Table 4-2 provides cumulative annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast. The RAP increases to more than 12% cumulative annual savings over the next six years.

TABLE 4-2 RESIDENTIAL CUMULATIVE ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

MWh						
Technical	114,516	242,109	325,265	410,315	460,483	515,889
Economic	106,549	222,594	297,135	376,090	422,227	475,305
MAP	53,840	136,061	192,386	253,741	306,917	353,855
RAP	41,177	84,538	105,533	134,072	159,025	184,648
Forecasted Sales	1,443,774	1,444,794	1,451,508	1,458,672	1,469,169	1,473,649
Energy Savings (as % of Forecast)						
Technical	7.9%	16.8%	22.4%	28.1%	31.3%	35.0%
Economic	7.4%	15.4%	20.5%	25.8%	28.7%	32.3%
MAP	3.7%	9.4%	13.3%	17.4%	20.9%	24.0%
RAP	2.9%	5.9%	7.3%	9.2%	10.8%	12.5%

Table 4-3 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast. The incremental RAP ranges from 2.6% to 3.5% per year over the next six years.

TABLE 4-3 RESIDENTIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

MWh						
Technical	114,516	136,960	120,797	111,329	99,306	86,829
Economic	106,549	124,856	110,653	103,092	92,493	81,164
MAP	53,840	90,090	82,609	79,096	75,741	68,596
RAP	41,177	50,889	44,349	42,814	42,014	38,952
Forecasted Sales	1,443,774	1,444,794	1,451,508	1,458,672	1,469,169	1,473,649
Energy Savings (as % of Forecast)						
Technical	7.9%	9.5%	8.3%	7.6%	6.8%	5.9%
Economic	7.4%	8.6%	7.6%	7.1%	6.3%	5.5%
MAP	3.7%	6.2%	5.7%	5.4%	5.2%	4.7%
RAP	2.9%	3.5%	3.1%	2.9%	2.9%	2.6%

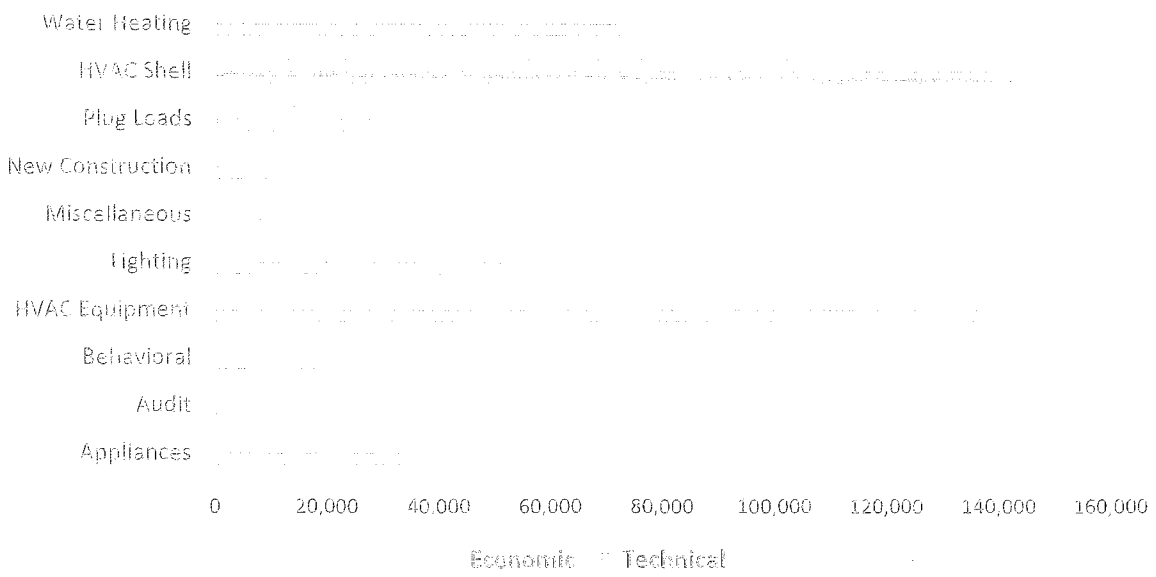
Technical & Economic Potential

Table 4-4 provides cumulative annual technical and economic potential results from 2020-2025. Figure 4-2 shows a comparison of the technical and economic potential (6-year) by end use. The HVAC Shell and HVAC Equipment are by far the leading end-uses among technical and economic potential.

TABLE 4-4 TECHNICAL AND ECONOMIC RESIDENTIAL ELECTRIC POTENTIAL

Energy (MWh)						
Technical	114,516	242,109	325,265	410,315	460,483	515,889
Economic	106,549	222,594	297,135	376,090	422,227	475,305
Peak Demand (MW)						
Technical	18.9	39.3	55.4	70.1	80.0	90.1
Economic	16.7	34.2	48.2	61.1	70.1	79.3

FIGURE 4-2 6-YEAR TECHNICAL AND ECONOMIC RESIDENTIAL ELECTRIC POTENTIAL – BY END-USE



Maximum Achievable Potential

Figure 4-3 illustrates the cumulative annual MAP results by end use across the 2020-2025 timeframe. Like technical and economic potential, HVAC Shell and HVAC Equipment are the leading end uses. Water Heating, Lighting and Appliances also have significant maximum achievable potential.

FIGURE 4-3 RESIDENTIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL GWH) MAP POTENTIAL BY END-USE

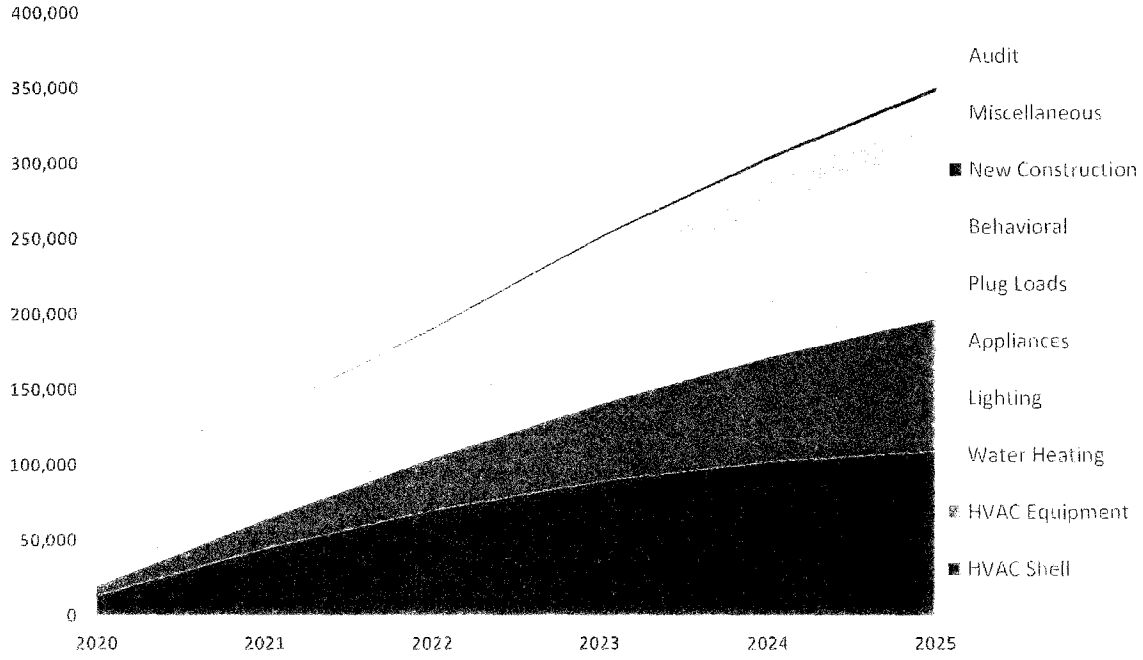


Table 4-5 provides the incremental and cumulative annual MAP across the 2020-2025 timeframe. The incremental MAP potential peaks in 2021 and declines slightly from 2022-2025 as the EISA backstop provision reduces lighting

potential and the HVAC Shell end use declines after much of the retrofit measures have been exhausted quickly in the MAP scenario.

TABLE 4-5 RESIDENTIAL ELECTRIC MAP BY END-USE

Incremental Annual MWh						
Appliances	3,722	4,817	5,313	5,351	5,133	4,722
Audit	61	119	146	167	180	187
Behavioral[29]	9,042	8,056	8,175	8,344	8,597	9,884
HVAC Equipment	6,596	13,003	15,440	17,537	18,995	19,707
Lighting	13,134	21,487	13,717	11,990	10,085	6,389
Miscellaneous[30]	161	215	278	348	421	490
New Construction	255	345	473	587	677	849
Plug Loads	2,023	3,604	4,433	5,085	6,946	6,181
HVAC Shell	13,402	31,486	26,946	21,471	16,065	11,427
Water Heating	5,444	6,957	7,689	8,217	8,642	8,759
Total	**53,840**	**90,090**	**82,609**	**79,096**	**75,741**	**68,596**
% of Forecasted Sales	**3.7%**	**6.2%**	**5.7%**	**5.4%**	**5.2%**	**4.7%**
Incremental Annual MW						
Total	7.4	12.7	12.0	11.4	10.9	10.2
% of Forecasted Demand	1.7%	2.9%	2.7%	2.6%	2.4%	2.3%
Cumulative Annual MWh[31]						
Appliances	3,722	8,540	13,780	19,046	24,047	28,656
Audit	61	119	146	167	180	187
Behavioral	9,042	9,526	10,557	11,781	13,440	15,404
HVAC Equipment	6,596	19,544	34,785	51,794	70,076	88,670
Lighting	13,134	34,830	31,327	36,243	36,889	38,538
Miscellaneous	161	376	655	1,003	1,423	1,914
New Construction	255	600	1,072	1,659	2,337	3,186
Plug Loads	2,023	5,626	10,059	15,144	20,912	24,448
HVAC Shell	13,402	44,560	70,192	89,281	102,002	109,345
Water Heating	5,444	12,339	19,814	27,624	35,612	43,506
Total	**53,840**	**136,061**	**192,386**	**253,741**	**306,917**	**353,855**
% of Forecasted Sales	**3.7%**	**9.4%**	**13.3%**	**17.4%**	**20.9%**	**24.0%**
Cumulative Annual MW						
Total	7.4	19.1	28.6	37.7	45.7	53.0
% of Forecasted Demand	1.7%	4.3%	6.4%	8.4%	10.2%	11.7%

Realistic Achievable Potential

Figure 4-4 illustrates the cumulative annual RAP results by end use across the 2020-2025 timeframe. Like maximum achievable potential, HVAC Shell and HVAC Equipment are the leading end uses. Water Heating, Lighting and Appliances also have significant realistic achievable potential.

[29] The behavioral end-use includes home energy reports and home energy management systems (HEMs).
[30] Miscellaneous consists of pool heater, efficient pool pumps, motors and timers, and well pumps.
[31] Audit measures and most Behavioral measures have a one-year assumed measure life. For this reason, Audit savings are the same for both incremental and cumulative annual, and there is only a minor difference between incremental and cumulative annual savings for Behavioral measures.

FIGURE 4-4 RESIDENTIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL GWH) RAP POTENTIAL BY END-USE

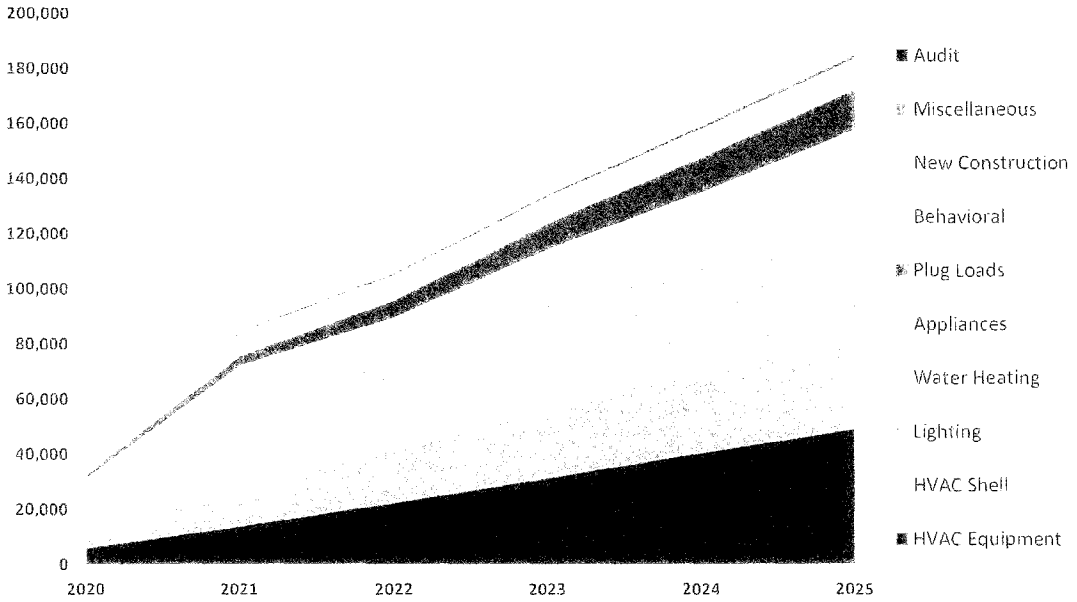


Table 4-6 provides the incremental and cumulative annual RAP across the 2020-2025 timeframe. Lighting and behavioral savings are leading end-uses of incremental RAP in the early years, and HVAC Shell, HVAC Equipment, and Water Heating increase throughout the six-year timeframe.

TABLE 4-6 RESIDENTIAL ELECTRIC RAP BY END-USE

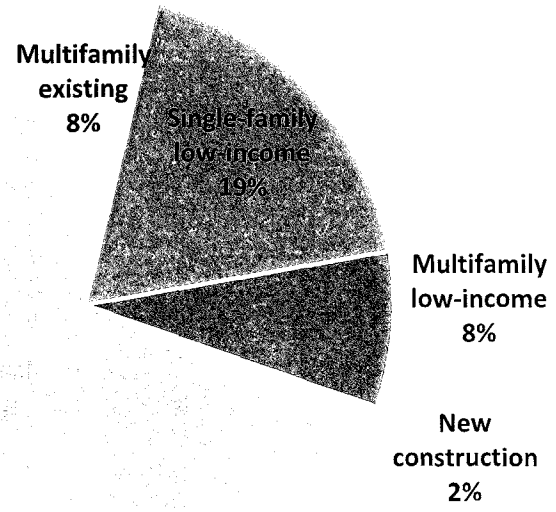
Incremental Annual MWh						
Appliances	2,364	3,363	3,692	3,844	3,902	3,794
Audit	39	78	93	108	121	131
Behavioral[32]	8,061	7,657	7,661	7,651	7,698	8,093
HVAC Equipment	5,848	7,985	8,594	9,039	9,321	9,579
Lighting	14,292	17,399	9,794	7,875	6,298	3,575
Miscellaneous[33]	128	153	176	200	226	252
New Construction	184	209	244	263	272	314
Plug Loads	1,267	2,394	2,688	2,922	3,799	3,433
HVAC Shell	6,246	7,198	6,529	5,752	4,960	4,234
Water Heating	2,748	4,454	4,880	5,160	5,417	5,547
Total	**41,177**	**50,889**	**44,349**	**42,814**	**42,014**	**38,952**
% of Forecasted Sales	**2.9%**	**3.5%**	**3.1%**	**2.9%**	**2.9%**	**2.6%**
Incremental Annual MW						
Total	5.5	6.9	6.5	6.4	6.3	6.1
% of Forecasted Demand	1.2%	1.6%	1.5%	1.4%	1.4%	1.3%

[32] The behavioral end-use includes home energy reports and home energy management systems (HEMs).
[33] Miscellaneous consists of pool heater, efficient pool pumps, motors and timers, and well pumps.

