

1 Attachment A

2 Education and Professional Background

3 Elizabeth R. Nixon

4
5 My name is Elizabeth R. Nixon. I am employed as a Utility Analyst with the New
6 Hampshire Public Utilities Commission (PUC). My business address is 21 S. Fruit St., Suite 10,
7 Concord, NH 03301.

8 I earned a B.S. in Mathematics from the University of Vermont in 1985. I worked for
9 ICF, a consulting firm, where we estimated, modeled, and analyzed the energy, environmental
10 and economic impacts of various emission reduction strategies at electric utilities. At ICF and
11 AER*X, Inc., I assisted companies in implementing market-based emissions trading programs. I
12 provided comments on various air quality programs affecting the electric utilities and other
13 industries in the Northeast and other states. I also worked for the Center for Clean Air Policy
14 where we coordinated a dialogue of states and electric utilities to discuss energy efficiency and
15 other emission control strategies to reduce acid rain and greenhouse gases at electric utilities.

16 At the New Hampshire Department of Environmental Services, I wrote the air quality
17 permits for Eversource's electric generating facilities as well as other electric generating
18 facilities and manufacturing facilities in NH. I testified before the NH Air Resources Council
19 regarding the determination of the baseline mercury emissions for Eversource's coal-fired
20 electric generating facilities.

21 I joined the PUC's Sustainable Energy Division in August 2012 where I managed
22 renewable energy incentive programs, determined compliance with the renewable portfolio
23 standard (RPS) program, and conducted analysis of and provided testimony and presentations on

1 the RPS program and rebate programs. In August 2016, I joined the PUC's Electric Division. I
2 completed electric utility rate training at New Mexico State University's Center for Public
3 Utilities.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 17-136

Date Request Received: 10/09/2017

Date of Response: 10/23/2017

Request No. STAFF 1-044

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Request from: New Hampshire Public Utilities Commission Staff

Witness: Michael R. Goldman

Request:

Reference Bates page 445, Table 1, regarding the NEIs for electric and gas utility programs combined in other states.

- a. Please provide this table for electric only.
- b. Please provide this table for gas only.
- c. Please explain why VT's adder is listed as a 15% adder, yet this table shows a much greater NEI percentage (60.88% for non-income eligible residential). If this table includes other adders (e.g., carbon adder, etc.) for VT, please itemize the NEIs totaling \$30 million and 60.88% by category (in \$ and %) to show the 15% adder and a breakout of the other adders.

Response:

Please see the attached spreadsheet for the referenced NEI table, with electric- and gas-specific numbers broken out. Please note that the numbers for Vermont's programs are based on the best information available from VEIC. The information VEIC provided does not include gas program NEIs since VEIC does not deliver gas efficiency programs. The information also does not allow for calculations of the values of each of the three categories of Vermont's NEIs: (1) the 15 percent adder accounting for hard-to-quantify participant benefits, (2) the additional 15 percent low-income NEI adder, and (3) the environmental externalities benefit based on the \$100/short ton of CO2 emissions value from the 2015 report, *Avoided Energy Supply Costs in New England* (March 31, 2015). However, VEIC staff have indicated that environmental externalities is the largest of the three NEI categories.

Joint Utility Response

	Program area	Total Resource Benefits (\$ millions) (note 1)	NEIs (\$ millions) (note 2)	NEIs as percent of Total Resource Benefits
MA Electric (2016 actual)	Non-income eligible residential	\$627	\$90	14.36%
	Income eligible residential	\$71	\$44	62.46%
	Commercial and industrial	\$1,229	\$200	16.26%
	Total Res and C&I	\$1,927	\$334	17.35%
MA Gas (2016 actual)	Non-income eligible residential	\$220	\$92	41.70%
	Income eligible residential	\$39	\$44	113.55%
	Commercial and industrial	\$140	\$23	16.67%
	Total Res and C&I	\$399	\$159	39.96%
CT Electric (2017 planned) (note 3)	Non-income eligible residential	\$107	\$41	38.64%
	Income eligible residential	\$22	\$17	77.85%
	Commercial and industrial	\$195	\$0	0.00%
	Total Res and C&I	\$324	\$59	18.12%
CT Gas (2017 planned) (note 3)	Non-income eligible residential	\$9	\$8	96.49%
	Income eligible residential	\$5	\$6	111.92%
	Commercial and industrial	\$12	\$0	0.00%
	Total Res and C&I	\$26	\$14	53.89%
RI Electric (2017 planned)	Non-income eligible residential	\$51	\$9	16.99%
	Income eligible residential	\$15	\$28	185.36%
	Commercial and industrial	\$140	\$5	3.83%
	Total Res and C&I	\$206	\$42	20.20%
RI Gas (2017 planned)	Non-income eligible residential	\$17	\$8	47.08%
	Income eligible residential	\$5	\$8	154.45%
	Commercial and industrial	\$26	\$1	4.70%
	Total Res and C&I	\$49	\$18	36.21%
VT Electric (2016 preliminary estimates) (note 4)	Non-income eligible residential	\$50	\$30	60.88%
	Income eligible residential	\$3	\$2	67.85%
	Commercial and industrial	\$66	\$35	52.93%
	Total Res and C&I	\$119	\$67	56.60%

