

➤ **Summary of 60-Day Notice: Single-Family Weatherization**

The following 60-Day Notice summarizes Public Service Company of Colorado's (the "Company") action to update the technical assumptions and deemed savings in the Single-Family Weatherization product.

The Company is including with this Notice:

- Updated Deemed Savings worksheets;
- Updated Technical Assumptions worksheets; and
- Updated cost-benefit analyses

A copy of this notice is available on our website at:

https://www.xcelenergy.com/company/rates_and_regulations/filings/colorado_demand-side_management

The Company is adding a measure for tankless water heaters to increase rebate eligibility within the product, as well as, correcting an error in the filed smart thermostat forecast and updating the deemed savings for refrigerator replacements to more accurately reflect savings occurring in market.

Tankless Water Heater

The Company is adding a tankless water heater measure to the Single-Family Weatherization product in order to align its offerings with other products in the general Residential portfolio. This measure will use the same deemed savings already filed for tankless water heaters. Storage tank water heaters are already included in the product as well.

Smart Thermostats

The Company is correcting the technical assumptions associated with smart thermostats for home with electric resistance heat. The forecast assumptions included in the 2021-2022 DSM Plan included heating savings for these applications; however, smart thermostats are not capable of controlling electric resistance heating, and the forecast assumptions should have only included cooling savings. Electric resistance heat strips are typically controlled by in-line thermostats designed to handle the full current required by the heat strip. The forecast has been corrected to include only cooling savings for homes with electric resistance heating resulting in lower energy savings.

Refrigerator Replacement

The Company is updating the deemed savings with updated baseline efficiency assumptions based on historic data regarding actual removed equipment from participation in the Company's Refrigerator & Freezer Recycling product. This resulted in a less efficient baseline estimate and a higher energy savings forecast than originally filed.

Table 1: Summary of Forecasted Impacts: Single-Family Weatherization

	2021		2022	
	<i>As Filed</i>	<i>Revised per 60-day</i>	<i>As Filed</i>	<i>Revised per 60-day</i>
Electric Savings (kWh)	22,894,895	23,376,049	22,887,193	23,368,347
Electric Demand Reduction (kW)	3,185	3,222	3,184	3,221
Budget*	\$2,043,177	\$2,043,027	\$2,043,177	\$2,043,027
MTRC Test Ratio	5.60	5.67	5.71	5.78
Gas Savings (Dth)	59,762	59,798	59,762	59,834
Budget*	\$4,102,072	\$4,103,572	\$4,102,072	\$4,105,072
MTRC Test Ratio	0.88	0.88	0.90	0.90

*Rebates only. While the anticipated expenditure impacts are forecasted, the Company acknowledges that this Notice does not change the filed budget.

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

1.12 Refrigerator Replacement

Algorithms

$$Customer\ kWh = Existing\ Equipment\ Quantity \times (kWh_{baseline} - kWh_{EnergyStar})$$

$$Customer\ kW = Existing\ Equipment\ Quantity \times \frac{Customer\ kWh}{Hours\ of\ Use}$$

$$Customer\ Coincident\ kW = Existing\ Equipment\ Quantity \times Customer\ kW \times Coincidence\ Factor$$

Variables

kWh _{Baseline}	741	Deemed energy consumption based on the age of the equipment (Reference 14)
kWh _{EnergyStar}	320	Deemed annual energy consumption of the ENERGY STAR unit; Top-Mounted freezer or refrigerator only (automatic defrost) (Reference 13)
Coincidence Factor	64%	Probability of equipment operating during peak time (Reference 4, Table 4)
Hours of Use	8,760	Annual hours of use in a year (Reference 13)
Lifetime	14	Measured Lifetime (Reference 13)
Incremental Cost	\$630.00	Difference in cost between the standard equipment and the more efficient equipment (Reference 12)
Rebate	\$630.00	(Reference 12)

Provided by Product Vendor

M&V Verified

Existing Equipment Quantity	Yes
Product Type and Class of ENERGY STAR Refrigerators and Freezers Installed	Yes

References:

1. Baseline kWh and Average to peak kW ratio from 1995 and 2012 versions of Residential Energy Data Sourcebook for the U.S. Residential Sector.
2. Data on expected life for savings on secondary refrigerators, 9th year Persistence Study for Southern California Edison, KEMA-XENERGY, 2004
3. Estimate for annual energy use for freezers as percent of refrigerator use. See Table Final Estimates on page 6-15 of report by KEMA-XENERGY
4. Data to support CF from "Domestic Refrigerators: Field Studies and Energy Efficiency Improvement", M. Siddhartha Bhatt, CPRI, July 2001.
5. Degradation factor cited in "2006 Refrigerator/Freezer Recycling Program Evaluation", Snohomish County PUD, Kevin L. Smit, February 2007.
6. Shipment Weighted Efficiencies from Residential Energy Databook, Years 1950 - 1995, <http://enduse.lbl.gov/Projects/RED.html>
7. Refrigerator-Freezer Sizes and Energy Factors (Shipment-Weighted Averages), Residential Energy Databook, Years 1972 - 2010,
8. Appliance Standards Awareness Project: Ref. Association of Home Appliance Manufacturers (AHAM)
9. Actual recent program data on age of recycled units were used to create weighted average energy consumption & remaining useful life of units recycled.
10. Data on Efficiency Standards, "Technical Support Document Refrigerators and Freezers", DOE, 2014.
11. Energy Star Program Requirements for Refrigerators. https://www.energystar.gov/ia/partners/product_specs/program_reqs/refrig_prog_req.pdf
12. Income Qualified Single Family Weatherization Colorado Program Data
13. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 3.1 January 20, 2020
14. Refrigerator Recycling Colorado Program Data

Changes from Recent Filing:

Added measure for the replacement of an existing refrigerator.

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

18.7 Residential Smart Thermostats

Algorithms

$$\text{Customer kWh} = \text{Customer Cooling kWh} + \text{Customer Heating kWh}$$

$$\text{Customer Coincident kW} = \text{Customer kW} * \text{Coincidence Factor}$$

Smart Thermostat Savings:

$$\text{Customer kW} = (\text{Cooling kW} * \text{TStat Qty Factor}) \times \text{ES Reduction}_{\text{cooling}} * \text{Cooling Scaling Factor}$$

$$\text{Customer Cooling kWh} = (\text{Cooling Tons} * \text{TStat Qty Factor}) * \frac{12}{\text{SEER}_{\text{Avg}}} * \text{EFLH}_{\text{Cooling}} * \text{ES Reduction}_{\text{cooling}} * \text{Cooling Scaling Factor}$$

$$\text{Customer Heating kWh} = (\text{Heating kW} * \text{TStat Qty Factor}) * \text{ES Reduction}_{\text{heating}} * \text{EFLH}_{\text{Heat}} * \text{Heating Scaling Factor}$$

$$\text{Customer DTh} = (\text{Baseline DTh} * \text{TStat Qty Factor}) * \text{ES Reduction}_{\text{heating}} * \text{Heating Scaling Factor}$$

Thermostat Optimization Savings:

$$\text{Customer kW} = \text{Cooling kW} * (1 - \text{ES Reduction}_{\text{cooling}}) * \text{Tstat_Optimization_Reduction} * \text{Cooling Scaling Factor}$$

$$\text{Customer Cooling kWh} = \text{Cooling Tons} * \frac{12}{\text{SEER}_{\text{Avg}}} * \text{EFLH}_{\text{Cooling}} * (1 - \text{ES Reduction}_{\text{cooling}}) * \text{Tstat_Optimization_Reduction} * \text{Cooling Scaling Factor}$$

$$\text{Customer Heating kWh} = \text{Heating kW} * \text{EFLH}_{\text{Heat}} * (1 - \text{ES Reduction}_{\text{heating}}) * \text{Tstat_Optimization_Reduction} * \text{Heating Scaling Factor}$$

$$\text{Customer Dth} = \text{Baseline Dth} * (1 - \text{ES Reduction}_{\text{heating}}) * \text{Tstat_Optimization_Reduction} * \text{Heating Scaling Factor}$$