Cumulative Annual MWh[34]						
Appliances	2,364	5,727	9,388	13,177	16,990	20,708
Audit	39	78	93	108	121	131
Behavioral	8,061	8,159	8,496	8,768	9,179	9,711
HVAC Equipment	5,848	13,820	22,375	31,268	40,402	49,002
Lighting	14,292	31,875	26,081	27,825	25,847	27,162
Miscellaneous	128	281	456	657	882	1,135
New Construction	184	393	636	899	1,171	1,485
Plug Loads	1,267	3,661	6,349	9,270	12,634	14,534
HVAC Shell	6,246	13,364	19,709	25,173	29,755	33,555
Water Heating	2,748	7,180	11,950	16,926	22,045	27,226
Total	**41,177**	**84,538**	**105,533**	**134,072**	**159,025**	**184,648**
% of Forecasted Sales	**2.9%**	**5.9%**	**7.3%**	**9.2%**	**10.8%**	**12.5%**
Cumulative Annual MW						
Total	5.5	11.5	15.8	20.4	24.8	28.9
% of Forecasted Demand	1.2%	2.6%	3.6%	4.6%	5.5%	6.4%

Figure 4-5 illustrates a market segmentation of the RAP in the residential sector by 2025. Nearly two-thirds of the RAP is associated with single-family existing homes that are not low-income, whereas the total low-income potential is nearly 30% of the RAP.[35]

FIGURE 4-5 2025 RESIDENTIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL) RAP POTENTIAL BY MARKET SEGMENT



[34] Audit measures and most Behavioral measures have a one-year assumed measure life. For this reason, Audit savings are the same for both incremental and cumulative annual, and there is only a minor difference between incremental and cumulative annual savings for Behavioral measures.

[35] The low-income measures in the RAP analysis did not have to pass the UCT.

RAP Benefits & Costs

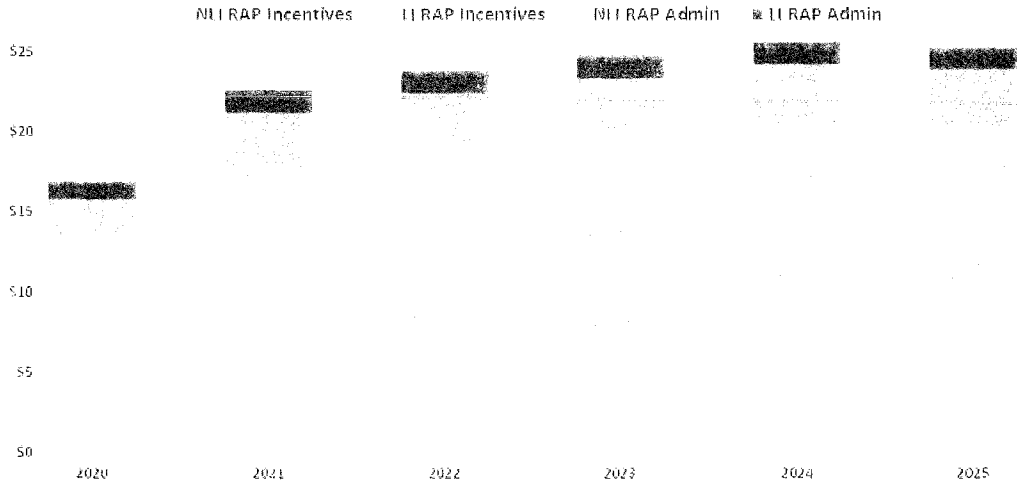
Table 4-7 provides the net present value benefits and cost, as calculated using the UCT, across the 2020-2025 timeframe for the RAP scenario. The overall UCT ratio is 1.1. However, if low-income measures were removed, the overall UCT ratio would be nearly 2.0.

TABLE 4-7 RESIDENTIAL NPV BENEFITS & COSTS RAP BY END-USE ($ IN MILLIONS)

Overall Results			
Appliances	$24.8	$24.1	1.03
Audit	$0.1	$2.8	0.04
Behavioral	$10.9	$5.1	2.14
HVAC Equipment	$88.5	$107.3	0.82
Lighting	$27.3	$11.7	2.33
Miscellaneous	$5.1	$1.3	3.95
New Construction	$3.1	$0.7	4.11
Plug Loads	$12.8	$11.2	1.15
HVAC Shell	$42.0	$52.8	0.80
Water Heating	$36.7	$17.8	2.06
Total	$251.3	$234.8	1.07
Excluding Low-Income			
Appliances	$18.0	$10.0	1.80
Audit	$0.0	$0.0	0.00
Behavioral	$10.9	$5.1	2.14
HVAC Equipment	$62.8	$27.4	2.29
Lighting	$25.4	$10.4	2.44
Miscellaneous	$5.1	$1.3	3.95
New Construction	$3.1	$0.7	4.11
Plug Loads	$12.6	$9.8	1.29
HVAC Shell	$17.2	$13.8	1.25
Water Heating	$34.5	$17.0	2.02
Total	$189.5	$95.4	1.99

Figure 4-6 provides the budget for the RAP scenario. The budget is broken into incentive and admin budgets for each year of the 2020-2025 timeframe. These budgets are further divided into low-income ("LI") and not low-income ("NLI") components. The low-income incentive portion of the budget ranges from 57% to 62% of the total budget from 2020 to 2025. RAP budgets rise to about $25 million after four years.

FIGURE 4-6 ANNUAL BUDGETS FOR RESIDENTIAL RAP ($ IN MILLIONS)



This section provides the potential results for technical, economic, MAP and RAP for the commercial sector. Results are broken down by end use. The cost-effectiveness results and budgets for the RAP scenario are also provided.

SCOPE OF MEASURES & END USES ANALYZED

There were 222 total electric measures included in the analysis. Table 5-1 provides the number of measures by end-use and fuel type (the full list of commercial measures is provided in Appendix C). The measure list was developed based on a review of current Vectren programs, the Indiana TRM, other regional TRMs, and industry documents related to emerging technologies. Data collection activities to characterize measures formed the basis of the assessment of incremental costs, electric energy and demand savings, and measure life.

TABLE 5-1 COMMERCIAL ENERGY EFFICIENCY MEASURES – BY FUEL TYPE

End Use	Number of Electric Measures
Space Heating	32
Cooling	76
Ventilation	8
Water Heating	14
Lighting	26
Cooking	7
Refrigeration	23
Office Equipment	14
Behavioral	3
Other	19

COMMERCIAL ELECTRIC POTENTIAL

Figure 5-1 provides the technical, economic, MAP and RAP results for the 6-year, 10-year, and 20-year timeframes. The 6-year technical potential is 22.1% of forecasted sales, and the economic potential is 20.0% of forecasted sales. The 6-year MAP is 14.8% and the RAP is 6.3%.

FIGURE 5-1 COMMERCIAL ELECTRIC ENERGY CUMULATIVE ANNUAL POTENTIAL (AS A % OF COMMERCIAL SALES)

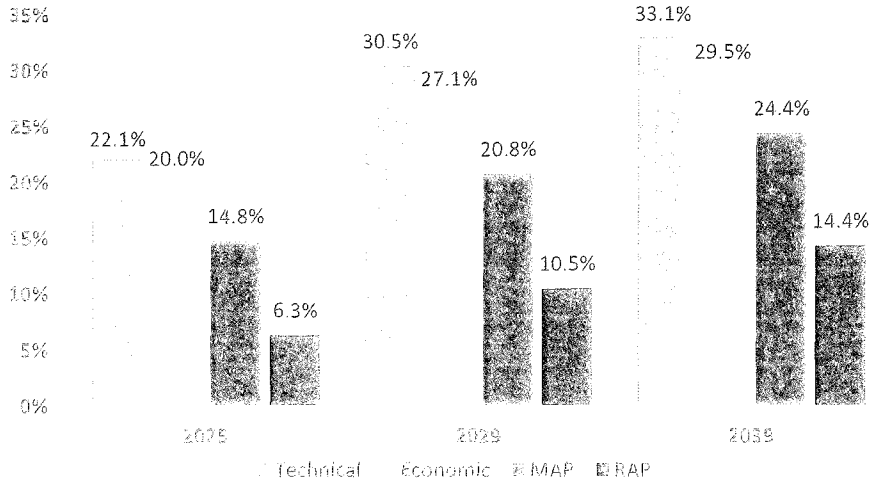


Table 5-2 provides cumulative annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast. The RAP reaches 6.3% after six years.

TABLE 5-2 COMMERCIAL CUMULATIVE ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

MWh						
Technical	44,537	90,258	139,200	189,608	237,091	280,925
Economic	41,327	83,264	127,773	173,145	215,118	253,284
MAP	26,345	55,895	88,639	123,072	156,473	187,460
RAP	10,311	21,974	35,168	49,609	64,869	80,454
Forecasted Sales	1,235,560	1,237,950	1,244,360	1,251,998	1,263,383	1,269,201
Energy Savings (as % of Forecast)						
Technical	3.6%	7.3%	11.2%	15.1%	18.8%	22.1%
Economic	3.3%	6.7%	10.3%	13.8%	17.0%	20.0%
MAP	2.1%	4.5%	7.1%	9.8%	12.4%	14.8%
RAP	0.8%	1.8%	2.8%	4.0%	5.1%	6.3%

Table 5-3 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast. The incremental RAP ranges from 0.8% to 1.4% per year over the next six years.

TABLE 5-3 COMMERCIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

MWh						
Technical	44,537	48,599	52,397	54,755	54,631	55,436
Economic	41,327	44,816	47,926	49,670	49,022	49,453
MAP	26,345	30,503	34,404	37,095	37,636	38,255
RAP	10,311	12,122	13,911	15,609	16,770	17,811
Forecasted Sales	1,235,560	1,237,950	1,244,360	1,251,998	1,263,383	1,269,201
Energy Savings (as % of Forecast)						
Technical	3.6%	3.9%	4.2%	4.4%	4.3%	4.4%
Economic	3.3%	3.6%	3.9%	4.0%	3.9%	3.9%
MAP	2.1%	2.5%	2.8%	3.0%	3.0%	3.0%
RAP	0.8%	1.0%	1.1%	1.2%	1.3%	1.4%

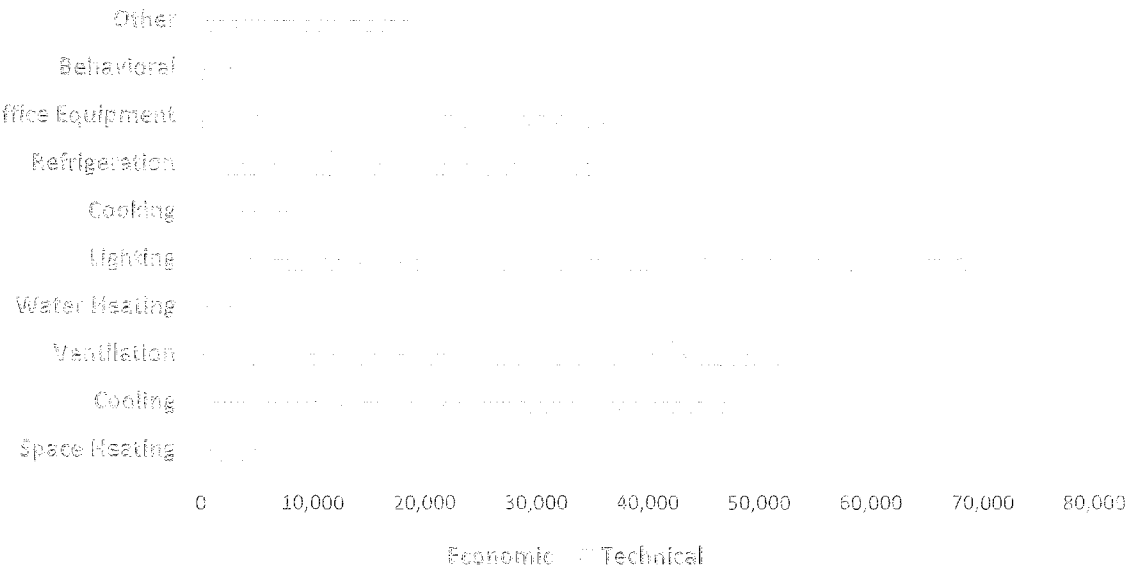
Technical & Economic Potential

Table 5-4 provides cumulative annual technical and economic potential results from 2020-2025. Figure 5-2 shows a comparison of the technical and economic potential (6-year) by end use. Lighting, Ventilation, and Cooling are the leading stand-alone end uses among technical and economic potential.

TABLE 5-4 TECHNICAL & ECONOMIC COMMERCIAL ELECTRIC POTENTIAL

Energy (MWh)						
Technical	44,537	90,258	139,200	189,608	237,091	280,925
Economic	41,327	83,264	127,773	173,145	215,118	253,284
Peak Demand (MW)						
Technical	6	12	18	24	30	35
Economic	4	9	14	19	23	28

FIGURE 5-2 6-YEAR TECHNICAL AND ECONOMIC COMMERCIAL ELECTRIC POTENTIAL – BY END-USE



Maximum Achievable Potential

Figure 5-3 illustrates the cumulative annual MAP results by end use across the 2020-2025 timeframe. Like technical and economic potential, Lighting, Ventilation, and Cooling are the leading end uses. Refrigeration and Office Equipment also have significant maximum achievable potential.

FIGURE 5-3 COMMERCIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL GWH) MAP POTENTIAL BY END-USE

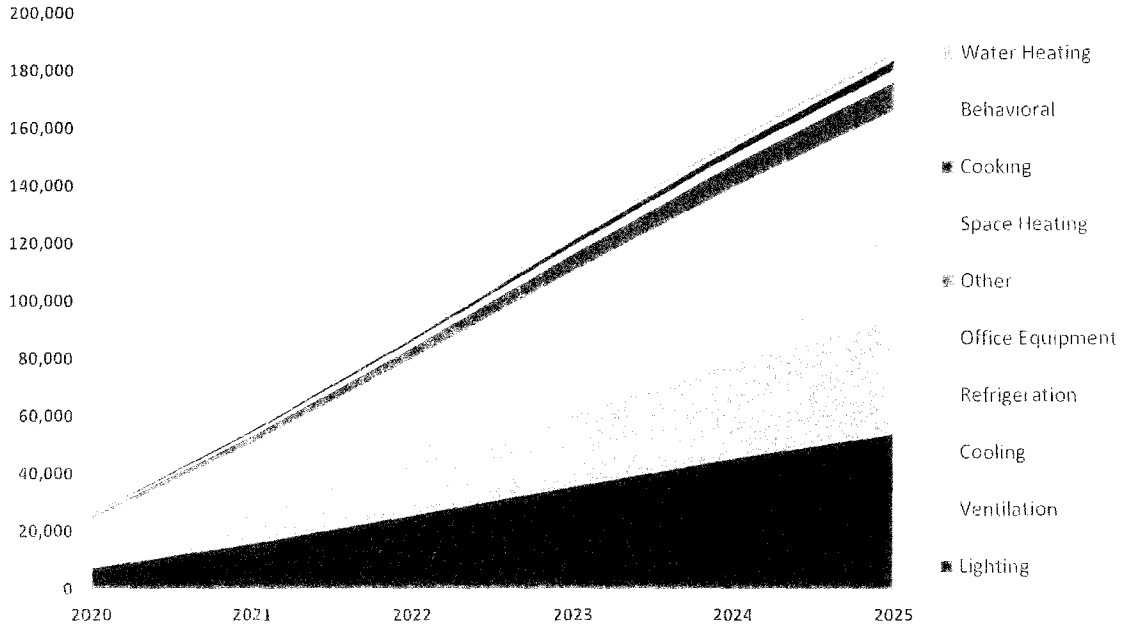


Table 5-5 provides the incremental and cumulative annual MAP across the 2020-2025 timeframe. The incremental MAP ranges from 2.1% to 3.0% of forecasted sales across the six-year timeframe. Cumulative annual MAP rises to 14.8% by 2025.