1. Total resource benefits include electric capacity, electric energy, natural gas, oil, propane, and water savings.

2. NEI values for all states reflect participant NEIs, such as O&M, labor, health, safety, and property values. Massachusetts' and Rhode Island's NEI values also include utility NEIs such as reduced arrearages associated with low-income customers. Vermont's participant NEIs are applied as a 15% adder to total energy benefits, with an additional 15% adder for low-income programs. In addition, Vermont NEIs include externalities based on values from the Avoided Energy Supply Component Study Group, "Avoided Energy Supply Costs in New England: 2015 Report," which are in turn based on \$100/short ton of CO2 emission.

3. Connecticut numbers are Eversource-only. They do not include the states' other regulated utilities (UI, CNG, and SCG), as these utilities do not publish sufficiently granular data for calculating NEI values comparably with Eversource's NEI values. Eversource serves the majority of CT's electric and natural gas customers.

4. Vermont numbers are based on the best information available from Vermont Energy Investment Corporation (VEIC). The information VEIC provided does not include information from non-electric programs, which are funded through different sources than the electric programs.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 17-136

Date Request Received: 10/06/2017

Request No. TWH 1-001

Request from: The Way Home

Date of Response: 10/23/2017

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Witness: Michael R. Goldman

Request:

Reference Testimony of Michael R. Goldman at p. 10, lines 10-12; a) Can you elucidate what standards are used to determine the independence and methodological rigor of NEI evaluations? b) What standards are used to determine whether a study is sufficiently independent and methodologically sound?

Response:

NEI evaluations, as with other energy efficiency evaluations, are conducted by independent third-party contractors, and are typically solicited, planned, conducted, and reported under an established process that includes review and input from a range of stakeholders, including public utility commissions and other regulatory bodies. The evaluations provide the basis for program plans and claimed savings, which are litigated before these same bodies. Furthermore, evaluators must typically demonstrate their expertise and past performance when bidding on evaluation contracts, and a thorough proposal review process ensures that evaluations are conducted by well-qualified, independent evaluators.

Methodological standards for energy efficiency evaluations have been established and refined by numerous bodies over several decades, including the International Efficiency Valuation Organization, the U.S. Department of Energy, and the American Society of Heating, Refrigerating and Air-Conditioning Engineers. Regarding NEIs specifically, a variety of evaluation methodologies are used, which have been developed and refined over time to ensure that they yield reliable and valid results. [See, for example, Stevens N., Clendenning, G., Caron, N., NMR/DNV-GL, *NEI Abbreviated Literature Review (TXC41)*, April 2017; Abdou M. et al, *EM&V Roadmap to Quantifying Challenging Non-Energy Impacts*, paper and presentation before the 2016 International Energy Program Evaluation Conference; Skumatz L., *Non-Energy Benefits / NEBs – Winning at Cost-Effectiveness Dominos: State Progress and TRMs*, 2016 ACEEE Summer Study; Clendenning, G. et al, *Measuring Participant Perspective Non-Energy Impacts (NEIs)*, 2012 ACEEE Summer Study.] There is a large body of research on engineering models, survey valuation methods, and the use of different cost and benefit data to measure health, economic, and other impacts. This research has led to the emergence of best practices, such as using engineering studies to supplement self-reported surveys, avoiding double counting of overlapping NEIs, and ensuring evaluations include non-energy costs as well as benefits. Methodologies used in NEI research have also been successfully utilized across the social sciences, including in healthcare, real estate appraisal, and economic development.

