_

Measure					Characteristics								Sources			Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Employees per facility	UOM Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scaler	Measure Savings @ meter (Therm) (NEM Only)	Base Saturation	Applicability
Paper and Printing	New	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 163.60	$ -	$ -	1.02	76.09	35.0%	50.0%
Paper and Printing	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 54.96	$ -	$ -	1.02	12.60	5.0%	85.0%
Paper and Printing	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 54.96	$ -	$ -	1.02	22.07	5.0%	85.0%
Paper and Printing	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro6ven20	0	sqft	1	889	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.16	$ -	$ 0.00	1.18	0.02	55.0%	75.0%
Paper and Printing	New	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 92.77	$ -	$ -	1.18	19.31	15.0%	55.0%
Paper and Printing	New	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 92.77	$ -	$ -	1.18	33.82	15.0%	55.0%
Paper and Printing	New	Heating	Gas Furnace - Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro30Slow	0	sqft	1	889	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Paper and Printing	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	Retro6ven20	0	sqft	1	1,531	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	1.18	-	5.0%	10.0%
Paper and Printing	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	Retro6ven20	0	sqft	1	1,531	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ -	1.04	-	25.0%	40.0%
Paper and Printing	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	Retro6ven20	0	sqft	1	1,531	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ 0.01	1.18	1.18	5.0%	20.0%
Paper and Printing	New	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	Retro6ven20	0	sqft	1	1,531	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ -	1.18	-	15.0%	30.0%
Paper and Printing	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro6ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 289.80	$ -	$ -	1.06	48.91	45.0%	50.0%
Paper and Printing	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro6ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 289.80	$ -	$ -	1.06	85.65	45.0%	50.0%
Paper and Printing	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro6ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 541.30	$ -	$ -	1.06	32.74	45.0%	50.0%
Paper and Printing	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro6ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 541.30	$ -	$ -	1.06	57.34	45.0%	50.0%
Paper and Printing	New	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	15.0%	65.0%
Paper and Printing	New	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	5.0%	50.0%
Paper and Printing	New	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	1	1,531	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.34	$ -	$ -	1.00	-	5.0%	65.0%
Paper and Printing	New	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	1,359	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Paper and Printing	New	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Paper and Printing	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro6ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 158.57	$ 3.78	$ -	1.00	-	5.0%	50.0%
Paper and Printing	New	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro6ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 158.57	$ 3.78	$ -	1.00	-	5.0%	50.0%
Paper and Printing	New	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro6ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 158.57	$ 3.78	$ -	1.00	-	5.0%	50.0%
Paper and Printing	New	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Paper and Printing	New	Process	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Paper and Printing	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	employee	1	1	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	1.06	0.01	20.0%	30.0%