TABLE 5-5 COMMERCIAL ELECTRIC MAP BY END-USE

Incremental Annual MWh						
Space Heating	567	663	729	740	699	619
Cooling	4,588	5,218	5,739	6,375	6,441	6,118
Ventilation	5,063	6,071	7,004	7,569	7,496	6,806
Water Heating	140	183	228	268	301	336
Lighting	7,338	8,570	9,628	10,120	9,750	8,608
Cooking	292	390	495	600	696	780
Refrigeration	3,843	4,502	4,993	5,237	5,245	6,009
Office Equipment	3,157	3,002	2,882	2,853	2,956	4,530
Behavioral	201	264	533	676	1,045	1,277
Other	1,156	1,641	2,175	2,657	3,006	3,173
Total	26,345	30,503	34,404	37,095	37,636	38,255
% of Forecasted Sales	2.1%	2.5%	2.8%	3.0%	3.0%	3.0%
Incremental Annual MW						
Total	2.1	2.5	2.9	3.0	3.1	2.9
% of Forecasted Demand	0.7%	0.8%	0.9%	1.0%	1.0%	1.0%
Cumulative Annual MWh						
Space Heating	567	1,230	1,959	2,699	3,398	4,017
Cooling	4,588	9,806	15,545	21,516	27,457	32,979
Ventilation	5,063	11,134	18,138	25,707	33,203	40,009
Water Heating	140	323	551	819	1,120	1,441
Lighting	7,338	15,908	25,535	35,656	45,406	54,014
Cooking	292	683	1,178	1,777	2,474	3,254
Refrigeration	3,843	7,617	11,630	15,621	19,368	22,748
Office Equipment	3,157	6,159	9,040	11,893	14,152	16,551
Behavioral	201	452	769	1,161	1,648	2,219
Other	1,156	2,583	4,294	6,222	8,249	10,228
Total	26,345	55,895	88,639	123,072	156,473	187,460
% of Forecasted Sales	2.1%	4.5%	7.1%	9.8%	12.4%	14.8%
Cumulative Annual MW						
Total	2.1	4.6	7.3	10.3	13.2	16.0
% of Forecasted Demand	0.7%	1.5%	2.4%	3.4%	4.4%	5.3%

Realistic Achievable Potential

Figure 5-4 illustrates the cumulative annual RAP results by end use across the 2020-2025 timeframe. Like maximum achievable potential, Lighting, Ventilation, and Cooling are the leading end uses. Refrigeration and Office Equipment also have significant realistic achievable potential.

FIGURE 5-4 COMMERCIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL GWH) RAP POTENTIAL BY END-USE

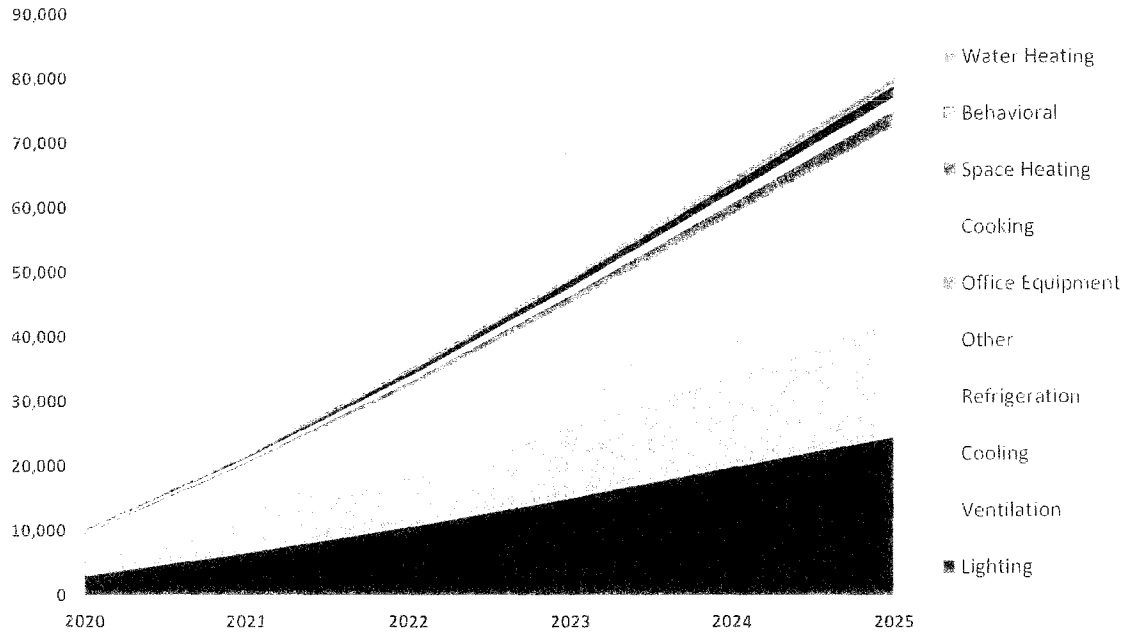


Table 5-6 provides the incremental and cumulative annual RAP across the 2020-2025 timeframe. The incremental RAP ranges from 0.8% to 1.4% of forecasted sales across the six-year timeframe. Cumulative annual RAP rises to 6.3% by 2025.

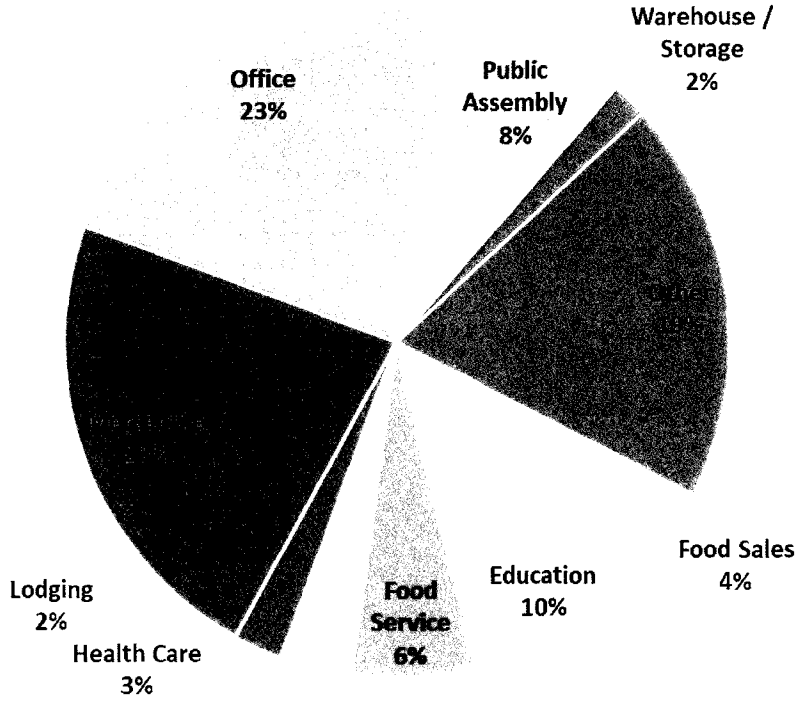
TABLE 5-6 COMMERCIAL ELECTRIC RAP BY END-USE

Incremental Annual MWh						
Space Heating	240	271	297	311	314	308
Cooling	1,955	2,170	2,379	2,738	2,852	2,874
Ventilation	2,232	2,616	2,951	3,231	3,377	3,387
Water Heating	77	97	117	137	156	180
Lighting	3,016	3,565	4,067	4,470	4,718	4,750
Cooking	198	247	299	352	404	455
Refrigeration	1,809	2,097	2,361	2,574	2,744	3,268
Office Equipment	220	280	364	463	571	701
Behavioral	57	80	169	227	353	456
Other	507	700	907	1,106	1,282	1,433
Total	10,311	12,122	13,911	15,609	16,770	17,811
% of Forecasted Sales	0.8%	1.0%	1.1%	1.2%	1.3%	1.4%
Incremental Annual MW						
Total	0.9	1.0	1.3	1.9	2.9	4.6
% of Forecasted Demand	0.3%	0.3%	0.4%	0.6%	1.0%	1.5%
Cumulative Annual MWh						
Space Heating	240	511	808	1,119	1,433	1,741
Cooling	1,955	4,125	6,504	9,030	11,641	14,251
Ventilation	2,232	4,848	7,799	11,029	14,406	17,793
Water Heating	77	174	291	428	584	756

End Use	2020	2021	2022	2023	2024	2025
Lighting	3,016	6,581	10,648	15,117	19,835	24,585
Cooking	198	444	743	1,095	1,499	1,954
Refrigeration	1,809	3,530	5,407	7,380	9,403	11,423
Office Equipment	220	500	864	1,327	1,898	2,599
Behavioral	57	133	240	381	556	774
Other	507	1,127	1,864	2,702	3,614	4,577
Total	10,311	21,974	35,168	49,609	64,869	80,454
% of Forecasted Sales	0.8%	1.8%	2.8%	4.0%	5.1%	6.3%
Cumulative Annual MW						
Total	0.9	1.9	3.1	4.3	5.7	7.0
% of Forecasted Demand	0.3%	0.6%	1.0%	1.4%	1.9%	2.3%

Figure 5-5 illustrates a market segmentation of the RAP in the commercial sector by 2025. Mercantile, Office, and Education are the leading building types.

FIGURE 5-5 2025 COMMERCIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL) RAP POTENTIAL BY MARKET SEGMENT



RAP Benefits & Costs

Table 5-7 provides the net present value benefits and cost, as calculated using the UCT, across the 2020-2025 timeframe for the RAP scenario. Lighting and Cooking are the most cost-effective end-uses, and Cooling also provides significant NPV benefits.

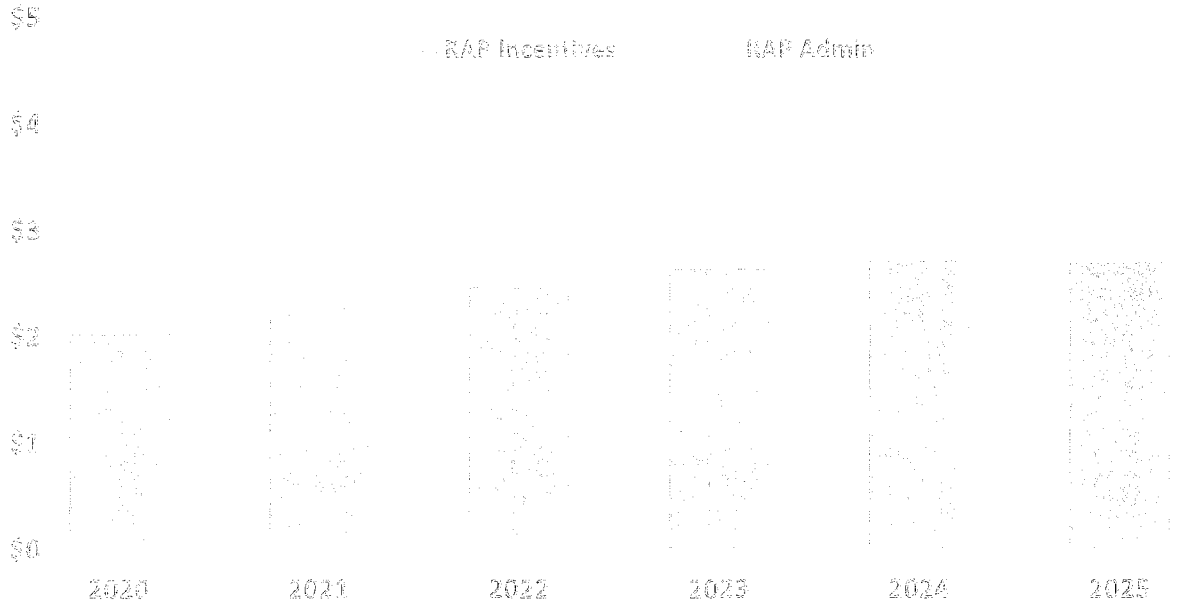
TABLE 5-7 COMMERCIAL NPV BENEFITS & COSTS RAP BY END-USE ($ IN MILLIONS)

End Use	NPV Benefits	NPV Costs	UCT Ratio
Space Heating	$0.62	$1.12	0.55
Cooling	$9.94	$3.09	3.21
Ventilation	$7.94	$5.05	1.57
Water Heating	$0.21	$0.08	2.60

Lighting	$11.03	$6.03	1.83
Cooking	$0.69	$0.34	2.06
Refrigeration	$3.45	$1.33	2.59
Office Equipment	$0.88	$0.48	1.85
Behavioral	$0.11	$0.08	1.33
Other	$1.95	$0.53	3.67
Total	**$36.8**	**$18.1**	**2.03**

Figure 5-6 provides the budget for the RAP scenario. The budget is broken into incentive and admin budgets for each year of the 2020-2025 timeframe. The incentives rise from $2.0 million to $2.7 million, and overall budgets rise from $2.9 million to $4.1 million by 2025.

FIGURE 5-6 ANNUAL BUDGETS FOR COMMERCIAL RAP ($ IN MILLIONS)



COMMERCIAL POTENTIAL INCLUDING OPT-OUT CUSTOMERS

Table 5-8 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast, excluding opt-out customers. This is the same information provided in Section 5.2. The cumulative annual energy savings across the 20-year study timeframe are also shown in the far-right column. Table 5-9 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast, including opt-out customers. The cumulative annual energy savings across the 20-year study timeframe are also shown in the far-right column.

The 20-year RAP is 17.8 GWh excluding opt-out customers. This figure rises to 20.0 GWh with opt-out customers included.