Joint Utility Response

Notes

Green = Electric Energy	Yellow = Electric Capacity	Blue = Non-Electric (NEB)
Electric and TR Benefit	Electric and TR Benefit	TR Benefit only

Avoided Costs do NOT include line losses. Those are added in during the calculation of the benefit

Avoided Cost Data - Forecasts can be entered in either "NOMINAL" or "REAL" dollars

- If "NOMINAL", enter values directly in the appropriate section below

- If "Real", enter specific values in the "REAL" dollars sections further down this page and the Model will convert them to NOMINAL below

AESC Tables are located at the bottom of this worksheet beginning in row 221

	2018	2019	2020	2021	2022
Nominal Discount Rate	4.00%	4.00%	4.00%		
Inflation	1.56%	1.56%	1.56%		
Real Discount Rate	2.40%	2.40%	2.40%		
Half-Year Factor	50.0%	50.0%	50.0%		
Source					
Reserve Margin Multiplier (to be	100.0%	100.0%	100.0%		
Transmission (\$ per kW)	\$ 19.74	\$ 19.74	\$ 19.74		
Distribution (\$ per kW)	\$ 79.98	\$ 79.98	\$ 79.98		
Res Water & Sewer	\$ 0.00791	\$ 0.00791	\$ 0.00791		
CI Water	\$ 0.00791	\$ 0.00791	\$ 0.00791		
Capacity DRIPE	Yes				
Energy DRIPE	Yes				
Gas Supply DRIPE	Yes				
Gas Electric Cross DRIPE	Yes				
Electric Cross DRIPE	Yes				
Environmental Externalities	No				
NEI Adder	Yes				

LINE LOSS FACTORS

Energy				
Winter Peak	Winter Off-Peak	Summer Peak	Summer Off-Peak	Summer Gener.
6.112%	5.330%	6.112%	5.330%	

TD_Year 2017

Wt_Year 2016

Real year 2017

Year 1 Avoided Cost Data - In 2018\$

	Annual		Cumulative		Annual		Cumulative		Annual		Cumulative		Annual		Cumulative	
	Winter Peak Energy	Winter Off-Peak Energy (\$ per kWh)	Winter Peak Energy	Winter Off-Peak Energy (\$ per kWh)	Summer Peak Energy (\$ per kWh)	Summer Off-Peak Energy (\$ per kWh)	Summer Peak Energy (\$ per kWh)	Summer Off-Peak Energy (\$ per kWh)	Summer Generation (\$ per kW)	Winter Generation (\$ per kW)	Summer Generation (\$ per kW)	Winter Generation (\$ per kW)	Summer Generation (\$ per kW)	Winter Generation (\$ per kW)	Summer Generation (\$ per kW)	Winter Generation (\$ per kW)
2018	\$0.056	\$0.055	\$0.049	\$0.048	\$0.040	\$0.039	\$0.032	\$0.032	\$77.13	\$0.00	\$76.22	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2019	\$0.060	\$0.113	\$0.053	\$0.100	\$0.046	\$0.084	\$0.036	\$0.068	\$51.73	\$0.00	\$126.15	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2020	\$0.065	\$0.174	\$0.056	\$0.153	\$0.055	\$0.135	\$0.042	\$0.108	\$52.92	\$0.00	\$176.02	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2021	\$0.071	\$0.239	\$0.063	\$0.211	\$0.060	\$0.190	\$0.048	\$0.152	\$130.61	\$0.00	\$296.22	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2022	\$0.073	\$0.305	\$0.064	\$0.268	\$0.062	\$0.246	\$0.050	\$0.197	\$123.07	\$0.00	\$406.82	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2023	\$0.077	\$0.373	\$0.068	\$0.328	\$0.066	\$0.304	\$0.054	\$0.244	\$115.64	\$0.00	\$508.32	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2024	\$0.080	\$0.442	\$0.070	\$0.388	\$0.069	\$0.363	\$0.058	\$0.294	\$120.43	\$0.00	\$611.