Paper and Printing	New	Process	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	Retro6ven20	0	employee	1	1	0.16%	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	n/a	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Paper and Printing	New	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	Retro6ven20	0	employee	1	1	0.16%	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	5	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Instruments	Existing	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro30Slow	2	sqft	1	80	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	45	$ 1.02	$ -	$ 0.08	1.18	0.10	60.0%	100.0%
Instruments	Existing	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro30Slow	2	sqft	1	80	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 0.31	$ -	$ 0.06	1.18	0.07	60.0%	100.0%
Instruments	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	1	59	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ 0.00	1.12	0.00	40.0%	60.0%
Instruments	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro6ven20	0	sqft	1	59	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ 0.00	1.18	0.00	15.0%	30.0%
Instruments	Existing	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro15Slow	0	sqft	1	80	0.16%	WIND_HE-Heating-RTF-v2.1-46	WIND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 0.23	$ -	$ 0.03	1.18	0.03	45.0%	100.0%
Instruments	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	employee	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ -	1.06	1.66	20.0%	30.0%
Instruments	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ -	1.06	2.11	20.0%	30.0%
Instruments	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	1.06	0.01	20.0%	30.0%
Instruments	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro5Med	0	employee	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 5.96	$ -	$ 1.18	1.18	7.36	20.0%	45.0%
Instruments	Existing	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro5Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 5.96	$ -	$ 1.18	1.18	9.38	20.0%	45.0%
Instruments	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro6ven20	0	employee	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 2.02	$ -	$ 0.08	1.18	3.30	73.0%	85.0%
Instruments	Existing	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro6ven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 2.02	$ -	$ 0.08	1.18	4.21	73.0%	85.0%
Instruments	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 8.59	$ -	$ 1.06	1.02	2.76	35.0%	50.0%
Instruments	Existing	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 8.59	$ -	$ 1.06	1.02	3.52	35.0%	50.0%
Instruments	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	employee	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 2.89	$ -	$ 1.02	0.80	5.05	85.0%	85.0%
Instruments	Existing	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 2.89	$ -	$ 1.02	1.02	5.05	85.0%	85.0%
Instruments	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro6ven20	0	sqft	59	59	0.16%	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	VENT_DCV-Heating-7PLN-v5-8	15	$ 0.25	$ -	$ 0.03	1.18	0.02	55.0%	75.0%
Instruments	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	employee	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 4.87	$ -	$ -	1.18	1.23	15.0%	55.0%
Instruments	Existing	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 4.87	$ -	$ -	1.18	1.56	15.0%	55.0%
Instruments	Existing	Heating	Gas Furnace - Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro30Slow	0	sqft	1	59	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Instruments	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	Retro6ven20	0	sqft	1	80	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	1.18	0.02	5.0%	10.0%
Instruments	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	Retro6ven20	0	sqft	1	80	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ 0.02	1.04	0.03	25.0%	40.0%
Instruments	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	Retro6ven20	0	sqft	1	80	0.16%	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	STAT_WIFI-All-7PLN-v2-1	5	$ 0.75	$ -	$ 0.07	1.18	0.07	5.0%	20.0%
Instruments	Existing	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	Retro6ven20	0	sqft	1	80	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ 0.05	1.18	0.06	15.0%	30.0%