Variables

ES Reduction Heating	8%	Energy Star Connected Thermostat criteria for annual heating equipment runtime reduction (Reference 1)
ES Reduction Cooling	10%	Energy Star Connected Thermostat criteria for annual cooling equipment runtime reduction (Reference 1)
Typical Res Gas Heating System Efficiency	80%	gas heating system efficiency in existing homes
Typical Res Electric Heating System Efficiency	100%	electric resistance heating system efficiency in existing homes
Cooling Tons	2.690	Average Home model capacity for Res Cooling (Tons)
SEER_Avg	13.400	Average Home model SEER rating
EER_Avg	11.417	Average Home model EER rating (converted from SEER)
Cooling kW	2.827	Forecasted High Efficiency Thermostat demand
EFLH_Cooling	See Table 18.0.1	Forecasted High Efficiency Thermostat hours use Cooling EFLH
Baseline Dth	101.1	Forecasted Home gas use estimated from average furnace program participation
Heating kW	12.989	Full load kW for electric resistance heating based on forecasted gas usage and annual operating hours.
EFLH_Heat	See Table 18.0.1	Forecasted High Efficiency Thermostat hours use Heating EFLH
TStat Qty Factor	See Table 18.7.3	The Primary Thermostat in a home saves the full EnergyStar heating or cooling criteria. A Secondary Thermostat in a home saves half of the energy and demand of a Primary Thermostat. The baseline cooling and heating demands will be adjusted by the factor based on the type of thermostat (Primary or Secondary) selected.
EnergyStar_CF	76%	Coincidence Factor for High Efficiency Thermostat
Cooling Scaling Factor	See Table 18.7.1	Cooling energy and demand percent adjustment for home types
Heating Scaling Factor	See Table 18.7.1	Heating energy percent adjustment for home types
Tstat_Optimization_Reduction	3%	Assumed percent savings by participating in manufacturer's optimization algorithm updates.
Lifetime	10	Measure life for ENERGY STAR Smart Thermostat (Reference 4)
Incremental Cost	See Table 18.7.2	Incremental cost for ENERGY STAR Smart Thermostat (Reference 4)

Customer Inputs

M&V Verified

Certified Energy Star Connected Thermostat	Yes	
County	No	
Home Type	No	

Table 18.7.1

Home type	Single Family	Multifamily	Townhome
Cooling Scaling Factor	100%	35%	64%
Heating Scaling Factor	100%	15%	52%

Table 18.7.2

	Incremental Cost
LI SFW EnergyStar Smart Thermostat	\$100.00
ENERGY STAR smart thermostat (Reference)	\$200.00
Home Energy Squad Smart Thermostat	\$125.00
Home Energy Squad upgraded Smart	\$225.00

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Table 18.7.3	TStat Qty Factor
Primary EnergyStar Smart Thermostat	1.0
Secondary EnergyStar Smart Thermostat	0.5

References:

1. ENERGY STAR Connected Thermostat Key Product Criteria - https://www.energystar.gov/products/heating_cooling/smart_thermostats/key_product_criteria
2. 2017 Seasonal Savings Evaluation, Navigant, 3/5/2018
3. Xcel Study of Winter Seasonal Savings, 2017-2018, Initial Estimates
4. Lifetime of 10 years for programmable T-Stats from "Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures", June 2007 by GDS Associates.

Changes from Recent Filing:

1. included electric heating savings
2. added Thermostat Optimization savings measure
3. clarified secondary thermostat savings for smart thermostat measures.