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2025	\$0.083	\$0.511	\$0.073	\$0.449	\$0.074	\$0.425	\$0.060	\$0.344	\$132.74	\$0.00	\$722.63	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2026	\$0.082	\$0.578	\$0.072	\$0.509	\$0.075	\$0.486	\$0.060	\$0.394	\$145.31	\$0.00	\$841.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2027	\$0.083	\$0.644	\$0.073	\$0.567	\$0.075	\$0.546	\$0.061	\$0.442	\$157.41	\$0.00	\$967.04	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2028	\$0.084	\$0.709	\$0.074	\$0.624	\$0.079	\$0.607	\$0.063	\$0.491	\$169.81	\$0.00	\$1,099.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2029	\$0.086	\$0.775	\$0.076	\$0.682	\$0.082	\$0.670	\$0.065	\$0.540	\$183.13	\$0.00	\$1,238.79	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2030	\$0.087	\$0.839	\$0.078	\$0.740	\$0.084	\$0.732	\$0.066	\$0.590	\$201.12	\$0.00	\$1,388.28	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2031	\$0.088	\$0.903	\$0.079	\$0.798	\$0.090	\$0.798	\$0.068	\$0.639	\$209.13	\$0.00	\$1,540.09	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2032	\$0.089	\$0.966	\$0.081	\$0.855	\$0.094	\$0.864	\$0.070	\$0.688	\$209.13	\$0.00	\$1,688.33	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2033	\$0.090	\$1.029	\$0.082	\$0.912	\$0.097	\$0.932	\$0.071	\$0.738	\$209.13	\$0.00	\$1,833.10	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2034	\$0.092	\$1.091	\$0.084	\$0.969	\$0.101	\$1.000	\$0.073	\$0.787	\$209.13	\$0.00	\$1,974.47	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2035	\$0.093	\$1.152	\$0.086	\$1.026	\$0.106	\$1.070	\$0.075	\$0.837	\$209.13	\$0.00	\$2,112.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2036	\$0.095	\$1.213	\$0.088	\$1.082	\$0.110	\$1.141	\$0.077	\$0.887	\$209.13	\$0.00	\$2,247.35	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2037	\$0.096	\$1.274	\$0.090	\$1.139	\$0.114	\$1.213	\$0.079	\$0.937	\$209.13	\$0.00	\$2,379.01	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2038	\$0.098	\$1.334	\$0.091	\$1.195	\$0.119	\$1.286	\$0.082	\$0.987	\$209.13	\$0.00	\$2,507.58	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2039	\$0.099	\$1.393	\$0.093	\$1.251	\$0.124	\$1.361	\$0.084	\$1.037	\$209.13	\$0.00	\$2,633.13	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2040	\$0.101	\$1.452	\$0.095	\$1.307	\$0.129	\$1.436	\$0.086	\$1.087	\$209.13	\$0.00	\$2,755.74	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2041	\$0.102	\$1.511	\$0.097	\$1.362	\$0.135	\$1.513	\$0.088	\$1.138	\$209.13	\$0.00	\$2,875.48	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2042	\$0.104	\$1.569	\$0.099	\$1.418	\$0.140	\$1.592	\$0.091	\$1.189	\$209.13	\$0.00	\$2,992.41	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Administrator: Eversource Energy
 Program Year: 2018