TABLE 5-8 COMMERCIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY – EXCLUDING OPT-OUT CUSTOMERS

MWh							
Technical	44,537	48,599	52,397	54,755	54,631	55,436	465,610
Economic	41,327	44,816	47,926	49,670	49,022	49,453	415,838
MAP	26,345	30,503	34,404	37,095	37,636	38,255	344,315
RAP	10,311	12,122	13,911	15,609	16,770	17,811	202,365
Forecasted Sales	1,235,560	1,237,950	1,244,360	1,251,998	1,263,383	1,269,201	1,408,342
Technical	3.6%	3.9%	4.2%	4.4%	4.3%	4.4%	33.1%
Economic	3.3%	3.6%	3.9%	4.0%	3.9%	3.9%	29.5%
MAP	2.1%	2.5%	2.8%	3.0%	3.0%	3.0%	24.4%
RAP	0.8%	1.0%	1.1%	1.2%	1.3%	1.4%	14.4%

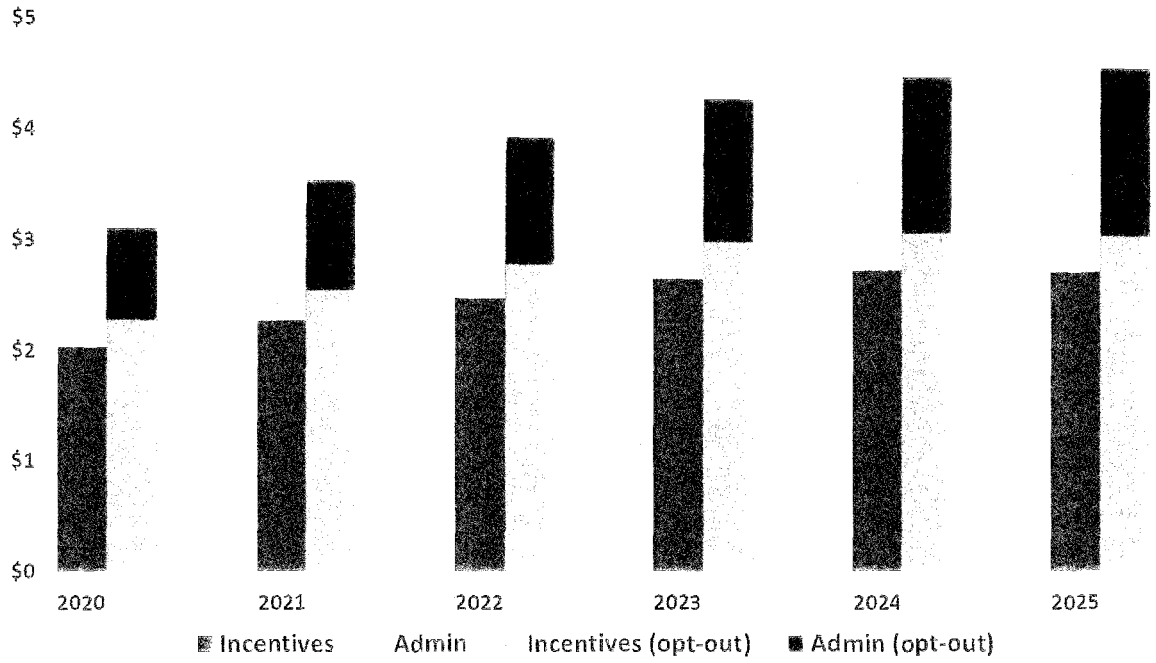
TABLE 5-9 COMMERCIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY – INCLUDING OPT-OUT CUSTOMERS[36]

MWh							
Technical	50,170	54,751	59,038	61,705	61,577	62,517	524,715
Economic	46,545	50,469	53,966	55,928	55,202	55,716	468,265
MAP	29,659	34,334	38,719	41,744	42,354	43,062	387,577
RAP	11,578	13,618	15,630	17,541	18,846	20,006	227,568
Forecasted Sales	1,390,224	1,392,929	1,400,166	1,408,787	1,421,633	1,428,202	1,585,207
Technical	3.6%	3.9%	4.2%	4.4%	4.3%	4.4%	33.1%
Economic	3.3%	3.6%	3.9%	4.0%	3.9%	3.9%	29.5%
MAP	2.1%	2.5%	2.8%	3.0%	3.0%	3.0%	24.4%
RAP	0.8%	1.0%	1.1%	1.2%	1.3%	1.4%	14.4%

Figure 5-7 provides the budget for the RAP scenario, with and without opt-out customers. The budget is broken into incentive and admin budgets for each year of the 2020-2025 timeframe. The overall budgets without opt-out customers rise from $2.9 million to $4.1 million by 2025. The budgets with opt-out customers included increase from $3.1 million to $4.5 million by 2025.

[36] Due to limited number of commercial opt-out customers and minor changes in building segmentation, savings as a percentage of sales is negligible out to three decimal places.

FIGURE 5-7 ANNUAL BUDGETS FOR COMMERCIAL RAP ($ IN MILLIONS) – WITH AND WITHOUT OPT-OUT CUSTOMERS



6 INDUSTRIAL ENERGY EFFICIENCY POTENTIAL

This section provides the potential results for technical, economic, MAP and RAP for the industrial sector. Results are broken down by end use. The cost-effectiveness results and budgets for the RAP scenario are also provided. The results in this section exclude the savings and sales forecast associated with opt-out customers

6.1 SCOPE OF MEASURES & END USES ANALYZED

There were 165 total unique electric measures included in the analysis. Table 6-1 provides number of measures by end-use (the full list of industrial measures is provided in Appendix D). The measure list was developed based on a review of current Vectren programs, the Indiana TRM, other regional TRMs, and industry documents related to emerging technologies. Data collection activities to characterize measures formed the basis of the assessment of incremental costs, electric energy and demand savings, and measure life.

TABLE 6-1 INDUSTRIAL ENERGY EFFICIENCY MEASURES – BY FUEL TYPE

End Use	Number of Measures
Computers & Office Equipment	6
Water Heating	6
Ventilation	7
Space Cooling	22
Space Heating	16
Cooking	7
Refrigeration	25
Lighting	20
Other	7
Machine Drive	21
Process Heating and Cooling	12
Agriculture	16

6.2 INDUSTRIAL ELECTRIC POTENTIAL

Figure 6-1 provides the technical, economic, MAP and RAP results for the 6-year, 10-year, and 20-year timeframes. The 6-year technical potential is 20.6% of forecasted sales, and the economic potential is 19.3% of forecasted sales. The 6-year MAP is 14.0% and the RAP is 6.7%.

FIGURE 6-1 INDUSTRIAL ELECTRIC ENERGY CUMULATIVE ANNUAL POTENTIAL (AS A % OF INDUSTRIAL SALES)

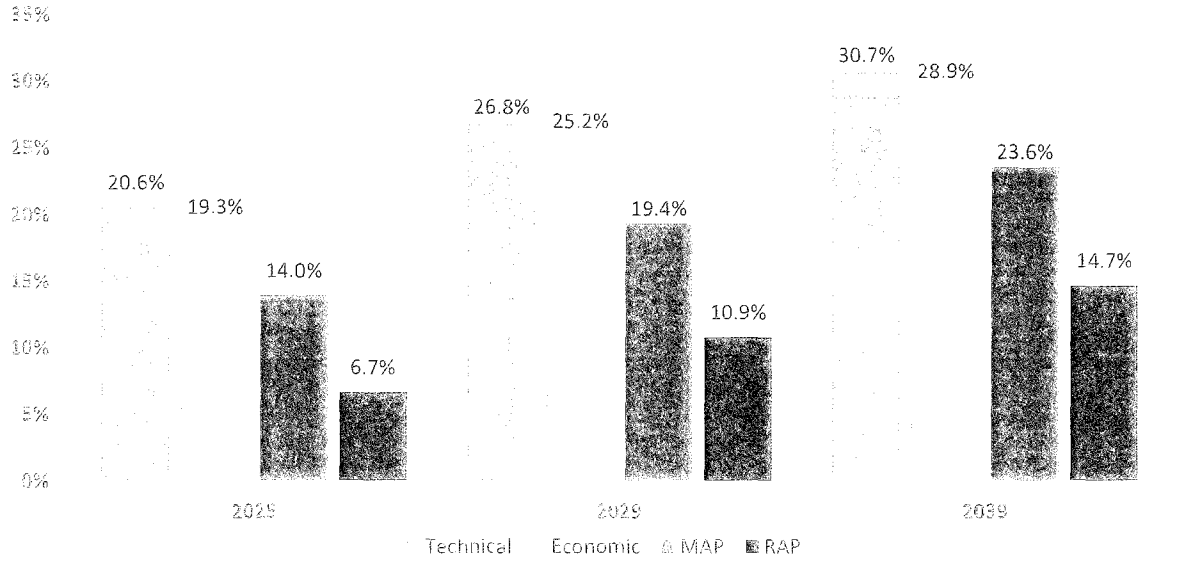


Table 6-2 provides cumulative annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast. The RAP reaches 6.7% after six years.

TABLE 6-2 INDUSTRIAL CUMULATIVE ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

MWh						
Technical	20,939	44,360	69,559	95,219	115,910	133,986
Economic	19,496	41,369	65,048	89,324	108,808	125,853
MAP	11,785	25,996	42,270	59,617	76,091	90,989
RAP	5,517	11,982	19,336	27,377	35,449	43,566
Forecasted Sales	640,023	641,915	644,247	646,702	649,006	651,371
Energy Savings (as % of Forecast)						
Technical	3.3%	6.9%	10.8%	14.7%	17.9%	20.6%
Economic	3.0%	6.4%	10.1%	13.8%	16.8%	19.3%
MAP	1.8%	4.0%	6.6%	9.2%	11.7%	14.0%
RAP	0.9%	1.9%	3.0%	4.2%	5.5%	6.7%

Table 6-3 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast. The incremental RAP ranges from 0.9% to 1.6% per year over the next six years.

TABLE 6-3 INDUSTRIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY

MWh						
Technical	20,939	24,019	26,570	27,937	28,192	27,324
Economic	19,496	22,471	25,050	26,553	26,985	26,293
MAP	11,785	14,679	17,322	19,105	20,003	19,927
RAP	5,517	6,688	7,846	8,854	9,799	10,567
Forecasted Sales	640,023	641,915	644,247	646,702	649,006	651,371
Energy Savings (as % of Forecast)						
Technical	3.3%	3.7%	4.1%	4.3%	4.3%	4.2%
Economic	3.0%	3.5%	3.9%	4.1%	4.2%	4.0%
MAP	1.8%	2.3%	2.7%	3.0%	3.1%	3.1%

MWh						
RAP	0.9%	1.0%	1.2%	1.4%	1.5%	1.6%

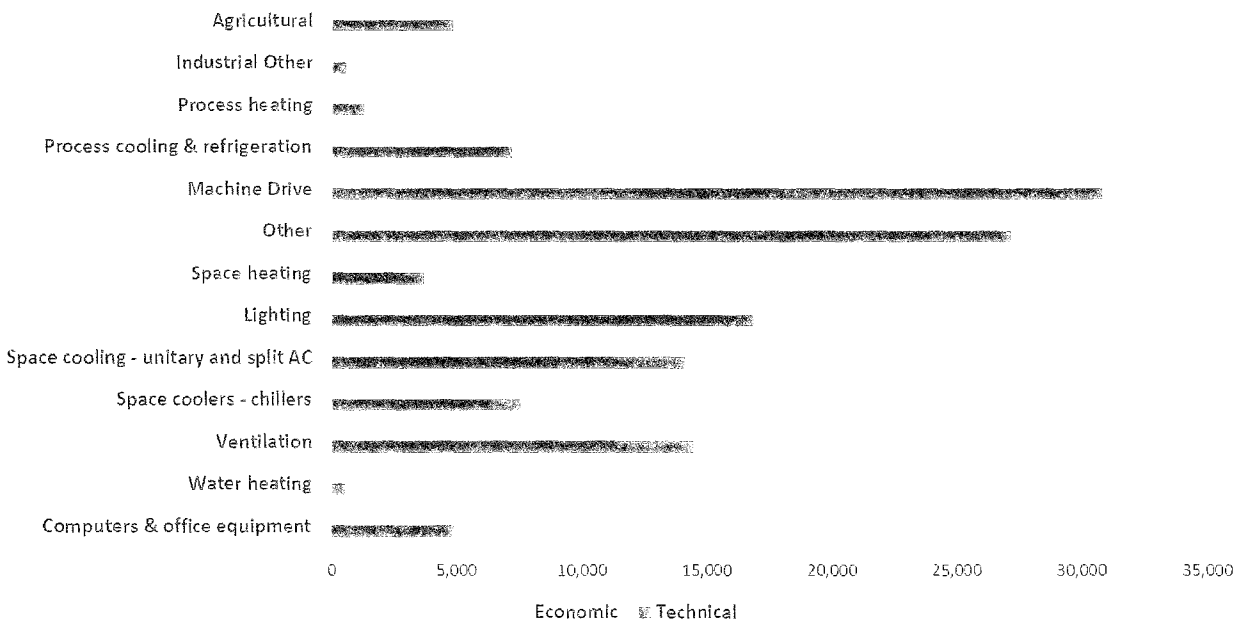
Technical & Economic Potential

Table 6-4 provides cumulative annual technical and economic potential results from 2020-2025. Figure 6-2 shows a comparison of the technical and economic potential (6-year) by end use. Machine drive, Lighting, and Ventilation are the leading stand-alone end uses among technical and economic potential.

TABLE 6-4 TECHNICAL AND ECONOMIC INDUSTRIAL ELECTRIC POTENTIAL

Energy (MWh)						
Technical	20,939	44,360	69,559	95,219	115,910	133,986
Economic	19,496	41,369	65,048	89,324	108,808	125,853
Peak Demand (MW)						
Technical	5	10	15	21	25	29
Economic	4	9	14	19	24	27

FIGURE 6-2 YEAR TECHNICAL AND ECONOMIC INDUSTRIAL ELECTRIC POTENTIAL – BY END-USE



Maximum Achievable Potential

Figure 6-3 illustrates the cumulative annual MAP results by end use across the 2020-2025 timeframe. Like technical and economic potential, Machine Drive, Lighting, and Ventilation are the leading end uses. Space cooling and process cooling & refrigeration also have significant maximum achievable potential.

FIGURE 6-3 INDUSTRIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL GWH) MAP POTENTIAL BY END-USE

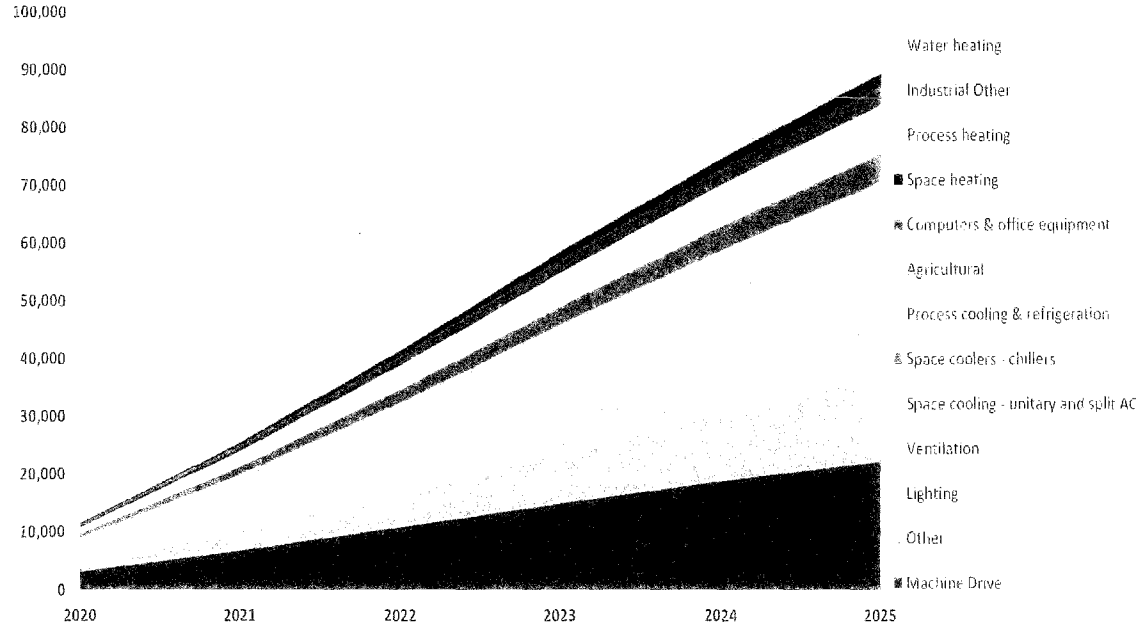


Table 6-5 provides the incremental and cumulative annual MAP across the 2020-2025 timeframe. The incremental MAP ranges from 1.8% to 3.1% of forecasted sales across the six-year timeframe. Cumulative annual MAP rises to 14.0% by 2025.