Program	Measure Group	Measure Lifetime (years)	Rebate Amount (\$)	Incremental Cost (\$)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCKW)	Gas Savings (Dth)	Non-Energy O&M Savings (\$)	Electric NTG (%)	Gas NTG (%)	Install Rate (%)	2021 Electric Units	2022 Electric Units	2021 Gas Units	2022 Gas Units
Income Qualified SF Weatherization	Aerators - EWH	10	\$5	\$1	60	0.008	0.0	\$3.85	100%	100%	100%	39	39	0	0
Income Qualified SF Weatherization	Aerators - GWH	10	\$4	\$1	0	0.000	0.3	\$3.89	100%	100%	100%	0	0	1,126	1,126
Income Qualified SF Weatherization	Air Sealing - Electric Heating Only	10	\$667	\$667	1,209	0.000	0.0	\$0.00	100%	100%	100%	35	35	0	0
Income Qualified SF Weatherization	Air Sealing - Gas Heating Only	10	\$667	\$667	0	0.000	8.2	\$0.00	100%	100%	100%	0	0	1,012	1,012
Income Qualified SF Weatherization	Attic Insulation - Electric Heating Only	20	\$1,459	\$1,459	4,217	0.000	0.0	\$0.00	100%	100%	100%	15	15	0	0
Income Qualified SF Weatherization	Attic Insulation - Gas Heating Only	20	\$1,459	\$1,459	0	0.000	10.4	\$0.00	100%	100%	100%	0	0	853	853
Income Qualified SF Weatherization	Crawl Space Wall Insulation - Electric Heating Only	20	\$1,444	\$1,444	4,910	0.000	0.0	\$0.00	100%	100%	100%	5	5	0	0
Income Qualified SF Weatherization	Crawl Space Wall Insulation - Gas Heating Only	20	\$1,444	\$1,444	0	0.000	16.2	\$0.00	100%	100%	100%	0	0	432	432
Income Qualified SF Weatherization	Energy Star Smart Thermostat	10	\$150	\$100	0	0.000	8.1	\$0.00	100%	100%	100%	0	0	214	214
Income Qualified SF Weatherization	Gas-Fired Storage Water Heater	13	\$300	\$374	0	0.000	1.7	\$0.00	100%	100%	100%	0	0	209	209
Income Qualified SF Weatherization	Heat Pump Water Heater	12	\$1,200	\$1,059	2,264	0.334	0.0	-\$1.70	100%	100%	100%	36	36	0	0
Income Qualified SF Weatherization	Heat Pump Water Heater - Gas WH Baseline	12	\$1,200	\$982	0	0.000	16.0	\$0.00	100%	100%	100%	0	0	14	14
Income Qualified SF Weatherization	High Efficiency ASHP and Electric Resistance Heat Backup with QI	18	\$6,500	\$583	9,892	0.403	0.0	\$0.00	100%	100%	100%	5	5	0	0
Income Qualified SF Weatherization	High Efficiency Boiler Tier 1	20	\$1,000	\$1,446	0	0.000	15.0	\$0.00	100%	100%	100%	0	0	1	1
Income Qualified SF Weatherization	High Efficiency Boiler Tier 2	20	\$4,000	\$1,446	0	0.000	15.0	\$0.00	100%	100%	100%	0	0	1	1
Income Qualified SF Weatherization	High Efficiency Dual Fuel ASHP with QI and associated furnace	1	\$0	\$0	0	0.000	0.0	\$0.00	100%	100%	100%	0	0	0	0
Income Qualified SF Weatherization	High Efficiency Dual Fuel Mini-Split Heat Pump	1	\$0	\$0	0	0.000	0.0	\$0.00	100%	100%	100%	0	0	0	0
Income Qualified SF Weatherization	High Efficiency Furnace Tier 1	18	\$1,000	\$1,138	0	0.000	18.2	\$0.00	100%	100%	100%	0	0	401	401
Income Qualified SF Weatherization	High Efficiency Furnace Tier 2	18	\$3,760	\$1,138	0	0.000	18.2	\$0.00	100%	100%	100%	0	0	96	96
Income Qualified SF Weatherization	High Efficiency Mini-Split Heat Pump	16	\$6,500	\$6,855	8,933	0.881	0.0	\$0.00	100%	100%	100%	5	5	0	0
Income Qualified SF Weatherization	Home Lighting DI	20	\$2	\$2	43	0.006	0.0	\$0.00	100%	100%	99%	487,558	487,558	0	0
Income Qualified SF Weatherization	IQ-SFW Boiler/Furnace Tune-up	2	\$317	\$250	0	0.000	8.6	\$0.00	100%	100%	100%	0	0	60	60
Income Qualified SF Weatherization	Refrigerator Replacement	14	\$630	\$630	0	0.000	0.0	\$0.00	100%	100%	100%	1,203	1,203	0	0
Income Qualified SF Weatherization	Showerheads - EWH	10	\$10	\$3	476	0.035	0.0	\$31.94	100%	100%	100%	21	21	0	0
Income Qualified SF Weatherization	Showerheads - GWH	10	\$10	\$3	0	0.000	2.0	\$31.94	100%	100%	100%	0	0	660	660
Income Qualified SF Weatherization	Single-Family Audit	1	\$150	\$150	0	0.000	0.0	\$0.00	100%	100%	100%	400	400	400	400
Income Qualified SF Weatherization	Standard evaporative cooler	15	\$1,200	\$2,889	602	1.389	0.0	-\$11.42	100%	100%	100%	140	140	0	0
Income Qualified SF Weatherization	Storm Windows - Electric Heating Only	20	\$1,003	\$1,003	4,590	0.000	0.0	\$0.00	100%	100%	100%	3	3	0	0
Income Qualified SF Weatherization	Storm Windows - Gas Heating Only	20	\$1,003	\$1,003	0	0.000	19.7	\$0.00	100%	100%	100%	0	0	182	182
Income Qualified SF Weatherization	Tankless Water Heater	80	\$300	\$1,100	0	0.000	7.3	\$0.00	100%	100%	100%	0	0	5	10
Income Qualified SF Weatherization	T-Stat Install & Programming	10	\$100	\$29	0	0.000	11.6	\$0.00	100%	100%	100%	0	0	1,115	1,115
Income Qualified SF Weatherization	Wall Insulation - Electric Heating Only	20	\$1,211	\$1,211	7,304	0.000	0.0	\$0.00	100%	100%	100%	2	2	0	0
Income Qualified SF Weatherization	Wall Insulation - Gas Heating Only	20	\$1,211	\$1,211	0	0.000	23.7	\$0.00	100%	100%	100%	0	0	211	211
Income Qualified SF Weatherization	Water Heater Blanket Electric	7	\$75	\$75	254	0.029	0.0	\$0.00	100%	100%	100%	1	1	0	0
Income Qualified SF Weatherization	Water Heater Blanket Gas	7	\$75	\$75	0	0.000	1.1	\$0.00	100%	100%	100%	0	0	526	526