Sector	Program	Subprogram	Measure	End Use	Quantity Year 1	Quantity Year 2	Quantity Year 3	Measure Life	Total Resource Cost	Incentive	Processing Costs	Customer Cost	Free-Ridership Rate	Spillover Rate (Participant)	Spillover Rate (Non-Participant)
(Dropdown)	(Dropdown)	(Dropdown)		(Dropdown)											
Low-Income	Home Energy Assist	HEA (Weatherization)	Oil-Wxn: Air Sealing, Insulation, Water me	Envelope	181	243	330	21	\$ 6,067.33	\$ 6,067.33		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Propane-Wxn: Air Sealing, Insulation, Water	Envelope	65	87	118	21	\$ 6,240.57	\$ 6,240.57		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Gas-Wxn: Air Sealing, Insulation, Water me	Envelope	71	96	130	22	\$ 3,515.42	\$ 3,515.42		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Kerosene-Wxn: Air Sealing, Insulation, Water	Envelope	129	173	235	20	\$ 6,060.59	\$ 6,060.59		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Electric-Wxn: Air Sealing, Insulation, Water	Envelope	15	20	27	21	\$ 5,743.49	\$ 5,743.49		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Cord Wood-Wxn: Air Sealing, Insulation, Water	Envelope	15	21	28	20	\$ 5,600.59	\$ 5,600.59		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Wood Pellets-Wxn: Air Sealing, Insulation, Water	Envelope	10	14	19	20	\$ 5,600.65	\$ 5,600.65		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Baseload SF homes	Envelope	110	147	200	20				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Oil- Thermostat	Envelope				25				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Propane- Thermostat	Envelope				25				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Gas- Thermostat	Envelope				25				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Kerosene- Thermostat	Envelope				25				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Electric- Thermostat	Envelope				25				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Wood Pellets- Thermostat	Envelope				25				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	All Fuels- Thermostat	Envelope				25				\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	LED Lighting Products	Lighting	3,217	4,321	5,876	5	\$ 12.78	\$ 12.78		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Refrigerator	Refrigeration	191	256	348	12	\$ 775.00	\$ 775.00		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Direct Install Water Measures (if broken out)	Hot Water								\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	User Defined									\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	User Defined									\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	User Defined									\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Oil Boiler Replacement, >=87% AFUE	HVAC	35	47	64	25	\$ 6,721.80	\$ 6,721.80		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Propane Boiler Replacement, >=95% AFUE	HVAC	6	8	11	25	\$ 5,128.86	\$ 5,128.86		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Gas Boiler Replacement, >=95% AFUE	HVAC	2	2	3	25	\$ 7,550.00	\$ 7,550.00		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Kerosene Boiler Replacement, >=87% AFUE	HVAC	1	1	2	25	\$ 6,900.00	\$ 6,900.00		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Boiler Replacement, User Defined	HVAC								\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Oil Furnace Replacment, >=87% ECM	HVAC	37	50	67	20	\$ 5,124.25	\$ 5,124.25		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Propane Furnace Replacment, >=95% ECM	HVAC	22	29	40	20	\$ 4,663.19	\$ 4,663.19		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Natural Gas Furnace Replacment, >=95% ECM	HVAC	6	8	11	20	\$ 5,546.82	\$ 5,546.82		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Kerosene Furnace Replacment, >=87% ECM	HVAC	34	45	61	20	\$ 3,334.74	\$ 3,334.74		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	Furnace Replacment, User Defined	HVAC								\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	DHW: Heat Pump Water Heater	Hot Water				13	\$ 1,400.00	\$ 1,400.00		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	WXn Admin Fee (if not captured above)									\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	WXn Quality Assurance		1	1	1	1	\$ 60,000.00	\$ 60,000.00		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Base load SF Lighting	Lighting	658	883	1,201	5	\$ 12.78	\$ 12.78		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	Base load SF Fridge	Refrigeration	55	74	100	12	\$ 775.00	\$ 775.00		\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (Weatherization)	User Defined									\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	User Defined									\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	User Defined									\$ -	0%	0%	0%
Low-Income	Home Energy Assist	HEA (HVAC Systems)	User Defined									\$ -	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Oil-Wxn: Air Sealing, Insulation, Water me	Envelope	290	520	819	20	\$ 7,094.96	\$ 3,547.48		\$ 3,547.48	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Propane-Wxn: Air Sealing, Insulation, Water	Envelope	117	210	331	20	\$ 6,558.53	\$ 3,279.27		\$ 3,279.27	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Gas-Wxn: Air Sealing, Insulation, Water me	Envelope				20	\$ 5,725.05	\$ 2,862.53		\$ 2,862.53	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Kerosene-Wxn: Air Sealing, Insulation, Water	Envelope	5	9	14	20	\$ 7,146.40	\$ 3,573.20		\$ 3,573.20	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Electric-Wxn: Air Sealing, Insulation, Water	Envelope	15	27	42	20	\$ 4,644.62	\$ 2,322.31		\$ 2,322.31	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Cord Wood-Wxn: Air Sealing, Insulation, Water	Envelope	24	44	69	20	\$ 7,151.41	\$ 3,575.71		\$ 3,575.71	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Wood Pellets-Wxn: Air Sealing, Insulation, Water	Envelope	19	35	55	20	\$ 7,151.41	\$ 3,575.71		\$ 3,575.71	0%	0%	0%
Residential	Home Performance v	HPwES (Weatherization)	Baseload SF	Envelope	101	181	286	20				\$ -	0%	0%	0%
Residential	Home Performance v	HPwES (HVAC System)	Oil- Thermostat	Envelope								\$ -	0%	0%	0%
Residential	Home Performance v	HPwES (HVAC System)	Propane- Thermostat	Envelope								\$ -	0%	0%	0%
Residential	Home Performance v	HPwES (HVAC System)	Gas- Thermostat	Envelope								\$ -	0%	0%	0%
Residential	Home Performance v	HPwES (HVAC System)	Kerosene- Thermostat	Envelope								\$ -	0%	0%	0%
Residential	Home Performance v	HPwES (HVAC System)	Electric- Thermostat	Envelope								\$ -	0%	0%	0%