TABLE 6-5 INDUSTRIAL ELECTRIC MAP BY END-USE

Incremental Annual MWh						
Computers & office equipment	385	494	596	678	736	867
Water heating	40	41	44	49	55	60
Ventilation	1,311	1,626	1,898	2,011	1,926	1,675
Space coolers - chillers	677	808	912	949	971	886
Space cooling - unitary and split AC	1,271	1,503	1,696	1,768	1,814	1,631
Lighting	1,797	2,238	2,662	2,951	3,008	2,839
Space heating	328	390	444	464	480	435
Other	1,466	1,909	2,391	2,877	3,392	3,930
Machine Drive	3,166	3,928	4,588	5,017	5,150	5,093
Process cooling & refrigeration	681	931	1,165	1,362	1,511	1,617
Process heating	122	169	217	259	290	306
Industrial Other	47	56	64	73	83	93
Agricultural	494	587	644	645	588	495
Total	11,785	14,679	17,322	19,105	20,003	19,927
% of Forecasted Sales	1.8%	2.3%	2.7%	3.0%	3.1%	3.1%
Incremental Annual MW						
Total	3	3	4	4	4	4
% of Forecasted Demand	2.3%	2.8%	3.3%	3.7%	3.8%	3.8%

Cumulative Annual MWh						
Computers & office equipment	385	878	1,474	2,153	2,630	3,056
Water heating	40	82	126	175	230	288
Ventilation	1,311	2,932	4,819	6,813	8,712	10,350
Space coolers - chillers	677	1,483	2,392	3,335	4,237	4,964
Space cooling - unitary and split AC	1,271	2,760	4,425	6,133	7,727	9,090
Lighting	1,797	3,972	6,492	9,204	11,859	14,223
Space heating	328	715	1,151	1,603	2,029	2,398
Other	1,466	3,374	5,764	8,638	11,542	14,682
Machine Drive	3,166	6,853	10,906	15,038	18,913	22,274
Process cooling & refrigeration	681	1,497	2,405	3,333	4,203	4,961
Process heating	122	271	443	625	801	956
Industrial Other	47	97	148	199	248	296
Agricultural	494	1,081	1,725	2,370	2,958	3,450
Total	11,785	25,996	42,270	59,617	76,091	90,989
% of Forecasted Sales	1.8%	4.0%	6.6%	9.2%	11.7%	14.0%
Cumulative Annual MW						
Total	3	6	9	13	17	20
% of Forecasted Demand	2.3%	5.0%	8.2%	11.6%	14.6%	17.4%

Realistic Achievable Potential

Figure 6-4 illustrates the cumulative annual RAP results by end use across the 2020-2025 timeframe. Like maximum achievable potential, Machine Drive, Lighting, and Ventilation are the leading end uses. Space cooling and process cooling & refrigeration also have significant realistic achievable potential.

FIGURE 6-4 INDUSTRIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL GWH) RAP POTENTIAL BY END-USE

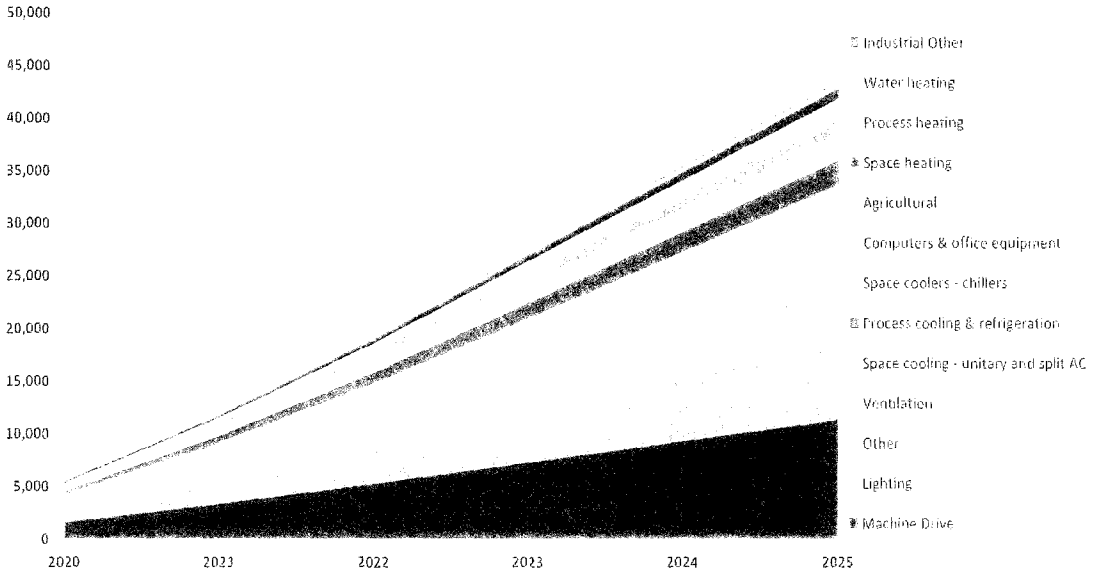


Table 6-6 provides the incremental and cumulative annual RAP across the 2020-2025 timeframe. The incremental RAP ranges from 0.9% to 1.6% of forecasted sales across the six-year timeframe. Cumulative annual RAP rises to 6.7% by 2025.

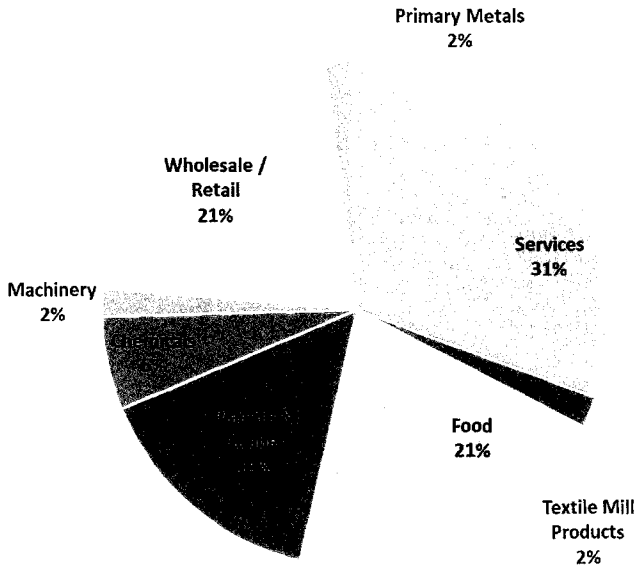
TABLE 6-6 INDUSTRIAL ELECTRIC RAP BY END-USE

Incremental Annual MWh						
Computers & office equipment	263	316	367	415	457	544
Water heating	9	12	16	20	25	29
Ventilation	599	713	818	883	915	911
Space coolers - chillers	271	323	372	406	453	465
Space cooling - unitary and split AC	477	570	655	711	801	815
Lighting	892	1,083	1,268	1,419	1,532	1,592
Space heating	125	150	173	189	213	218
Other	649	834	1,046	1,269	1,502	1,772
Machine Drive	1,575	1,881	2,183	2,456	2,683	2,888
Process cooling & refrigeration	326	421	517	619	724	826
Process heating	56	75	95	116	136	156
Industrial Other	13	17	23	29	36	44
Agricultural	262	292	312	323	321	307
Total	5,517	6,688	7,846	8,854	9,799	10,567
% of Forecasted Sales	0.9%	1.0%	1.2%	1.4%	1.5%	1.6%
Incremental Annual MW						
Total	1	1	2	2	2	2
% of Forecasted Demand	1.1%	1.3%	1.5%	1.7%	1.9%	2.0%
Cumulative Annual MWh						
Computers & office equipment	263	579	945	1,360	1,623	1,873
Water heating	9	21	37	57	82	110
Ventilation	599	1,311	2,124	3,000	3,904	4,799
Space coolers - chillers	271	593	964	1,367	1,790	2,177
Space cooling - unitary and split AC	477	1,041	1,683	2,372	3,081	3,783
Lighting	892	1,948	3,157	4,478	5,863	7,253
Space heating	125	273	443	627	817	1,007
Other	649	1,484	2,530	3,798	5,051	6,463
Machine Drive	1,575	3,334	5,252	7,275	9,335	11,358
Process cooling & refrigeration	326	694	1,093	1,516	1,948	2,373
Process heating	56	121	195	276	361	445
Industrial Other	13	27	44	63	84	107
Agricultural	262	554	867	1,189	1,511	1,817
Total	5,517	11,982	19,336	27,377	35,449	43,566
% of Forecasted Sales	0.9%	1.9%	3.0%	4.2%	5.5%	6.7%

Cumulative Annual MW						
Total	1	3	4	6	8	9
% of Forecasted Demand	1.1%	2.3%	3.7%	5.3%	6.8%	8.4%

Figure 6-5 illustrates a market segmentation of the RAP in the industrial sector by 2025. Food, plastics & rubber and chemicals are the leading market segments.

FIGURE 6-5 2025 INDUSTRIAL ELECTRIC ENERGY (CUMULATIVE ANNUAL) RAP POTENTIAL BY MARKET SEGMENT[37]



RAP Benefits & Costs

Table 6-7 provides the net present value benefits and cost, as calculated using the UCT, across the 2020-2025 timeframe for the RAP scenario. Machine Drive is the most cost-effective end-use, and Facility Lighting provides the greatest NPV benefits.

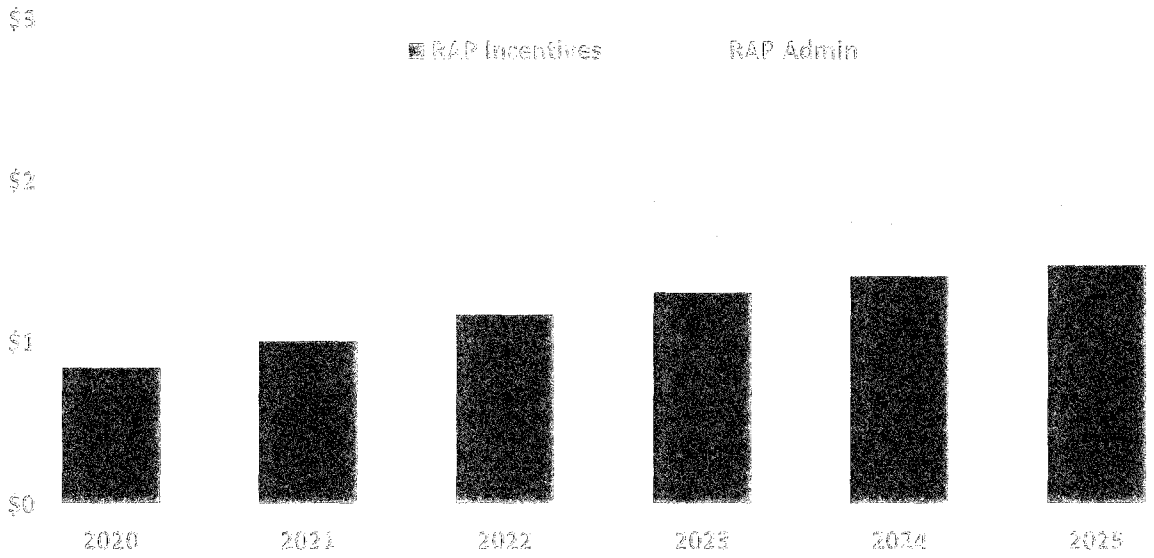
TABLE 6-7 INDUSTRIAL NPV BENEFITS AND COSTS RAP BY END-USE ($ IN MILLIONS)

End Use	NPV Benefits	NPV Costs	UCT Ratio
Machine Drive	$7.4	$1.3	5.90
Facility HVAC	$5.9	$1.4	4.18
Facility Lighting	$9.9	$3.7	2.64
Other Facility Support	$2.9	$1.2	2.45
Process Cooling and Refrigeration	$1.3	$0.4	3.64
Process Heating	$0.2	$0.0	4.59
Other	$3.6	$1.2	3.04
Total	$31.2	$9.2	3.40

[37] "Wholesale/Retail" and "Services" industrial types include industrial buildings that devote a minority percentage of floor space to commercial activities like wholesale and retail trade, and construction, healthcare, education and accommodation & food service. Automotive related industries are divided between plastics, rubber, and machinery based on their NAICS codes.

Figure 6-6 provides the budget for the RAP scenario. The budget is broken into incentive and admin budgets for each year of the 2020-2025 timeframe. The incentives rise from $0.8 million to $1.5 million, and overall budgets rise from $1.2 million to $2.3 million by 2025.

FIGURE 6-6 ANNUAL BUDGETS FOR INDUSTRIAL RAP ($ IN MILLIONS)



6.3 INDUSTRIAL POTENTIAL INCLUDING OPT-OUT CUSTOMERS

Table 6-8 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast, excluding opt-out customers. This is the same information provided in Section 6.2. The cumulative annual energy savings across the 20-year study timeframe are also shown in the far-right column. Table 6-9 provides the incremental annual technical, economic, MAP and RAP energy savings, in total MWh and as a percentage of the sector-level sales forecast, including opt-out customers.[38] The cumulative annual energy savings across the 20-year study timeframe are also shown in the far-right column.

The 20-year RAP is 14.7%, excluding opt-out customers. This figure drops to 13.5%, with opt-out customers included. Though the savings as a percentage of sales decreases, the energy savings of the RAP rises from 100,008 MWh to 334,101 MWh when the opt-out customers are included in the analysis.

TABLE 6-8 INDUSTRIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY – EXCLUDING OPT-OUT CUSTOMERS

	2020	2021	2022	2023	2024	2025	20-Year Total
MWh							
Technical	20,939	24,019	26,570	27,937	28,192	27,324	208,784
Economic	19,496	22,471	25,050	26,553	26,985	26,293	196,720
MAP	11,785	14,679	17,322	19,105	20,003	19,927	160,447
RAP	5,517	6,688	7,846	8,854	9,799	10,567	100,008
Forecasted Sales	640,023	641,915	644,247	646,702	649,006	651,371	679,928
Energy Savings (as % of forecast)							
Technical	3.3%	3.7%	4.1%	4.3%	4.3%	4.2%	30.7%
Economic	3.0%	3.5%	3.9%	4.1%	4.2%	4.0%	28.9%
MAP	1.8%	2.3%	2.7%	3.0%	3.1%	3.1%	23.6%
RAP	0.9%	1.0%	1.2%	1.4%	1.5%	1.6%	14.7%

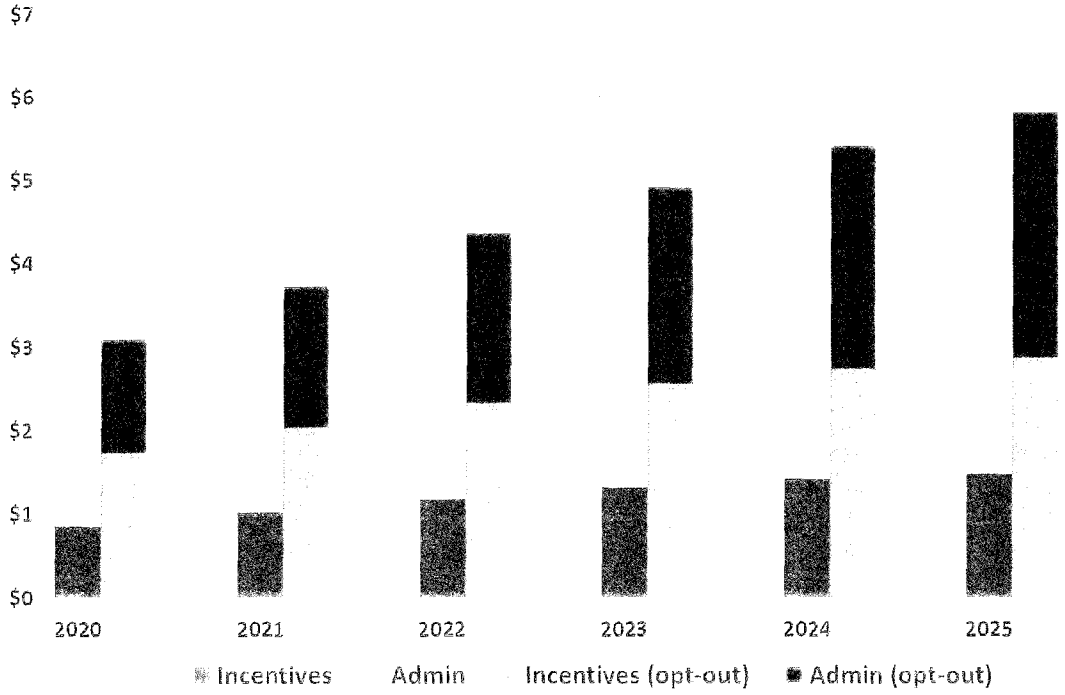
[38] Note the increase in the forecasted sales with opt-out customers included.