SINGLE-FAMILY WEATHERIZATION				
2021 Net Present Cost Benefit Summary Analysis For All Participants				
	Participant Test (\$Total)	Utility Test (\$Total)	Rate Impact Test (\$Total)	Modified Total Resource Test (\$Total)
Benefits				
Avoided Revenue Requirements				
Generation Capacity	N/A	\$3,982,537	\$3,982,537	\$3,982,537
Trans. & Dist. Capacity	N/A	\$498,761	\$498,761	\$498,761
Marginal Energy	N/A	\$6,844,294	\$6,844,294	\$6,844,294
Avoided Emissions (CO2)	N/A	N/A	N/A	\$4,999,124
Subtotal				\$16,324,716
Non-Energy Benefits Adder (50.0%)				
Subtotal	N/A	\$11,325,592	\$11,325,592	\$21,987,512
Participant Benefits				
Bill Reduction - Electric	\$37,350,015	N/A	N/A	N/A
Participant Rebates and Incentives	\$2,043,027	N/A	N/A	\$2,043,027
Incremental Capital Savings	\$404,393	N/A	N/A	\$404,393
Incremental O&M Savings	\$6,731	N/A	N/A	\$6,731
Subtotal	\$39,804,166	N/A	N/A	\$2,454,151
Total Benefits	\$39,804,166	\$11,325,592	\$11,325,592	\$24,441,663
Costs				
Utility Project Costs				
Program Planning & Design	N/A	\$0	\$0	\$0
Administration & Program Delivery	N/A	\$127,499	\$127,499	\$127,499
Advertising/Promotion/Customer Ed	N/A	\$190,000	\$190,000	\$190,000
Participant Rebates and Incentives	N/A	\$2,043,027	\$2,043,027	\$2,043,027
Equipment & Installation	N/A	\$0	\$0	\$0
Measurement and Verification	N/A	\$87,000	\$87,000	\$87,000
Subtotal	N/A	\$2,447,526	\$2,447,526	\$2,447,526
Utility Revenue Reduction				
Revenue Reduction - Electric	N/A	N/A	\$37,350,015	N/A
Subtotal	N/A	N/A	\$37,350,015	N/A
Participant Costs				
Incremental Capital Costs	\$1,841,880	N/A	N/A	\$1,841,880
Incremental O&M Costs	\$18,641	N/A	N/A	\$18,641
Subtotal	\$1,860,521	N/A	N/A	\$1,860,521
Total Costs	\$1,860,521	\$2,447,526	\$39,797,540	\$4,308,047
Net Benefit (Cost)	\$37,943,645	\$8,878,066	(\$28,471,949)	\$20,133,616
Benefit/Cost Ratio	21.39	4.63	0.28	5.67