Instruments	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro6ven20	0	employee	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 15.22	$ -	$ -	1.06	3.11	40.0%	50.0%
Instruments	Existing	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro6ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 15.22	$ -	$ -	1.06	3.96	40.0%	50.0%
Instruments	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro6ven20	0	employee	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 28.42	$ -	$ -	1.06	2.08	40.0%	50.0%
Instruments	Existing	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro6ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 28.42	$ -	$ -	1.06	2.65	40.0%	50.0%
Instruments	Existing	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	15.0%	65.0%
Instruments	Existing	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	5.0%	50.0%
Instruments	Existing	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	1	80	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.30	$ -	$ 1.23	1.00	0.06	5.0%	65.0%
Instruments	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	82	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Instruments	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Instruments	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro6ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 6.81	$ -	$ 42.51	1.00	2.23	5.0%	50.0%
Instruments	Existing	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro6ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 6.81	$ -	$ 42.51	1.00	1.70	5.0%	50.0%
Instruments	Existing	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro6ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 6.81	$ -	$ 42.51	1.00	1.12	5.0%	50.0%
Instruments	Existing	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Instruments	Existing	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Instruments	Existing	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	Retro6ven20	0	employee	1	1	0.16%	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	AEG Estimate	5	$ 12.19	$ -	$ 47.60	1.04	2.59	15.0%	50.0%
Instruments	Existing	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	Retro6ven20	0	employee	1	1	0.16%	COM_RCX-Heating-7PLN-v5-18	COM_RCX-Heating-7PLN-v5-18	AEG Estimate	5	$ 12.19	$ -	$ 47.60	1.04	6.67	15.0%	50.0%
Instruments	New	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro30Slow	2	sqft	1	80	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Instruments	New	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro30Slow	2	sqft	1	80	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 0.22	$ -	$ -	1.18	-	0.0%	0.0%
Instruments	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	1	59	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ 0.00	1.12	0.00	40.0%	60.0%
Instruments	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro6ven20	0	sqft	1	59	0.16%	DCT_RPR-All-DEER-1	N/A	Building Energy Simulation Tool	18	$ 0.59	$ -	$ 0.00	1.18	0.00	15.0%	30.0%
Instruments	New	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro15Slow	0	sqft	1	80	0.16%	WIND_HE-Heating-RTF-v2.1-46	N/A	Building Energy Simulation Tool	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Instruments	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ 0.06	1.06	1.57	5.0%	10.0%
Instruments	New	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ 0.06	2.11	5.0%	10.0%
Instruments	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ 0.06	0.01	5.0%	10.0%
Instruments	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro5Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 5.83	$ -	$ 1.18	6.99	20.0%	45.0%
Instruments	New	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro5Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 5.83	$ -	$ 1.18	9.38	20.0%	45.0%
Instruments	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro6ven20	0	employee	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 1.88	$ -	$ 1.08	3.13	0.0%	0.0%
Instruments	New	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro6ven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 1.88	$ -	$ 1.08	4.21	0.0%	0.0%
Instruments	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTR

Measure					Characteristics								Sources		Measure Assumptions in 2017						
Segment	Vintage	End Use	Measure	Efficient Definition	Replacement Type	Baseline Definition (NEM Only)	Measure Description	Measure Ramp Rate Name	Ramp Offset	Input Unit of Measure	Employees per facility	UOM Per Facility	Line Loss	Lifetime Source	Costs Source	Savings Source	Measure Lifetime (Years)	Incremental Measure Cost ($)	Incremental O&M Cost ($)	Incremental Non-Energy Benefits ($)	Cost Scaler	Measure Savings @ meter (therm) (NEM Only)	Base Saturation	Applicability
Wood and lumber Products	New	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro15Slow	0	sqft	1	171	0.16%	WND_HE-Heating-RTF-v2.1-46	N/A	Building Energy Simulation Tool	45	$ -	$ -	$ -	1.18	-	0.0%	0.0%
Wood and lumber Products	New	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 3.00	$ -	$ -	1.06	38.10	5.0%	10.0%
Wood and lumber Products	New	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.03	$ -	$ -	1.06	5.18	5.0%	10.0%
Wood and lumber Products	New	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	1.06	0.01	5.0%	10.0%
Wood and lumber Products	New	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro5Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 68.50	$ -	$ -	1.18	169.32	20.0%	45.0%
Wood and lumber Products	New	Process	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro5Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 68.50	$ -	$ -	1.18	23.01	20.0%	45.0%
Wood and lumber Products	New	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 22.09	$ -	$ -	1.08	75.92	0.0%	0.0%
Wood and lumber Products	New	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 22.09	$ -	$ -	1.08	10.32	0.0%	0.0%
Wood and lumber Products	New	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 98.69	$ -	$ -	1.02	63.49	35.0%	50.0%
Wood and lumber Products	New	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 98.69	$ -	$ -	1.02	8.63	35.0%	50.0%
Wood and lumber Products	New	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 33.16	$ -	$ -	1.02	18.41	5.0%	85.0%
Wood and lumber Products	New	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 33.16	$ -	$ -	1.02	2.50	5.0%	85.0%
Wood and lumber Products	New	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro5Ven20	0	sqft	1	131	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.16	$ -	$ 0.01	1.18	0.02	55.0%	75.0%
Wood and lumber Products	New	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 55.97	$ -	$ -	1.18	28.22	15.0%	55.0%
Wood and lumber Products	New	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 55.97	$ -	$ -	1.18	3.83	15.0%	55.0%
Wood and lumber Products	New	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro30Slow	0	sqft	1	131	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Wood and lumber Products	New	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	Retro5Ven20	0	sqft	1	171	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	1.18	-	5.0%	10.0%
Wood and lumber Products	New	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	Retro5Ven20	0	sqft	1	171	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ -	1.04	-	25.0%	40.0%
Wood and lumber Products	New	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	Retro5Ven20	0	sqft	1	171	0.16%	STAT_WIFI-AI-7PUN-v2-1	STAT_WIFI-AI-7PUN-v2-1	STAT_WIFI-AI-7PUN-v2-1	5	$ 0.75	$ -	$ 0.01	1.18	-	5.0%	20.0%
Wood and lumber Products	New	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	Retro5Ven20	0	sqft	1	171	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ -	1.18	-	15.0%	75.0%
Wood and lumber Products	New	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 174.83	$ -	$ -	1.06	71.47	45.0%	50.0%
Wood and lumber Products	New	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 174.83	$ -	$ -	1.06	9.71	45.0%	50.0%
Wood and lumber Products	New	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 326.55	$ -	$ -	1.06	47.84	45.0%	50.0%
Wood and lumber Products	New	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 326.55	$ -	$ -	1.06	6.50	45.0%	50.0%
Wood and lumber Products	New	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	15.0%	65.0%