TABLE 6-9 INDUSTRIAL INCREMENTAL ANNUAL ENERGY EFFICIENCY POTENTIAL SUMMARY – INCLUDING OPT-OUT CUSTOMERS

	2020	2021	2022	2023	2024	2025	2020-2025 Cumulative
MWh							
Technical	66,750	78,664	89,185	95,702	97,760	95,516	688,359
Economic	63,335	74,992	85,566	92,390	94,842	92,995	659,191
MAP	41,085	51,432	61,105	67,856	71,118	70,784	521,639
RAP	19,324	23,576	27,883	31,695	35,218	38,149	334,101
Forecasted Sales	2,329,890	2,336,776	2,345,264	2,354,201	2,362,591	2,371,200	2,475,157
Energy Savings (as % of Forecast)							
Technical	2.9%	3.4%	3.8%	4.1%	4.1%	4.0%	27.8%
Economic	2.7%	3.2%	3.6%	3.9%	4.0%	3.9%	26.6%
MAP	1.8%	2.2%	2.6%	2.9%	3.0%	3.0%	21.1%
RAP	0.8%	1.0%	1.2%	1.3%	1.5%	1.6%	13.5%

Figure 6-8 provides the budget for the RAP scenario, with and without opt-out customers. The budget is broken into incentive and admin budgets for each year of the 2020-2025 timeframe. The overall budgets without opt-out customers rise from $1.2 million to $2.3 million by 2025. The budgets with opt-out customers included increase from $3.1 million to $5.8 million by 2025.

FIGURE 6-7 ANNUAL BUDGETS FOR INDUSTRIAL RAP ($ IN MILLIONS) – WITH AND WITHOUT OPT-OUT CUSTOMERS



This section provides the results of the technical, economic, MAP and RAP potential for the demand response analysis. Results are broken down by sector and program. The cost-effectiveness results and budgets for the MAP and RAP scenarios are also provided. Section 2.5 provides a description of the demand response methodology. Additional demand response results details are provided in Appendix G.

This section also provides the results of the CVR analysis. Energy and peak demand savings are provided, along with estimated budget requirements and the program benefits and costs.

TOTAL DEMAND RESPONSE POTENTIAL

Table 7-1 shows the technical, economic, and achievable (MAP and RAP) cumulative annual potential for the 2020-2025 timeframe. Achievable potential includes a participation rate to estimate the realistic number of customers that are expected to participate in each cost-effective demand response program option. These values are at the customer meter. The MAP assumes the maximum participation that would happen in the real-world, while the realistically achievable potential (RAP) discounts MAP by considering barriers to program implementation that could limit the amount of savings achieved.

TABLE 7-1 SUMMARY OF TECHNICAL, ECONOMIC, AND ACHIEVABLE POTENTIAL[39]

Technical	399	368	333	312	304	300
Economic	367	348	322	306	299	295
MAP	23	64	110	131	138	139
RAP	7	20	38	49	53	55

Table 7-2 and Table 7-3 show the achievable potential savings for the 2020-2025 timeframe. Only those programs that were found to be cost-effective are included. Critical Peak Pricing (with Enabling Technologies) are the leading programs in both the commercial and residential sectors.

TABLE 7-2 MAP SAVINGS BY PROGRAM

Residential	DLC AC Thermostat (Utility Incentivized)	2	3	5	7	8	10
	DLC AC Thermostat (BYOT)	2	3	5	7	8	10
	Critical Peak Pricing (with Enabling Technologies)	8	24	49	64	68	68
	Critical Peak Pricing (without Enabling Technologies)	4	11	17	19	19	18
	Peak Time Rebates	5	10	10	6	5	4
	Total	18	49	82	96	99	100

[39] The results in Table 7-1 do not account for any interactions with energy efficiency. In other words, the results are independent of the energy efficiency potential. Table 7-2 and Table 7-3 provide the DR total both without and with accounting for the interactions between energy efficiency potential and demand response potential. The "with energy efficiency interaction" results assume that energy efficiency potential comes first, then demand response.

	Program	2024 Savings (MW)	2025 Savings (MW)	2026 Savings (MW)	2027 Savings (MW)	2028 Savings (MW)	2029 Savings (MW)
Commercial	DLC AC Thermostat (Utility Incentivized)	0	1	1	1	1	2
	DLC AC Thermostat (BYOT)	0	1	1	1	1	2
	Critical Peak Pricing (with Enabling Technologies)	4	11	23	31	33	33
	Critical Peak Pricing (without Enabling Technologies)	1	2	3	3	3	3
	Time of Use Rate	0	1	1	1	1	1
	Total	5	15	28	36	38	39
Residential & Commercial Total (without energy efficiency interaction)		23	64	110	131	138	139
Residential & Commercial Total (with energy efficiency interaction)		22	61	103	121	124	123

TABLE 7-3 RAP SAVINGS BY PROGRAM

	Program	2024 Savings (MW)	2025 Savings (MW)	2026 Savings (MW)	2027 Savings (MW)	2028 Savings (MW)	2029 Savings (MW)
Residential	DLC AC Thermostat (Utility Incentivized)	1	2	3	3	4	5
	DLC AC Thermostat (BYOT)	1	2	3	3	4	5
	Critical Peak Pricing (with Enabling Technologies)	2	6	12	16	18	18
	Critical Peak Pricing (without Enabling Technologies)	1	3	5	7	7	7
	Peak Time Rebates	1	3	6	8	8	8
	Time of Use Rate	1	2	3	3	4	4
	Residential Total	5	16	30	38	41	42
Commercial	DLC AC Thermostat (Utility Incentivized)	0	0	0	0	0	1
	DLC AC Thermostat (BYOT)	0	0	0	0	0	1
	Critical Peak Pricing (with Enabling Technologies)	1	3	7	9	10	10
	Critical Peak Pricing (without Enabling Technologies)	0	1	1	2	2	2
	Commercial Total	1	4	8	11	12	12
Residential & Commercial Total (without energy efficiency interaction)		7	20	38	49	53	55
Residential & Commercial Total (with energy efficiency interaction)		7	19	37	47	51	51

Benefits & Costs

Table 7-4 and Table 7-5 show the MAP and RAP budget requirement (for only cost-effective programs) across the 2020-2025 timeframe that would be required to achieve the cumulative annual potential for each of the thermostat scenarios. GDS assumed that the Utility Incentivized Scenario would be combined with the existing energy efficiency smart thermostat program, so those customers would already have thermostats installed. Therefore, there would be no additional incentives or equipment costs for those customers. For the BYOT program, GDS assumed there would be a $75 one-time credit[40] for each new participant. The current and future hardware and software cost of a Demand Response Management System and the cost of non-equipment incentives are included in these budgets.

TABLE 7-4 SUMMARY OF MAP BUDGET REQUIREMENTS

2020	$2,603,899	$2,903,578
2021	$3,795,482	$4,142,869
2022	$3,491,247	$3,886,512
2023	$1,824,460	$2,267,934
2024	$795,194	$1,286,975
2025	$524,919	$1,065,077

TABLE 7-5 SUMMARY OF RAP BUDGET REQUIREMENTS

2020	$1,214,023	$1,366,348
2021	$1,519,553	$1,695,871
2022	$1,874,090	$2,074,485
2023	$1,218,690	$1,443,328
2024	$687,836	$936,763
2025	$517,151	$790,398

Table 7-6 and Table 7-7 show the MAP and RAP residential net present values of the total benefits, costs, and savings, along with the UCT ratio for each program for the length of the study. The study period is 2020 to 2034 for MAP (15 years) and 2020 to 2039 for RAP (20 years). Two scenarios were looked at for the demand response study: control of air conditioners by smart thermostats where the utility provides the thermostat (utility incentivized), or where the customer provides their own thermostat (BYOT).

TABLE 7-6 MAP NPV BENEFITS, COSTS, AND UCT RATIOS FOR EACH DEMAND RESPONSE PROGRAM

Residential	DLC AC Thermostat (Utility Incentivized)	$17,194,723	$1,983,943	8.67
	DLC AC Thermostat (BYOT)	$17,194,723	$8,202,189	2.10
	DLC AC Switch	$444,312	$981,072	0.45
	DLC Water Heaters	$70,254	$909,399	0.08
	DLC Pool Pumps	$3,606	$932,923	0.00
	Critical Peak Pricing (with Enabling Technologies)	$71,995,462	$4,229,589	17.02
	Critical Peak Pricing (without Enabling Technologies)	$22,495,433	$3,296,084	6.82

[40] Vectren South 2018 Electric DSM Operating Plan

	Peak Time Rebates	$7,465,909	$2,061,985	3.62
	Time of Use Rates	$827,243	$1,655,665	0.50
	DLC AC Thermostat (Utility Incentivized)	$2,808,364	$740,617	3.79
	DLC AC Thermostat (BYOT)	$2,808,364	$1,217,479	2.31
	DLC AC Switch	$7,448	$888,343	0.01
	DLC Water Heaters	$238	$887,382	0.00
Commercial	Critical Peak Pricing (with Enabling Technologies)	$36,360,268	$1,072,797	33.89
	Critical Peak Pricing (without Enabling Technologies)	$3,959,266	$804,905	4.92
	Real Time Pricing	$166,288	$627,540	0.26
	Peak Time Rebates	$327,957	$818,521	0.40
	Time of Use Rates	$960,336	$826,947	1.16

TABLE 7-7 RAP NPV BENEFITS, COSTS, AND UCT RATIOS FOR EACH DEMAND RESPONSE PROGRAM

	DLC AC Thermostat (Utility Incentivized)	$13,414,527	$1,347,251	9.96
	DLC AC Thermostat (BYOT)	$13,414,527	$5,676,540	2.36
	DLC AC Switch	$161,139	$1,085,281	0.15
	DLC Water Heaters	$24,158	$1,058,798	0.02
Residential	DLC Pool Pumps	$703	$1,101,271	0.00
	Critical Peak Pricing (with Enabling Technologies)	$23,447,290	$1,299,760	18.04
	Critical Peak Pricing (without Enabling Technologies)	$10,175,975	$1,383,206	7.36
	Peak Time Rebates	$11,651,211	$1,567,503	7.43
	Time of Use Rates	$5,036,926	$1,623,212	3.10
	DLC AC Thermostat (Utility Incentivized)	$1,332,037	$752,800	1.77
	DLC AC Thermostat (BYOT)	$1,332,037	$957,031	1.39
	DLC AC Switch	$305	$1,051,229	0.00
	DLC Water Heaters	$41	$1,051,193	0.00
Commercial	Critical Peak Pricing (with Enabling Technologies)	$13,997,560	$706,486	19.81
	Critical Peak Pricing (without Enabling Technologies)	$2,562,131	$697,914	3.67
	Real Time Pricing	$715,458	$745,708	0.96
	Peak Time Rebates	$437,224	$855,727	0.51
	Time of Use Rates	$725,868	$803,613	0.90

CVR POTENTIAL

Tables 7-8 and 7-9 show the respective incremental and cumulative annual CVR potential for the first six years of the study. Energy (MWh) and peak demand (kW) savings estimates are included in the tables.

TABLE 7-8. CVR INCREMENTAL ANNUAL POTENTIAL

	2020	2021	2022	2023	2024	2025
Projected MWh Savings	2,494	0	0	3,861	0	0
Projected kW Savings	449	0	0	695	0	0

TABLE 7-9. CVR CUMULATIVE ANNUAL POTENTIAL

	2020	2021	2022	2023	2024	2025
Projected MWh Savings	2,494	2,494	2,494	6,355	6,355	6,355
Projected kW Savings	449	449	449	1,144	1,144	1,144

Table 7-10 shows the annual budget requirements to run the CVR program with the East Side and Broadview substations. The capital cost of the East Side substation is $1,350,000, and initial equipment and software costs of the Broadview station is $1,550,000. The implementation costs for the East Side substation are $139,748 per year, and $163,225 for the Broadview substation (starting in 2023). Administrative costs are assumed to be $40,000 for the entire CVR program in 2020 and escalates by 1.5% per year thereafter.

TABLE 7-10. ANNUAL CVR BUDGET REQUIREMENTS

	CVR Budget
2020	$179,748
2021	$180,348
2022	$180,957
2023	$344,810
2024	$345,437
2025	$346,074

Table 3-9 shows the NPV benefits and costs associated with the CVR program across the 20-yr timeframe of the study. The UCT ratio is 1.38.

TABLE 7-11. NPV BENEFITS, COSTS, AND UCT RATIO FOR CVR PROGRAM

Program	NPV Benefits	NPV Costs	UCT Ratio
CVR	$4,687,972	$3,407,160	1.38

VOLUME II

[illegible] Integrated Electric Action Plan

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VECTREN
Live Smart

JANUARY 2019

1.1 VECTREN'S ACTION PLAN

The Market Potential Study serves as the basis for developing Vectren's Action Plan. The Action Plan is designed to extract the insights and data from the Market Potential Study and translate them into opportunities to deliver to customers. The Action Plan provides guidance to mobilize the results of the Market Potential Study research and design program initiatives that provide a pathway to advance efforts that are reasonable and relevant in developing Vectren's portfolio. The following section lays out the process, principles, and elements of Vectren's portfolio of programs. A summary of the results for the proposed portfolio is also provided.

1.2 GUIDING PLANNING PRINCIPLES IN DEVELOPING ACTION PLAN OFFERINGS

Vectren's Energy Efficiency Action Plan was developed in accordance with a number of guiding principles and considerations. The process was built on using the most recent Market Potential Study as the foundation, and was then designed to incorporate industry best standards, implementer experiences, and projected changes in the market (such as codes and standards) in order to translate the insights and knowledge from the Market Potential Study into actionable energy efficiency programs for Vectren's planning purposes and customers.