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2021	ELECTRIC	GOAL
Input Summary and Totals		
Program "Inputs" per Customer kW and per Participant		
Lifetime (Weighted on Generator kWh)	A	19.8 years
T & D Loss Factor (Energy)	B	6.38%
T & D Loss Factor (Demand)	C	9.13%
Net-to-Gross (Energy)	D	100.00%
Net-to-Gross (Demand)	E	100.00%
Installation Rate (Energy)	F	99.07%
Installation Rate (Demand)	G	99.11%
Net coincident kW Saved at Generator	H	0.01 kW
Gross Annual kWh Saved at Customer	I	45.13 kWh
Net Annual kWh Saved at Generator	J	47.76 kWh
Program Summary All Participants		
Total Budget	K	\$2,447,526
Net coincident kW Saved at Generator	L	3,222 kW
Gross Annual kWh Saved at Customer	M	22,090,731 kWh
Net Annual kWh Saved at Generator	N	23,376,049 kWh
Total MTRC Net Benefits with Adder	O	\$20,133,616
Total MTRC Net Benefits without Adder	P	\$14,470,820
Utility Program Cost per kWh Lifetime		
	K/(A x N)	\$0.0053
Utility Program Cost per kW at Gen		
	K/ L	\$760
Avoided Lifetime CO2 Emissions, Total Program (tons CO2)		
		133,780

SINGLE-FAMILY WEATHERIZATION				
2022 Net Present Cost Benefit Summary Analysis For All Participants				
	Participant Test (\$Total)	Utility Test (\$Total)	Rate Impact Test (\$Total)	Modified Total Resource Test (\$Total)
Benefits				
Avoided Revenue Requirements				
Generation Capacity	N/A	\$4,061,663	\$4,061,663	\$4,061,663
Trans. & Dist. Capacity	N/A	\$508,672	\$508,672	\$508,672
Marginal Energy	N/A	\$7,125,535	\$7,125,535	\$7,125,535
Avoided Emissions (CO2)	N/A	N/A	N/A	\$4,901,368
Subtotal				\$16,597,238
Non-Energy Benefits Adder (50.0%)				
Subtotal	N/A	\$11,695,870	\$11,695,870	\$22,445,173
Participant Benefits				
Bill Reduction - Electric	\$38,410,811	N/A	N/A	N/A
Participant Rebates and Incentives	\$2,043,027	N/A	N/A	\$2,043,027
Incremental Capital Savings	\$404,393	N/A	N/A	\$404,393
Incremental O&M Savings	\$6,731	N/A	N/A	\$6,731
Subtotal	\$40,864,962	N/A	N/A	\$2,454,151
Total Benefits	\$40,864,962	\$11,695,870	\$11,695,870	\$24,899,324
Costs				
Utility Project Costs				
Program Planning & Design	N/A	\$0	\$0	\$0
Administration & Program Delivery	N/A	\$128,456	\$128,456	\$128,456
Advertising/Promotion/Customer Ed	N/A	\$190,000	\$190,000	\$190,000
Participant Rebates and Incentives	N/A	\$2,043,027	\$2,043,027	\$2,043,027
Equipment & Installation	N/A	\$0	\$0	\$0
Measurement and Verification	N/A	\$87,000	\$87,000	\$87,000
Subtotal	N/A	\$2,448,483	\$2,448,483	\$2,448,483
Utility Revenue Reduction				
Revenue Reduction - Electric	N/A	N/A	\$38,410,811	N/A
Subtotal	N/A	N/A	\$38,410,811	N/A
Participant Costs				
Incremental Capital Costs	\$1,841,880	N/A	N/A	\$1,841,880
Incremental O&M Costs	\$18,641	N/A	N/A	\$18,641
Subtotal	\$1,860,521	N/A	N/A	\$1,860,521
Total Costs	\$1,860,521	\$2,448,483	\$40,859,294	\$4,309,004
Net Benefit (Cost)	\$39,004,441	\$9,247,387	(\$29,163,424)	\$20,590,320
Benefit/Cost Ratio	21.96	4.78	0.29	5.78