Wood and lumber Products	New	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	5.0%	50.0%
Wood and lumber Products	New	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	1	171	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.34	$ -	$ -	1.18	-	5.0%	65.0%
Wood and lumber Products	New	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	1,986	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Wood and lumber Products	New	Process	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Wood and lumber Products	New	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro5Ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 23.11	$ 0.55	$ -	1.00	-	5.0%	50.0%
Wood and lumber Products	New	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro5Ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 23.11	$ 0.55	$ -	1.00	-	5.0%	50.0%
Wood and lumber Products	New	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro5Ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 23.11	$ 0.55	$ -	1.00	-	5.0%	50.0%
Wood and lumber Products	New	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Wood and lumber Products	New	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Wood and lumber Products	New	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	Retro20Ven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PUN-v5-18	COM_RCK-Heating-7PUN-v5-18	n/a	5	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Wood and lumber Products	New	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	Retro20Ven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PUN-v5-18	COM_RCK-Heating-7PUN-v5-18	n/a	5	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Other Industrial	Existing	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro30Slow	2	sqft	1	97	0.16%	INS_CLG-Heating-RTF-v2.1-55	INS_CLG-Heating-RTF-v2.1-55	Building Energy Simulation Tool	45	$ 1.02	$ -	$ 0.07	1.18	0.10	60.0%	100.0%
Other Industrial	Existing	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro30Slow	2	sqft	1	97	0.16%	INS_WC-Heating-RTF-v2.1-1	INS_WC-Heating-RTF-v2.1-1	Building Energy Simulation Tool	45	$ 0.31	$ -	$ 0.05	1.18	0.07	60.0%	100.0%
Other Industrial	Existing	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	1	97	0.16%	INS_DCT-All-DEER-1	INS_DCT-All-DEER-1	Building Energy Simulation Tool	20	$ 0.86	$ -	$ 0.00	1.12	0.00	40.0%	60.0%
Other Industrial	Existing	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro5Ven20	0	sqft	1	97	0.16%	DCT_RPR-All-DEER-1	DCT_RPR-Cooling-RTF-1	Building Energy Simulation Tool	18	$ 0.59	$ -	$ 0.00	1.18	0.00	15.0%	50.0%
Other Industrial	Existing	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro30Slow	0	sqft	1	97	0.16%	WND_HE-Heating-RTF-v2.1-46	WND_HE-Heating-RTF-v2.1-46	Building Energy Simulation Tool	45	$ 2.23	$ -	$ 0.02	1.18	0.03	45.0%	100.0%
Other Industrial	Existing	Heating	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	employee	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ -	1.06	1.95	20.0%	30.0%
Other Industrial	Existing	Process	Gas Boiler - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	GBLR_MNT-Heating-ILTRM-v4.0-1	3	$ 0.00	$ -	$ -	1.06	1.27	20.0%	30.0%
Other Industrial	Existing	Heating	Gas Furnace - Maintenance	General cleaning and maintenance	Retrofit	Degrade performance	General cleaning and maintenance	Retro20Fast	0	sqft	1	1	0.16%	GFURN_MNT-Heating-ILTRM-v4.0-1	GFURN_MNT-Heating-MNTRM-v2.1-1	GFURN_MNT-Heating-MNTRM-v2.1-1	2	$ 0.00	$ -	$ -	1.06	0.01	20.0%	30.0%
Other Industrial	Existing	Heating	Gas Boiler - Hot Water Reset	Reset control installed	Retrofit	No control	Reset control installed	Retro5Med	0	sqft	1	1	0.16%	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	GBLR_HWRST-Heating-ILTRM-v4.0-1	20	$ 5.10	$ -	$ -	1.18	5.66	20.0%	45.0%
Other Industrial	Existing	Process	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro5Ven20	0	employee	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 1.73	$ -	$ -	1.08	3.89	73.0%	85.0%
Other Industrial	Existing	Heating	Steam Trap Maintenance	Cleaning and maintenance	Retrofit	Degrade performance	Cleaning and maintenance	Retro5Ven20	0	employee	1	1	0.16%	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	GBLR_MNT_ST-Heating-XCELCO-2017-18-2	4	$ 1.73	$ -	$ -	1.08	2.54	73.0%	85.0%