A review of the key planning guidelines and considerations used to frame the Action Plan follows:

TABLE 1-1 KEY PLANNING GUIDELINES IN DEVELOPING THE ACTION PLAN

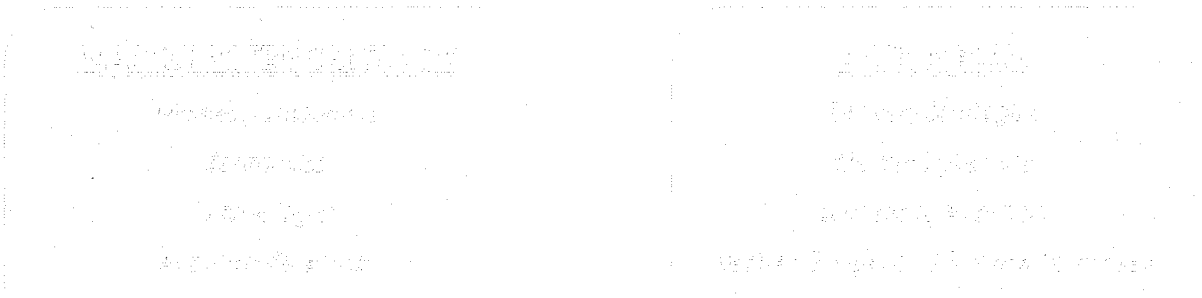
Market Coverage	Consideration was given to crafting a portfolio of programs that offers opportunities for savings across all of Vectren's customer groups. This includes residential (single, multifamily and income qualified) as well as commercial and industrial markets.
Direct Link to the Market Potential Study	The Action Plan is directly linked to the Market Potential Study by using its market and cost data. It is acknowledged that there are differences between market and achievable potential due to market dynamics (net versus gross impacts), timeframe differences, proxy versus specific program delivery approaches, and budget realities. Wherever possible, the Market Potential Study serves as a primary reference source making it easier for Vectren to return to the Market Potential Study for added insights as conditions in the market change.
Leveraging Current Program Efforts	Efforts were directed at leveraging existing Vectren offerings to take advantage of market and trade ally understanding, to utilize existing market relationships, retain the relevant elements of programs already working well, and to continue promotional efforts (where relevant).
Introduce New Measures and Concepts	The approach actively looked at incorporating new, applicable measures deemed cost effective and suitable for Vectren's portfolio. This included the introduction of selected new measures in the existing prescriptive-type programs.
Cost Effectiveness Analysis	For planning purposes, each of the recommended programs must pass the Utility Cost Test (UCT) and the Total Resource Cost (TRC) tests, except for Income-Qualified Programs which do not need to meet cost-effectiveness tests in order to promote a greater social good. The cost-effectiveness results are reported for the UCT and the TRC tests. Each program is assessed separately to determine relative benefits and costs (in contrast to assessing each individual measure).
Income-Qualified Programs	Because income-qualified programs are not required to be cost-effective, the Market Potential Study did not screen out measures for income qualified programs based on any cost-effectiveness tests. The team used alternate guidelines for determining which measures would be included in the program. The team chose a "quality over quantity" approach and provided more services to each individual customer than in previous program years. To ensure that income-qualified programs did not overwhelm other energy efficiency program priorities, the team ensured that the overall program budget did not vastly exceed previous program budgets.
C&I Custom Program	Because the C&I Custom program utilizes engineering estimates for each project, customers can submit a wide range of projects through the program. Typically, C&I customers submit large projects through the program to provide an economy of scale for the company taking the time to

	complete program paperwork. The Market Potential Study, however, includes all measures that C&I customers may submit through the program no matter the size of the project. Due to this project sizing difference, the Market Potential Study estimates significantly higher savings than the team believed was achievable through the program. The team adjusted C&I Custom program participation and savings based on feedback from implementers and historical program participation.
Adoption Forecasts	Forecasts of customer adoption were reviewed and applied from the Market Potential Study in combination with the historical participation from Vectren's programs. Information was also captured from actual VEDI program experience from evaluation reporting, reliance on "like-utility" estimates in offering similar programs and discussions with implementers.
Impact of Codes and Standards	The savings presented in the Action Plan considers upcoming changes to the baseline. The residential lighting program serves as a good example, where the baseline is changing in 2020 due to the Energy Independence Security Act (EISA). Since 2010, first CFLs and then LEDs have claimed significant shares of the U.S. light bulb market. As a result, the energy efficiency of the average new light bulb sold in the U.S. has increased significantly. That means the savings that energy efficiency programs can claim for helping to install an efficient LED has decreased. Starting in 2020, LED (or equivalent lights) become the standard alternative, directly impacting the amount of savings available for customers changing out their bulbs. The elimination of savings from LED lighting is included in the Vectren portfolio starting in 2021-2022. A similar situation is evident in looking at savings estimates from electrically commutated motors (ECM) as part of furnaces. The standards for ECM motors are scheduled to increase in July 2019, resulting in a loss of reportable energy savings starting in 2020 from the measure.
Program Costs and Budgets	A budget that characterizes the estimated costs for delivering programs to customers is presented for each program. The costs include all participant incentive, planning, evaluation and implementation costs forecast for each year of program operation.
Electric and Natural Gas Integration	As a combination utility, some of Vectren's programs offer savings addressing both electric and natural gas reductions. Programs such as new construction, behavioral savings, multifamily, and income-qualified weatherization all include electric and gas savings. These programs follow the need to split program costs across fuel types while the cost-effectiveness results include benefits of electric and gas reductions. This effort was directed at areas of the Vectren service territory which offer both fuel types to customers. The specific impacts of these programs are provided in the individual program write-ups.

1.3 VECTREN ENERGY EFFICIENCY ACTION PLAN BACKGROUND

The development of the Action Plan is designed to translate the insights and information from the broader Market Potential Study analysis into discrete and specific offerings for Vectren's customers. The Market Potential Study and the Action Plan are related and share common values, but the Action Plan provides more detail, specificity and mobilization strategies.

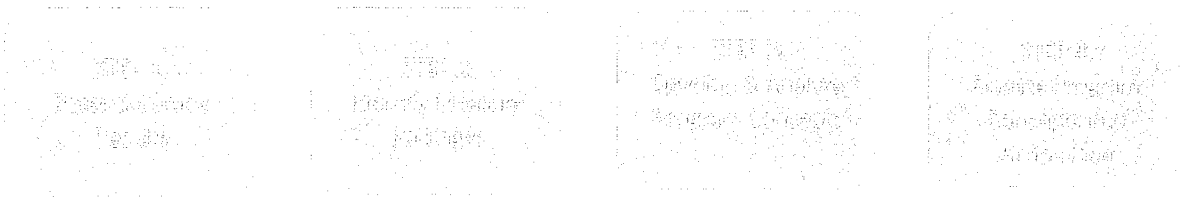
The Action Plan outlines recommended electric programs for 2020-2025, a shorter timeframe than the potential research. The Action Plan lays outs how to achieve the savings uncovered in the potential study research, shifting the broad and high-level forecast of savings opportunities in the Market Potential Study results into specific and actionable savings opportunities. An illustrative view between the Market Potential Study and the Action Plan elements follows:



VECTREN ENERGY EFFICIENCY ACTION PLAN FRAMEWORK

The effort to develop Vectren's energy efficiency programs, for their planning purposes, follows a grounded and sequential process. The process was built on applying the recent market potential analytics as a starting point and, from there, developing program offerings that cost-effectively meet Vectren's planning and program objectives. An illustrative review of the process follows.

Our approach was based on conducting a series of sequential activities that take the top measures from the potential analyses and develop more detailed and defined concepts to better reflect likely delivery strategies and actual experience. This included packaging measures into programs to analyze and forecast adoption, economic impacts, and savings estimates. This approach is consistent with similar energy efficiency potential efforts and is detailed in the Guide for Conducting Energy Efficiency Potential Studies, prepared by the National Action Plan for Energy Efficiency (2007). These activities are discussed in more detail below.



Step 1.

The starting point for developing the programs in the Vectren Action Plan was the recently-completed Market Potential Study. This study provided a current assessment of the energy efficiency opportunities available in Vectren service territory and was built on the utility's most recent sales information, market characterization, and forecast of adoption using a number of scenarios and data on measure penetration, costs, energy savings, and overall economics. A key input used for the Action Plan was the identification of the relative savings impacts and cost and benefits for a large array of possible measures that were considered for the Vectren portfolio.

The focus on identifying relevant measures for further consideration in the Vectren portfolio was based on looking at the forecast impacts from both the Total Resource Cost (TRC) and the Utility Cost Test (UCT). Measures which passed either test were reviewed and screened to determine their applicability, market rationale, and viability to be packaged into programs for subsequent examination. The project team, working with Vectren, coordinated multiple meetings with staff and implementers to assist in our understanding of current and proposed DSM initiatives, details of Indiana and Vectren-specific markets, and the suitability of efficiency measures given the utility's customer base. For example, there were a number of retail consumer-related products that passed the relevant screening—such as energy efficient laptops, printers, SMART televisions, and monitors—but are not typically handled through utility intervention. Instead they are part of national standards and market efforts. The result was a list of 413 measures, deemed to be the most reasonable and relevant for further consideration by Vectren.

Step 2.

Using the data and results of the MPS, relevant measures were bundled into packages to better reflect targeted end uses, typical trade ally involvement in customer transactions, and common delivery strategies. The combined packages of measures were designed to advance the analysis efforts and optimally spread delivery costs across a range of technologies. The packages were developed through discussions with Vectren staff, review of prior utility offerings and discussions with Vectren's implementors.

Step 3.

Measure packages were then combined into program concepts, designed to reflect program implementation. The concepts were developed through a series of interviews with Vectren's program implementers. These discussions

were designed to capture their insights and suggestions as what works best in Vectren's market based on their experiences. Discussions were also conducted with Vectren staff to get a sense of prior offerings, to better understand program delivery experiences. Finally, effort was also directed at incorporating practices and findings from other utility experiences in Indiana and in the region. The results of this step provided inputs to the Action Plan modeling including: energy savings, program costs, participation and incentives. These elements are all key inputs into modeling the stream of benefits and costs and determine cost effectiveness.

Step 4.

The final program concepts and relevant information were incorporated into Vectren's Action Plan document. The Action Plan provides the key information for required to implement desired programs.

A review of the key Action Plan data elements and sources follows:

TABLE 1-2 ACTION PLAN DATA ELEMENTS

Energy Savings	Each program contains savings estimates for kWh, kW, and therms developed from the Market Potential Study analysis. Additional sources for the savings estimates include: the Indiana TRM, prior evaluation results from VEDI, prior DSM filings, and discussions with relevant implementers.
Technology Costs	Technology cost was obtained from the Market Potential Study analysis. Additional sources included prior evaluation results from VEDI and prior DSM filings.
Estimated Useful Lifetime	Estimates of useful lifetime (EUL) were based on the Market Potential Study analytics and the Indiana Measure Library. For programs with multiple measures, the program EUL was calculated using a weighted average of the number of each measure implemented.
Incentive Strategy	The specific incentive strategy including type (rebate, loan, POS reduction, manufacturer payment), and amount was determined from discussions with Vectren. There is a good history from prior VEDI DSM efforts to detail incentive strategy and amounts to move the market. The cost economics from the Participant Test were also used to gauge impacts.
Annual Adoption	Forecasts of customer adoption from the Market Potential Study were reviewed and adjustments were applied based on historical participation in Vectren's programs, upcoming changes in codes and standards, actual performance reported in VEDI evaluation reporting, and "like-utility" estimates in offering similar programs.
NTG Impacts	NTG estimates from past evaluation studies were used for existing programs. Benchmarking against other Indiana utilities or "like utilities" was used for new initiatives. Discussions with implementers were also included.
Program Costs	Program budgets were developed using historical program cost data and past VEDI evaluations. Discussions with relevant implementation contractors also provided insight regarding typical utility management requirements and related costs.
Benefit-Cost Impacts	Each program concept also includes the impact of the relative costs and benefits for each initiative. The results include the forecast of benefit-costs from various perspectives: Participant test, Rate Impact test, Utility Cost test, and Total Resource Cost test.

The following section outlines the portfolio of programs developed by Vectren, EMI Consulting, and GDS (referred to hereafter as "the team"). The section begins with a high-level summary of the recommended programs and then provides detailed participation estimates for each year of the Action Plan.

2.1 RECOMMENDED VECTREN ENERGY EFFICIENCY PROGRAM PORTFOLIO

The following table presents the recommended Vectren proposed portfolio. A more detailed program-by-program write-up is also provided in Section 3 to define each program's overall design and incorporate relevant technology and market data to permit modeling of load impacts, budgets, and cost-effectiveness.

TABLE 2-1 SUMMARY OF DRAFT 2020-2025 ENERGY EFFICIENCY PROGRAMS

Residential Lighting	X			Bulb	
Residential Prescriptive	X	X		Equipment / Appliance / Service	X
Residential New Construction	X			Home	X
Income Qualified Weatherization	X			Home	X
Energy Efficient Schools	X			Kit	X
Residential Behavioral Savings	X	X		Home	X
Appliance Recycling	X	X		Refrigerator/ Freezer	
Home Energy Assessment	X			Home	X
Food Bank	X	X		Bulb	X
CVR Residential	X			NA	
Home Energy Management Systems		X	X	Home	X
Smart Cycle (DLC Change Out)	X			Thermostat	
Bring Your Own Thermostat	X			Thermostat	
Commercial Prescriptive	X	X		Equipment / Appliance / Service	X
Commercial Custom	X	X		Project	X
Small Business	X	X		Project	X
CVR C&I	X			NA	

SUMMARY OF ENERGY EFFICIENCY IMPACTS

An overall summary of results reflecting savings and costs is shown in Table 2-2 below. These results present an aggregation of all the programs, as well as the results by portfolio (Residential and Commercial/Industrial).

TABLE 2-2 VECTREN INDIANA ELECTRIC DSM 2020-2025 SAVINGS- ALL PROGRAMS

Year							
2020	345,916	47,451	10,758	3,731	5,342	1,207	10,279
2021	382,684	49,716	10,653	3,814	5,724	1,547	11,085
2022	216,286	44,565	10,262	3,787	5,714	1,251	10,752
2023	135,923	45,375	10,907	3,551	5,867	1,253	10,670
2024	137,955	43,309	10,405	3,565	6,063	1,570	11,198
2025	138,078	43,244	10,683	3,563	6,116	1,279	10,959
Total	**1,356,842**	**273,660**	**63,667**	**22,011**	**34,826**	**8,107**	**64,944**

TABLE 2-3 VECTREN INDIANA ELECTRIC DSM 2020-2025 SAVINGS- RESIDENTIAL

Year							
2020	302,908	22,880	5,784	1,321	3,860	582	5,763
2021	333,657	24,682	5,569	1,358	4,185	768	6,312
2022	162,737	18,353	4,926	1,316	4,118	515	5,949
2023	80,062	17,461	5,215	1,103	4,166	482	5,752
2024	81,637	16,186	4,879	1,166	4,297	587	6,050
2025	83,617	16,349	5,216	1,236	4,356	483	6,076
Total	**1,044,618**	**115,911**	**31,588**	**7,502**	**24,983**	**3,418**	**35,902**

TABLE 2-4 VECTREN INDIANA ELECTRIC DSM 2020-2025 SAVINGS- COMMERCIAL AND INDUSTRIAL

Year							
2020	43,008	24,571	4,975	2,410	1,482	625	4,516
2021	49,027	25,034	5,084	2,456	1,539	779	4,773
2022	53,549	26,212	5,336	2,471	1,596	736	4,803
2023	55,861	27,914	5,691	2,447	1,700	771	4,919
2024	56,318	27,124	5,526	2,399	1,766	983	5,148
2025	54,461	26,895	5,467	2,327	1,760	795	4,883
Total	**312,224**	**157,749**	**32,079**	**14,510**	**9,843**	**4,689**	**29,042**

PORTFOLIO TARGETS BY YEAR

The following tables present the portfolio participation, savings, and costs targets by each program year.

TABLE 2-5 2020 PORTFOLIO TARGETS

Residential							
Residential Lighting	239,866	8,088,914	905.24	$101,000	$186,419	$463,014	$750,433
Residential Prescriptive	7,966	2,465,148	691.22	$40,400	$347,608	$632,065	$1,020,073
Residential New Construction	86	188,624	121.46	$5,050	$50,000	$16,775	$71,825
Home Energy Assessment	300	519,393	55.48	$5,050	$240,000	-	$245,050
Income Qualified Weatherization	539	778,285	443.32	$20,200	$1,275,176	-	$1,295,376
Energy Efficient Schools	2,600	1,149,200	136.50	$20,200	$113,589	-	$133,789
Residential Behavioral Savings	49,000	7,049,208	1,574.28	$40,400	$323,803	-	$364,203
Appliance Recycling	1,251	1,179,811	171.20	$40,400	$143,657	$61,000	$245,057
CVR Residential	-	1,461,047	430	$30,300	$218,023	-	$248,323
Smart Cycle (DLC Change Out)	1,000	-	1,015.00	$20,200	$516,000	$96,000	$632,200
BYOT (Bring Your Own Thermostat)	300	-	240.00	$20,200	$22,280	$52,280	$94,760
Food Bank	-	-	-	-	-	-	-
Home Energy Management Systems	-	-	-	$10,100	$70,000	-	$80,100
Residential Subtotal	**302,908**	**22,879,629**	**5,783.70**	**$353,500**	**$3,506,555**	**$1,321,134**	**$5,181,189**
Commercial & Industrial (C&I)							
Commercial Prescriptive	42,431	14,490,335	3,807.71	$55,550	$622,327	$1,370,010	$2,047,886
Commercial Custom	196	6,107,234	740.00	$60,600	$344,162	$491,537	$896,299
Small Business	381	2,940,932	213.00	$5,050	$215,618	$548,167	$768,835
CVR Commercial	-	1,032,656	214	$30,300	$148,233	-	$178,533
Commercial & Industrial Subtotal	**43,008**	**24,571,158**	**4,974.71**	**$151,500**	**$1,330,340**	**$2,409,714**	**$3,891,554**
Indirect Costs							
Contact Center							$63,000
Online Audit							$42,911
Outreach							$410,000
Portfolio Costs Subtotal							**$515,911**
Subtotal (Before Evaluation)							**$9,588,653**
Evaluation							$490,728
DSM Portfolio Total							**$10,079,381**
Other Costs							
Emerging Markets							$200,000
Market Potential Study							-
Other Costs Subtotal							**$200,000**
DSM Portfolio Total including Other Costs							**$10,279,381**

Note: The team did not factor in the Energy Independence and Security Act (EISA) backstop provision until 2022. The team assumed that Vectren would continue to pilot the Home Energy Management Systems program through 2020.