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	Year	2018																	
3	Inputs																		
4	Sector	Program	Subprogram	Measure	End Use	Quantity	Measure Life	TRC (Total)	Incentive (Total)	Customer Cost (Total)	Gross Annual MWh Savings	Adjusted Gross Annual MWh Savings	Adjusted Gross Lifetime MWh Savings	Net Annual MWh Savings	Net Lifetime MWh Savings	Winter Peak Energy MWh Net Lifetime	Winter Off-Peak Energy MWh Net Lifetime	Summer Peak Energy MWh Net Lifetime	Summer Off-Peak Energy MWh Net Lifetime
5	Low-Income	Home Energy Assista	HEA (Weatherization)	Oil-Wxn: Air Sealing, Insulation, W	Envelope	181	21	\$ 1,096,670	\$ 1,096,670	\$ -	69,047	60,001	1,239,270	60,001	1,239,270	334,603	495,708	161,105	247,854
6	Low-Income	Home Energy Assista	HEA (Weatherization)	Propane-Wxn: Air Sealing, Insulati	Envelope	65	21	\$ 404,594	\$ 404,594	\$ -	24,766	21,522	449,827	21,522	449,827	121,453	179,931	58,477	89,965
7	Low-Income	Home Energy Assista	HEA (Weatherization)	Gas-Wxn: Air Sealing, Insulation, V	Envelope	71	22	\$ 250,701	\$ 250,701	\$ -	27,242	23,673	518,862	23,673	518,862	140,039	207,465	67,426	103,732
8	Low-Income	Home Energy Assista	HEA (Weatherization)	Kerosene-Wxn: Air Sealing, Insulat	Envelope	129	20	\$ 779,170	\$ 779,170	\$ -	49,111	42,678	856,157	42,678	856,157	231,162	342,463	111,300	171,231
9	Low-Income	Home Energy Assista	HEA (Weatherization)	Electric-Wxn: Air Sealing, Insulatio	Envelope	15	21	\$ 86,337	\$ 86,337	\$ -	84,352	73,302	1,551,580	73,302	1,551,580	418,927	620,632	201,705	310,316
10	Low-Income	Home Energy Assista	HEA (Weatherization)	Cord Wood-Wxn: Air Sealing, Insu	Envelope	15	20	\$ 86,222	\$ 86,222	\$ -	5,881	5,111	104,755	5,111	104,755	28,284	41,902	13,618	20,951
11	Low-Income	Home Energy Assista	HEA (Weatherization)	Wood Pellets-Wxn: Air Sealing, Ins	Envelope	10	20	\$ 57,482	\$ 57,482	\$ -	3,921	3,407	69,837	3,407	69,837	18,856	27,935	9,079	13,967
12	Low-Income	Home Energy Assista	HEA (Weatherization)	Baseload SF homes	Envelope	110	20	\$ -	\$ -	\$ -	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13																			
14	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Oil- Thermostat	Envelope														
15	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Propane- Thermostat	Envelope														
16	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Gas- Thermostat	Envelope														
17	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Kerosene- Thermostat	Envelope														
18	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Electric- Thermostat	Envelope														
19	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Wood Pellets- Thermostat	Envelope														
20	Low-Income	Home Energy Assista	HEA (HVAC Systems)	All Fuels- Thermostat	Envelope														
21																			
22	Low-Income	Home Energy Assista	HEA (Weatherization)	LED Lighting Products	Lighting	3,217	5	\$ 41,113	\$ 41,113	\$ -	195,594	169,972	849,856	169,972	849,856	365,439	203,966	178,470	101,983
23	Low-Income	Home Energy Assista	HEA (Weatherization)	Refrigerator	Refrigeration	191	12	\$ 147,744	\$ 147,744	\$ -	160,517	139,489	1,673,872	139,489	1,673,872	508,522	577,151	269,996	318,203
24	Low-Income	Home Energy Assista	HEA (Weatherization)	Direct Install Water Measures (if b	Hot Water														
25	Low-Income	Home Energy Assista	HEA (Weatherization)	User Defined															
26	Low-Income	Home Energy Assista	HEA (Weatherization)	User Defined															
27	Low-Income	Home Energy Assista	HEA (Weatherization)	User Defined															
28																			
29	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Oil Boiler Replacement, >=87% AF	HVAC	35	25	\$ 236,672	\$ 236,672	\$ -	2,696	2,343	58,563	2,343	58,563	28,725	28,661	0.433	0.744
30	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Propane Boiler Replacement, >=85	HVAC	6	25	\$ 30,097	\$ 30,097	\$ -	2,341	2,035	50,868	2,035	50,868	24,951	24,895	0.376	0.846
31	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Gas Boiler Replacement, >=95% A	HVAC	2	25	\$ 12,659	\$ 12,659	\$ -	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Kerosene Boiler Replacement, >=8	HVAC	1	25	\$ 5,784	\$ 5,784	\$ -	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Boiler Replacement, User Defined	HVAC														
34																			
35	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Oil Furnace Replacement, >=87% E	HVAC	37	20	\$ 189,014	\$ 189,014	\$ -	0.247	0.215	4,295	0.215	4,295	2.107	2.102	0.032	0.055
36	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Propane Furnace Replacement, >=8	HVAC	22	20	\$ 101,641	\$ 101,641	\$ -	2,847	2,474	49,482	2,474	49,482	24,271	24,216	0.366	0.628