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2022	ELECTRIC	GOAL
Input Summary and Totals		
Program "Inputs" per Customer kW and per Participant		
Lifetime (Weighted on Generator kWh)	A	19.8 years
T & D Loss Factor (Energy)	B	6.38%
T & D Loss Factor (Demand)	C	9.13%
Net-to-Gross (Energy)	D	100.00%
Net-to-Gross (Demand)	E	100.00%
Installation Rate (Energy)	F	99.07%
Installation Rate (Demand)	G	99.11%
Net coincident kW Saved at Generator	H	0.01 kW
Gross Annual kWh Saved at Customer	I	45.12 kWh
Net Annual kWh Saved at Generator	J	47.74 kWh
Program Summary All Participants		
Total Budget	K	\$2,448,483
Net coincident kW Saved at Generator	L	3,221 kW
Gross Annual kWh Saved at Customer	M	22,083,521 kWh
Net Annual kWh Saved at Generator	N	23,368,347 kWh
Total MTRC Net Benefits with Adder	O	\$20,590,320
Total MTRC Net Benefits without Adder	P	\$14,742,385
Utility Program Cost per kWh Lifetime	K/(A x N)	\$0.0053
Utility Program Cost per kW at Gen	K/ L	\$760
Avoided Lifetime CO2 Emissions, Total Program (tons CO2)		126,315

SINGLE-FAMILY WEATHERIZATION

2021 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test (\$Total)	Utility Test (\$Total)	Rate Impact Test (\$Total)	Modified Total Resource Test (\$Total)
Benefits				
Avoided Revenue Requirements				
Commodity Cost Reduction	N/A	\$1,766,639	\$1,766,639	\$1,766,639
Variable O&M Savings	N/A	\$29,441	\$29,441	\$29,441
Demand Savings	N/A	\$206,215	\$206,215	\$206,215
Subtotal				\$2,002,294
Non-Energy Benefits Adder (50.0%)				\$1,001,147
Subtotal	N/A	\$2,002,294	\$2,002,294	\$3,003,441
Participant Benefits				
Bill Reduction - Gas	\$3,148,933	N/A	N/A	N/A
Participant Rebates and Incentives	\$4,103,572	N/A	N/A	\$4,103,572
Incremental Capital Savings	\$0	N/A	N/A	\$0
Incremental O&M Savings	\$210,052	N/A	N/A	\$210,052
Subtotal	\$7,462,557	N/A	N/A	\$4,313,624
Total Benefits	\$7,462,557	\$2,002,294	\$2,002,294	\$7,317,066
Costs				
Utility Project Costs				
Program Planning & Design	N/A	\$0	\$0	\$0
Administration & Program Delivery	N/A	\$180,204	\$180,204	\$180,204
Advertising/Promotion/Customer Ed	N/A	\$60,000	\$60,000	\$60,000
Participant Rebates and Incentives	N/A	\$4,103,572	\$4,103,572	\$4,103,572
Equipment & Installation	N/A	\$0	\$0	\$0
Measurement and Verification	N/A	\$115,600	\$115,600	\$115,600
Subtotal	N/A	\$4,459,376	\$4,459,376	\$4,459,376
Utility Revenue Reduction				
Revenue Reduction - Gas	N/A	N/A	\$3,148,933	N/A
Subtotal	N/A	N/A	\$3,148,933	N/A
Participant Costs				
Incremental Capital Costs	\$3,819,388	N/A	N/A	\$3,819,388
Incremental O&M Costs	\$0	N/A	N/A	\$0
Subtotal	\$3,819,388	N/A	N/A	\$3,819,388
Total Costs	\$3,819,388	\$4,459,376	\$7,608,309	\$8,278,764
Net Benefit (Cost)	\$3,643,169	(\$2,457,082)	(\$5,606,014)	(\$961,698)
Benefit/Cost Ratio	1.95	0.45	0.26	0.88