Other Industrial	Existing	Heating	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	employee	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 7.35	$ -	$ -	1.02	1.27	35.0%	50.0%
Other Industrial	Existing	Process	Gas Boiler - High Turndown	Turndown control installed	Retrofit	No control	Turndown control installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	GBLR_TRN-Heating-MNTRM-v2.1-1	15	$ 7.35	$ -	$ -	1.02	2.12	35.0%	50.0%
Other Industrial	Existing	Heating	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	employee	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 2.47	$ -	$ -	1.02	0.94	5.0%	85.0%
Other Industrial	Existing	Process	Gas Boiler - Burner Control Optimization	Optimized burner controls	Retrofit	Average performance	Optimized burner controls	Retro30Slow	0	sqft	1	1	0.16%	GBLR_OZTRM-Heating-ILTRM-v4.0-1	GBLR_OZTRM-Heating-MEMD-2018-1	GBLR_OZTRM-Heating-ILTRM-v4.0-1	18	$ 2.47	$ -	$ -	1.02	0.62	5.0%	85.0%
Other Industrial	Existing	Heating	HVAC - Demand Controlled Ventilation	DCV enabled	Retrofit	Constant ventilation	DCV enabled	Retro5Ven20	0	sqft	1	97	0.16%	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	VENT_DCV-Heating-7PUN-v5-8	15	$ 0.25	$ -	$ 0.02	1.18	0.02	55.0%	75.0%
Other Industrial	Existing	Heating	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	employee	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 4.17	$ -	$ -	1.18	1.44	15.0%	55.0%
Other Industrial	Existing	Process	Gas Boiler - Stack Economizer	Economizer installed	Retrofit	None	Economizer installed	Retro12Med	0	sqft	1	1	0.16%	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	GBLR_ECON-Heating-XCELCO-2017-18-1	12	$ 4.17	$ -	$ -	1.18	0.94	15.0%	55.0%
Other Industrial	Existing	Heating	Gas Furnace Tube Inserts	Tube inserts installed	Retrofit	None	Tube inserts installed	Retro30Slow	0	sqft	1	97	0.16%	N/A	N/A	N/A	5	$ 1.00	$ -	$ -	1.00	-	0.0%	0.0%
Other Industrial	Existing	Heating	Space Heating - Heat Recovery Ventilator	HRV installed	Retrofit	None	HRV installed	Retro5Ven20	0	sqft	1	97	0.16%	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	HRV-Heating-ILTRM-v5.0-3	15	$ 0.42	$ -	$ -	1.18	0.02	5.0%	10.0%
Other Industrial	Existing	Heating	Thermostat - Programmable	Programmable thermostat installed	Retrofit	Manual control	Programmable thermostat installed	Retro5Ven20	0	sqft	1	97	0.16%	STAT-Cooling/Heating-ILTRM-v4.0-6	STAT-Cooling/Heating-ILTRM-v4.0-6	BEST	4	$ 0.19	$ -	$ 0.02	1.04	0.03	25.0%	40.0%
Other Industrial	Existing	Heating	Thermostat - WiFi Enabled	Wi-Fi/interactive thermostat installed	Retrofit	Manual control	Wi-Fi/interactive thermostat installed	Retro5Ven20	0	sqft	1	97	0.16%	STAT_WIFI-AI-7PUN-v2-1	STAT_WIFI-AI-7PUN-v2-1	STAT_WIFI-AI-7PUN-v2-1	5	$ 0.75	$ -	$ 0.04	1.18	0.08	15.0%	30.0%
Other Industrial	Existing	Heating	Destratification Fans (HVLS)	Fans installed	Retrofit	None/Standard ventilation	Fans installed	Retro5Ven20	0	sqft	1	97	0.16%	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	HVLS-Heating-AEG-v5.0-121	10	$ 0.67	$ -	$ 0.04	1.18	0.08	15.0%	75.0%
Other Industrial	Existing	Heating	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro5Ven20	0	employee	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 13.02	$ -	$ -	1.06	3.66	40.0%	50.0%
Other Industrial	Existing	Process	Gas Boiler - Insulate Steam Lines/Condensate Tank	Lines and condensate tank insulated	Retrofit	No insulation	Lines and condensate tank insulated	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	GBLR_PINS_STM-Heating-PGE-R7-1	11	$ 13.02	$ -	$ -	1.06	2.39	40.0%	50.0%
Other Industrial	Existing	Heating	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro5Ven20	0	employee	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.32	$ -	$ -	1.06	2.45	40.0%	50.0%
Other Industrial	Existing	Process	Gas Boiler - Insulate Hot Water Lines	Insulated water lines	Retrofit	No insulation	Insulated water lines	Retro5Ven20	0	sqft	1	1	0.16%	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	GBLR_PINS_HW-Heating-PGE-R7-1	11	$ 24.32	$ -	$ -	1.06	1.60	40.0%	50.0%