37	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Natural Gas Furnace Replacement,	HVAC	6	20	\$ 32,550	\$ 32,550	\$ -	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Kerosene Furnace Replacement, >=	HVAC	34	20	\$ 111,824	\$ 111,824	\$ -	2,937	2,553	51,054	2,553	51,054	25,042	24,986	0.378	0.648
39	Low-Income	Home Energy Assista	HEA (HVAC Systems)	Furnace Replacement, User Define	HVAC														
40																			
41	Low-Income	Home Energy Assista	HEA (Weatherization)	DHW: Heat Pump Water Heater	Hot Water														
42																			
43																			
44	Low-Income	Home Energy Assista	HEA (Weatherization)	Wxn Admin Fee (if not captured at		1		\$ 60,000	\$ 60,000	\$ -	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	Low-Income	Home Energy Assista	HEA (Weatherization)	Wxn Quality Assurance		1		\$ 60,000	\$ 60,000	\$ -	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46																			
47	Low-Income	Home Energy Assista	HEA (Weatherization)	Base load SF Lighting	Lighting	658	5	\$ 8,403	\$ 8,403	\$ -	39,979	34,742	173,708	34,742	173,708	74,695	41,690	36,479	20,845
48	Low-Income	Home Energy Assista	HEA (Weatherization)	Base load SF Fridge	Refrigeration	55	12	\$ 42,467	\$ 42,467	\$ -	46,138	40,094	481,127	40,094	481,127	146,166	165,893	77,606	91,462
49	Low-Income	Home Energy Assista	HEA (Weatherization)	User Defined															
50	Low-Income	Home Energy Assista	HEA (HVAC Systems)	User Defined															
51	Low-Income	Home Energy Assista	HEA (HVAC Systems)	User Defined															
52	Low-Income	Home Energy Assista	HEA (HVAC Systems)	User Defined															
53																			
54																			
55																			
56	Residential	Home Performance w	HPwES (Weatherization)	Oil-Wxn: Air Sealing, Insulation, W	Envelope	290	20	\$ 2,057,595	\$ 1,028,798	\$ 1,028,798	65,252	65,252	1,305,036	65,252	1,305,036	352,380	522,014	169,656	261,007
57	Residential	Home Performance w	HPwES (Weatherization)	Propane-Wxn: Air Sealing, Insulati	Envelope	117	20	\$ 768,386	\$ 384,193	\$ 384,193	26,361	26,361	527,212	26,361	527,212	142,347	210,885	68,538	105,442
58	Residential	Home Performance w	HPwES (Weatherization)	Gas-Wxn: Air Sealing, Insulation, V	Envelope														
59	Residential	Home Performance w	HPwES (Weatherization)	Kerosene-Wxn: Air Sealing, Insulat	Envelope	5	20	\$ 34,733	\$ 17,366	\$ 17,366	1,094	1,094	21,871	1,094	21,871	5,905	8,748	2,843	4,374
60	Residential	Home Performance w	HPwES (Weatherization)	Electric-Wxn: Air Sealing, Insulatio	Envelope	15	20	\$ 69,049	\$ 34,524	\$ 34,524	85,178	85,178	1,703,550	85,178	1,703,550	459,959	681,420	221,462	340,710
61	Residential	Home Performance w	HPwES (Weatherization)	Cord Wood-Wxn: Air Sealing, Insu	Envelope	24	20	\$ 174,603	\$ 87,301	\$ 87,301	5,493	5,493	109,868	5,493	109,868	29,664	43,947	14,283	21,974
62	Residential	Home Performance w	HPwES (Weatherization)	Wood Pellets-Wxn: Air Sealing, Ins	Envelope	19	20	\$ 139,437	\$ 69,718	\$ 69,718	4,387	4,387	87,740	4,387	87,740	23,690	35,096	11,406	17,548
63	Residential	Home Performance w	HPwES (Weatherization)	Baseload SF	Envelope	101	20	\$ -	\$ -	\$ -	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
64																			
65	Residential	Home Performance w	HPwES (HVAC Systems)	Oil- Thermostat	Envelope														
66	Residential	Home Performance w	HPwES (HVAC Systems)	Propane- Thermostat	Envelope														
67	Residential	Home Performance w	HPwES (HVAC Systems)	Gas- Thermostat	Envelope														
68	Residential	Home Performance w	HPwES (HVAC Systems)	Kerosene- Thermostat	Envelope														
69	Residential	Home Performance w	HPwES (HVAC Systems)	Electric- Thermostat	Envelope														
70	Residential	Home Performance w	HPwES (HVAC Systems)	Wood Pellets- Thermostat	Envelope														
71	Residential	Home Performance w	HPwES (HVAC Systems)	All Fuels- Thermostat	Envelope														
72																			
73	Residential	Home Performance w	HPwES (Weatherization)	LED Lighting Products	Lighting	3,088	5	\$ 33,902	\$ 33,902	\$ -	93,889	93,889	469,445	93,889	469,445	201,861	112,667	98,583	56,333
74	Residential	Home Performance w	HPwES (Weatherization)	Refrigerator	Refrigeration	29	12	\$ 5,603	\$ 5,603	\$ -	22,986	22,986	275,828	22,986	275,828	83,796	95,105	44,491	52,435
75	Residential	Home Performance w	HPwES (Weatherization)	Direct Install Water Measures (if b															
76	Residential	Home Performance w	HPwES (Weatherization)	Other (user defined)															
77	Residential	Home Performance w	HPwES (Weatherization)	Other (user defined)															
78	Residential	Home Performance w	HPwES (Weatherization)	Other (user defined)															