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2021 GAS

GOAL

Input Summary and Totals		
Program "Inputs" per Dth		
Lifetime (Weighted on Dth)	A	15.2 years
Net-to-Gross (Weighted on Dth)	B	100.00%
Install Rate (Weighted on Dth)	C	100.00%
Program Summary per Participant		
Gross Annual Dth Saved	D	8.0
Net Annual Dth Saved	E	8.0
Program Summary All Participants		
Total Budget	F	\$4,459,376
Gross Annual Dth Saved	G	59,798 Dth
Net Annual Dth Saved	H	59,798 Dth
Total MTRC Net Benefits with Adder	I	(\$961,698)
Total MTRC Net Benefits without Adder	J	(\$1,962,845)
Utility Program Cost per Dth Lifetime	F / (A x H)	\$4.8953

SINGLE-FAMILY WEATHERIZATION

2022 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test (\$Total)	Utility Test (\$Total)	Rate Impact Test (\$Total)	Modified Total Resource Test (\$Total)
Benefits				
Avoided Revenue Requirements				
Commodity Cost Reduction	N/A	\$1,842,850	\$1,842,850	\$1,842,850
Variable O&M Savings	N/A	\$29,462	\$29,462	\$29,462
Demand Savings	N/A	\$206,365	\$206,365	\$206,365
Subtotal				\$2,078,678
Non-Energy Benefits Adder (50.0%)				\$1,039,339
Subtotal	N/A	\$2,078,678	\$2,078,678	\$3,118,016
Participant Benefits				
Bill Reduction - Gas	\$3,284,775	N/A	N/A	N/A
Participant Rebates and Incentives	\$4,105,072	N/A	N/A	\$4,105,072
Incremental Capital Savings	\$0	N/A	N/A	\$0
Incremental O&M Savings	\$210,052	N/A	N/A	\$210,052
Subtotal	\$7,599,900	N/A	N/A	\$4,315,124
Total Benefits	\$7,599,900	\$2,078,678	\$2,078,678	\$7,433,141
Costs				
Utility Project Costs				
Program Planning & Design	N/A	\$0	\$0	\$0
Administration & Program Delivery	N/A	\$180,924	\$180,924	\$180,924
Advertising/Promotion/Customer Ed	N/A	\$60,000	\$60,000	\$60,000
Participant Rebates and Incentives	N/A	\$4,105,072	\$4,105,072	\$4,105,072
Equipment & Installation	N/A	\$0	\$0	\$0
Measurement and Verification	N/A	\$115,600	\$115,600	\$115,600
Subtotal	N/A	\$4,461,596	\$4,461,596	\$4,461,596
Utility Revenue Reduction				
Revenue Reduction - Gas	N/A	N/A	\$3,284,775	N/A
Subtotal	N/A	N/A	\$3,284,775	N/A
Participant Costs				
Incremental Capital Costs	\$3,824,889	N/A	N/A	\$3,824,889
Incremental O&M Costs	\$0	N/A	N/A	\$0
Subtotal	\$3,824,889	N/A	N/A	\$3,824,889
Total Costs	\$3,824,889	\$4,461,596	\$7,746,371	\$8,286,485
Net Benefit (Cost)	\$3,775,011	(\$2,382,918)	(\$5,667,694)	(\$853,344)
Benefit/Cost Ratio	1.99	0.47	0.27	0.90

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2022

GAS

GOAL

Input Summary and Totals		
Program "Inputs" per Dth		
Lifetime (Weighted on Dth)	A	15.2 years
Net-to-Gross (Weighted on Dth)	B	100.00%
Install Rate (Weighted on Dth)	C	100.00%
Program Summary per Participant		
Gross Annual Dth Saved	D	8.0
Net Annual Dth Saved	E	8.0
Program Summary All Participants		
Total Budget	F	\$4,461,596
Gross Annual Dth Saved	G	59,834 Dth
Net Annual Dth Saved	H	59,834 Dth
Total MTRC Net Benefits with Adder	I	(\$853,344)
Total MTRC Net Benefits without Adder	J	(\$1,892,683)
Utility Program Cost per Dth Lifetime	F / (A x H)	\$4.8938