Other Industrial	Existing	Process	Process - Insulate Heated Process Fluids	Insulated process fluid lines	Retrofit	No insulation	Insulated process fluid lines	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	15.0%	65.0%
Other Industrial	Existing	Process	Process Heat Recovery	HR system installed	Retrofit	No HR system	HR system installed	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	5	$ 1.00	$ -	$ -	1.00	-	5.0%	50.0%
Other Industrial	Existing	Heating	Building Automation System	Automation system installed and programmed	Retrofit	No control system	Automation system installed and programmed	Retro15Slow	0	sqft	1	97	0.16%	COM_EMS-All-XCELCO-2017-18-3	BEHAV_EIS-All-CPUC-2018_PG-10	COM_EMS-All-XCELCO-2017-18-3	15	$ 0.30	$ -	$ 1.03	1.00	0.06	5.0%	65.0%
Other Industrial	Existing	Heating	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	97	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Other Industrial	Existing	Process	Steam System Efficiency Improvements	Optimized system	Retrofit	Average system efficiency	Optimized system	Retro15Slow	0	sqft	1	1	0.16%	n/a	n/a	n/a	5	$ -	$ -	$ -	1.08	-	30.0%	60.0%
Other Industrial	Existing	Heating	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro5Ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 6.73	$ -	$ 42.54	1.00	2.68	5.0%	50.0%
Other Industrial	Existing	Process	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro5Ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 6.73	$ -	$ 42.54	1.00	1.41	5.0%	50.0%
Other Industrial	Existing	Miscellaneous	Strategic Energy Management	Energy management system installed and programmed	Retrofit	No energy management system	Energy management system installed and programmed	Retro5Ven20	0	employee	1	1	0.16%	BEHAV_SEM-All-CPUC-2018_PG-26	BEHAV_SEM-All-CPUC-2018_PG-26	AEG Research	5	$ 6.73	$ -	$ 42.54	1.00	0.90	5.0%	50.0%
Other Industrial	Existing	Heating	Commissioning	Optimized HVAC design and controls	Retrofit	New construction code	Optimized HVAC design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Other Industrial	Existing	Process	Commissioning	Optimized process design and controls	Retrofit	New construction code	Optimized process design and controls	Retro12Med	0	employee	1	1	0.16%	TBD	TBD	TBD	3	$ -	$ -	$ -	1.04	-	0.0%	0.0%
Other Industrial	Existing	Heating	Retrocommissioning	Optimized HVAC flow and controls	Retrofit	Vintage/existing building	Optimized HVAC flow and controls	Retro20Ven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PUN-v5-18	COM_RCK-Heating-7PUN-v5-18	COM_RCK-Heating-7PUN-v5-18	5	$ -	$ -	$ 47.61	1.04	5.52	15.0%	50.0%
Other Industrial	Existing	Process	Retrocommissioning	Optimized process design and controls	Retrofit	Vintage/existing building	Optimized process design and controls	Retro20Ven20	0	employee	1	1	0.16%	COM_RCK-Heating-7PUN-v5-18	COM_RCK-Heating-7PUN-v5-18	COM_RCK-Heating-7PUN-v5-18	5	$ 10.80	$ -	$ 47.61	1.04	2.69	15.0%	50.0%
Other Industrial	New	Heating	Insulation - Roof/Ceiling	R-38	Retrofit	R-13	R-38	Retro30Slow	2	sqft	1	97	0.16%	INS_CLG-Heating-RTF-v2.1-55	N/A	Building Energy Simulation Tool	45	$ 1.18	$ -	$ -	1.18	-	0.0%	0.0%
Other Industrial	New	Heating	Insulation - Wall Cavity	R-21	Retrofit	R-11 or less	R-21	Retro30Slow	2	sqft	1	97	0.16%	INS_WC-Heating-RTF-v2.1-1	N/A	Building Energy Simulation Tool	45	$ 0.22	$ -	$ -	1.18	-	0.0%	0.0%
Other Industrial	New	Heating	Insulation - Ducting	50% reduction in thermal losses	Retrofit	~2°F thermal losses	50% reduction in thermal losses	Retro5Med	0	sqft	1	97	0.16%	INS_DCT-All-DEER-1	N/A	Building Energy Simulation Tool	20	$ 1.12	$ -	$ 0.00	1.12	0.00	0.0%	0.0%
Other Industrial	New	Heating	HVAC - Duct Repair and Sealing	30% reduced duct leaking	Retrofit	Poorly sealed/leaky ducts	30% reduced duct leaking	Retro5Ven20	0	sqft	1	97	0.16%	DCT_RPR-All-DEER-1	N/A	Building Energy Simulation Tool	18	$ -	$ -	$ 0.00	1.18	0.00	0.0%	0.0%
Other Industrial	New	Heating	Windows - High Efficiency	U-.22 or better	Retrofit	U-.5 or worse	U-.22 or better	Retro30Slow	0	sqft	1	97	0.16%	WND_HE-Heating-RTF-v2.1-46	N/A	Building Energy Simulation Tool	45	$ 1.85	$ -	$ -	1.18	-	0.0%	0.0%
Other Industrial	New	Heating	Gas Boiler - Maintenance	General cleaning and