Home Energy Assistance									
Planned		2015	2016	2017	2018	2019	2020		
1)	Total Electric Budget	\$ 2,661,464.00	\$ 2,751,286.00	\$ 3,450,394.00	\$ 4,611,266.00	\$ 5,960,136.00	\$ 7,927,639.00		
	Total Annual Electric Savings (kWh)	332,704.68	487,614.55	429,219.81	623,609.04	823,838.00	1,102,644.60		
	\$/Annual kWh Saved	\$ 8.00	\$ 5.64	\$ 8.04	\$ 7.39	\$ 7.23	\$ 7.19		
2)	Total Electric Budget	\$ 2,661,464.00	\$ 2,751,286.00	\$ 3,450,394.00	\$ 4,611,266.00	\$ 5,960,136.00	\$ 7,927,639.00		
	Total kW saved	31.70	46.33	40.26	83.25	111.46	151.12		
	\$/kW saved	\$ 83,961.98	\$ 59,383.90	\$ 85,705.87	\$ 55,388.90	\$ 53,473.18	\$ 52,458.82		
3)	Total Electric Budget	\$ 2,661,464.00	\$ 2,751,286.00	\$ 3,450,394.00	\$ 4,611,266.00	\$ 5,960,136.00	\$ 7,927,639.00		
	Total Fuel Neutral MMBtu Saved	7,527.20	8,371.96	11,489.26	14,683.27	19,721.49	26,820.91		
	\$/Total Fuel Neutral MMBtu Saved	\$ 353.58	\$ 328.63	\$ 300.31	\$ 314.05	\$ 302.22	\$ 295.58		
Home Energy Assistance									
Actuals		2015	2016						
1)	Total Utility Costs	\$ 2,602,622.35	\$ 2,630,799.37						
	Total Annual Electric Savings (kWh)	638,554.22	514,041.71						
	\$/Annual kWh Saved	\$ 4.08	\$ 5.12						
2)	Total Utility Costs	\$ 2,602,622.35	\$ 2,630,799.37						
	Total kW saved	64.34	16.12						
	\$/kW saved	\$ 40,451.13	\$ 163,221.09						
3)	Total Utility Costs	\$ 2,602,622.35	\$ 2,630,799.37						
	Total Fuel Neutral MMBtu Saved	7,839.29	9,126.57						
	\$/Total Fuel Neutral MMBtu Saved	\$ 332.00	\$ 288.26						