TABLE 2-6 2021 PORTFOLIO TARGETS

	[illegible]	[illegible]	[illegible]	Admin	[illegible]	[illegible]	Total Budget
Residential							
Residential Lighting	262,832	8,704,288	875.28	$102,616	$189,402	$455,001	$747,018
Residential Prescriptive	8,276	2,618,629	661.70	$41,046	$353,169	$645,510	$1,039,726
Residential New Construction	77	168,932	108.81	$5,131	$57,249	$15,025	$77,405
Home Energy Assessment	350	605,959	64.72	$5,131	$258,000	-	$263,131
Income Qualified Weatherization	566	823,215	467.28	$20,523	$1,293,527	-	$1,314,050
Energy Efficient Schools	2,600	1,149,200	136.50	$20,523	$117,253	-	$137,776
Residential Behavioral Savings	49,000	7,049,208	1,574.28	$20,523	$328,984	-	$349,507
Appliance Recycling	1,344	1,285,473	172.83	$41,046	$159,415	$66,625	$267,086
CVR Residential	-	-	-	$30,785	$197,378	-	$228,163
Smart Cycle (DLC Change Out)	1,000	198,000	1,015	$20,523	$536,000	$116,000	$672,523
BYOT (Bring Your Own Thermostat)	300	-	240.00	$20,523	$30,280	$60,280	$111,083
Food Bank	6,312	1,564,332	172.21	$20,523	$92,517	-	$113,041
Home Energy Management Systems	1,000	515,000	80.00	$10,262	$212,900	-	$223,162
Residential Subtotal	**333,657**	**24,682,235**	**5,568.60**	**$359,156**	**$3,826,074**	**$1,358,441**	**$5,543,671**
Commercial & Industrial (C&I)							
Commercial Prescriptive	48,449	15,981,655	4,131.23	$56,439	$682,432	$1,424,756	$2,163,627
Commercial Custom	196	6,107,234	740.00	$61,570	$349,669	$491,537	$902,775
Small Business	382	2,944,615	213.00	$5,131	$219,172	$539,573	$763,876
CVR Commercial	-	-	-	$30,785	$133,547	-	$164,332
Commercial & Industrial Subtotal	**49,027**	**25,033,504**	**5,084.23**	**$153,924**	**$1,384,820**	**$2,455,867**	**$3,994,610**
Indirect Costs							
Contact Center							$64,008
Online Audit							$43,598
Outreach							$416,560
Portfolio Costs Subtotal							**$524,166**
Subtotal (Before Evaluation)							**$10,062,446**
Evaluation							$522,653
DSM Portfolio Total							**$10,585,099**
Other Costs							
Emerging Markets							$200,000
Market Potential Study							$300,000
Other Costs Subtotal							**$500,000**
DSM Portfolio Total including Other Costs							**$11,085,099**

Note: Participation and savings spike in 2021 due to: high Residential Prescriptive participation estimated by the Market Potential Study, the start of the Home Energy Management Systems program, the inclusion of the Food Bank program, and a final surge in participation in the Residential Lighting program estimated by the Market Potential Study.

TABLE 2-7 2022 PORTFOLIO TARGETS

Residential							
Residential Lighting	91,708	3,259,915	255.83	$104,258	$144,380	$346,846	$595,484
Residential Prescriptive	8,303	2,722,283	737.22	$41,703	$358,820	$680,160	$1,080,683
Residential New Construction	75	164,892	106.37	$5,213	$53,186	$14,675	$73,074
Home Energy Assessment	420	727,151	77.67	$5,213	$263,225	-	$268,438
Income Qualified Weatherization	594	869,076	492.09	$20,852	$1,312,171	-	$1,333,023
Energy Efficient Schools	2,600	670,800	93.60	$20,852	$92,229	-	$113,080
Residential Behavioral Savings	49,000	7,049,208	1,574.28	$20,852	$334,248	-	$355,099
Appliance Recycling	1,425	1,360,636	184.89	$41,703	$171,385	$70,500	$283,589
CVR Residential	-	-	-	$31,277	$190,034	-	$221,311
Smart Cycle (DLC Change Out)	1,000	198,000	1,015	$20,852	$556,000	$136,000	$712,852
BYOT (Bring Your Own Thermostat)	300	-	240.00	$20,852	$38,280	$68,280	$127,412
Food Bank	6,312	816,353	69.09	$20,852	$18,800	-	$39,651
Home Energy Management Systems	1,000	515,000	80.00	$10,426	$219,900	-	$230,326
Residential Subtotal	**162,737**	**18,353,314**	**4,926.04**	**$364,902**	**$3,752,658**	**$1,316,461**	**$5,434,021**
Commercial & Industrial (C&I)							
Commercial Prescriptive	52,971	17,154,963	4,383.05	$57,342	$733,558	$1,448,274	$2,239,173
Commercial Custom	196	6,107,234	740.00	$62,555	$355,263	$491,537	$909,355
Small Business	382	2,949,771	213.00	$5,213	$222,721	$530,824	$758,758
CVR Commercial	-	-	-	$31,277	$128,261	-	$159,538
Commercial & Industrial Subtotal	**53,549**	**26,211,968**	**5,336.05**	**$156,387**	**$1,439,803**	**$2,470,635**	**$4,066,825**
Indirect Costs							
Contact Center							$65,032
Online Audit							$44,295
Outreach							$423,225
Portfolio Costs Subtotal							**$532,552**
Subtotal (Before Evaluation)							**$10,033,398**
Evaluation							$518,856
DSM Portfolio Total							**$10,552,254**
Other Costs							
Emerging Markets							$200,000
Market Potential Study							-
Other Costs Subtotal							**$200,000**
DSM Portfolio Total including Other Costs							**$10,752,254**

Note: Savings and participation are down in 2022 as the team assumed that the EISA backstop provision would remove downstream standard screw-in lighting incentives from all programs except for direct installations.

TABLE 2-8 2023 PORTFOLIO TARGETS

	Participants	Energy Savings (kWh)	Demand Savings (kW)	Admin	Implementation	Incentives	Total Budget
Residential							
Residential Lighting	12,231	807,282	19.16	$105,926	$32,756	$78,689	$217,370
Residential Prescriptive	8,140	2,793,920	812.09	$42,370	$364,561	$707,135	$1,114,066
Residential New Construction	73	160,852	103.94	$5,296	$50,202	$14,325	$69,824
Home Energy Assessment	504	872,581	93.20	$5,296	$267,437	-	$272,733
Income-Qualified Weatherization	623	917,290	518.75	$21,185	$1,331,114	-	$1,352,299
Energy-Efficient Schools	2,600	670,800	93.60	$21,185	$98,274	-	$119,460
Residential Behavioral Savings	49,000	7,049,208	1,574.28	$21,185	$339,596	-	$360,781
Appliance Recycling	1,435	1,366,149	188.46	$42,370	$174,745	$70,750	$287,865
CVR Residential	-	1,461,047	430	$31,778	$270,252	-	$302,029
Smart Cycle (DLC Change Out)	1,000	198,000	1,015	$21,185	$576,000	$156,000	$753,185
BYOT (Bring Your Own Thermostat)	300	-	240.00	$21,185	$46,280	$76,280	$143,745
Food Bank	3,156	649,158	46.71	$21,185	$9,550	-	$30,735
Home Energy Management Systems	1,000	515,000	80.00	$10,593	$234,900	-	$245,493
Residential Subtotal	**80,062**	**17,461,286**	**5,215.19**	**$370,741**	**$3,795,666**	**$1,103,179**	**$5,269,586**
Commercial & Industrial (C&I)							
Commercial Prescriptive	55,283	17,821,076	4,524.43	$58,259	$769,435	$1,434,660	$2,262,354
Commercial Custom	196	6,107,234	740.00	$63,556	$360,948	$491,537	$916,040
Small Business	382	2,952,715	213.00	$5,296	$226,003	$521,287	$752,586
CVR Commercial		1,032,656	214	$31,778	$184,861	-	$216,639
Commercial & Industrial Subtotal	**55,861**	**27,913,681**	**5,691.43**	**$158,889**	**$1,541,248**	**$2,447,483**	**$4,147,620**
Indirect Costs							
Contact Center							$66,073
Online Audit							$45,004
Outreach							$429,997
Portfolio Costs Subtotal							**$541,073**
Subtotal (Before Evaluation)							**$9,958,279**
Evaluation							$512,192
DSM Portfolio Total							**$10,470,471**
Other Costs							
Emerging Markets							$200,000
Market Potential Study							-
Other Costs Subtotal							**$200,000**
DSM Portfolio Total including Other Costs							**$10,670,471**

Note: The team assumed that the EISA backstop provision would remove downstream specialty screw-in lighting incentives from all programs except for direct installations.

TABLE 2-9 2024 PORTFOLIO TARGETS

Residential							
Residential Lighting	14,089	977,297	19.66	$107,621	$38,416	$92,287	$238,324
Residential Prescriptive	7,892	2,860,501	889.35	$43,048	$370,394	$732,410	$1,145,582
Residential New Construction	71	156,812	101.51	$5,381	$48,144	$13,975	$67,500
Home Energy Assessment	504	840,768	89.03	$5,381	$271,716	-	$277,097
Income-Qualified Weatherization	653	967,302	546.35	$21,524	$1,350,360	-	$1,371,884
Energy-Efficient Schools	2,600	670,800	93.60	$21,524	$106,392	-	$127,916
Residential Behavioral Savings	49,000	7,049,208	1,574.28	$21,524	$345,029	-	$366,554
Appliance Recycling	1,372	1,300,910	183.54	$43,048	$168,946	$67,325	$279,320
CVR Residential	-	-	-	$32,286	$315,241	-	$347,528
Smart Cycle (DLC Change Out)	1,000	198,000	1,015	$21,524	$596,000	$176,000	$793,524
BYOT (Bring Your Own Thermostat)	300	-	240.00	$21,524	$54,280	$84,280	$160,084
Food Bank	3,156	649,158	46.71	$21,524	$9,703	-	$31,227
Home Energy Management Systems	1,000	515,000	80.00	$10,762	$245,940	-	$256,702
Residential Subtotal	**81,637**	**16,185,755**	**4,879.02**	**$376,673**	**$3,920,561**	**$1,166,277**	**$5,463,511**
Commercial & Industrial (C&I)							
Commercial Prescriptive	55,739	18,058,503	4,572.95	$59,191	$791,792	$1,394,674	$2,245,657
Commercial Custom	196	6,107,234	740.00	$64,572	$366,723	$491,537	$922,832
Small Business	383	2,957,870	213.00	$5,381	$229,663	$512,537	$747,582
CVR Commercial	-	-	-	$32,286	$216,561	-	$248,848
Commercial & Industrial Subtotal	**56,318**	**27,123,608**	**5,525.95**	**$161,431**	**$1,604,739**	**$2,398,748**	**$4,164,919**
Indirect Costs							
Contact Center							$67,130
Online Audit							$45,724
Outreach							$436,877
Portfolio Costs Subtotal							**$549,730**
Subtotal (Before Evaluation)							**$10,178,160**
Evaluation							$520,077
DSM Portfolio Total							**$10,698,237**
Other Costs							
Emerging Markets							$200,000
Market Potential Study							$300,000
Other Costs Subtotal							**$500,000**
DSM Portfolio Total including Other Costs							**$11,198,237**

Note: The team assumed that lighting direct installations would decrease from the previous year due to EISA.

TABLE 2-10 2025 PORTFOLIO TARGETS

Residential							
Residential Lighting	15,913	1,146,410	274.12	$109,343	$44,005	$105,714	$259,061
Residential Prescriptive	8,136	2,974,980	961.29	$43,737	$376,320	$767,435	$1,187,492
Residential New Construction	70	154,792	100.29	$5,467	$46,909	$13,800	$66,176
Home Energy Assessment	504	790,845	83.15	$5,467	$276,063	-	$281,530
Income-Qualified Weatherization	685	1,018,544	575.34	$21,869	$1,369,913	-	$1,391,782
Energy-Efficient Schools	2,600	670,800	93.60	$21,869	$117,023	-	$138,891
Residential Behavioral Savings	49,000	7,049,208	1,574.28	$21,869	$350,550	-	$372,418
Appliance Recycling	1,253	1,180,913	171.99	$43,737	$155,651	$61,050	$260,438
CVR Residential	-	-	-	$32,803	$282,073	-	$314,876
Smart Cycle (DLC Change Out)	1,000	198,000	1,015	$21,869	$616,000	$196,000	$833,869
BYOT (Bring Your Own Thermostat)	300	-	240.00	$21,869	$62,280	$92,280	$176,429
Food Bank	3,156	649,158	46.71	$21,869	$9,858	-	$31,727
Home Energy Management Systems	1,000	515,000	80.00	$10,934	$266,980	-	$277,914
Residential Subtotal	**83,617**	**16,348,650**	**5,215.76**	**$382,700**	**$3,973,626**	**$1,236,279**	**$5,592,604**
Commercial & Industrial (C&I)							
Commercial Prescriptive	53,882	17,825,085	4,513.77	$60,139	$797,128	$1,331,794	$2,189,060
Commercial Custom	196	6,107,234	740.00	$65,606	$372,590	$491,537	$929,733
Small Business	383	2,963,026	213.00	$5,467	$233,383	$503,787	$742,637
CVR Commercial	-	-	-	$32,803	$193,019	-	$225,821
Commercial & Industrial Subtotal	**54,461**	**26,895,345**	**5,466.77**	**$164,014**	**$1,596,120**	**$2,327,118**	**$4,087,252**
Indirect Costs							
Contact Center							$68,204
Online Audit							$46,456
Outreach							$443,867
Portfolio Costs Subtotal							**$558,526**
Subtotal (Before Evaluation)							**$10,238,382**
Evaluation							$520,203
DSM Portfolio Total							**$10,758,585**
Other Costs							
Emerging Markets							$200,000
Market Potential Study							-
Other Costs Subtotal							**$200,000**
DSM Portfolio Total including Other Costs							**$10,958,585**

Note: The team assumed that lighting direct installations would decrease from the previous year due to EISA.

This section provides an overview of each program, organized by the following topic areas: 1) Background, 2) Relationship to Vectren's Market Potential Study, 3) Methods and Associated Risks, and 4) Technology and Program Data.

RESIDENTIAL LIGHTING

The Residential Lighting Program remains an upstream program designed to reach Vectren customers through retail outlets. The program is aimed at encouraging Vectren customers to install more energy-efficient bulbs in their homes. The program consists of a buy-down strategy at the point of purchase, so it is seamless to the participant. Any customer of a participating retailer in Vectren South's electric territory is eligible for the program.

Vectren will oversee the program and work with a partner organization on delivery. The implementation contractor will verify the paperwork of the participating retail stores and spot check stores to assure that the program guidelines are being followed.

The measures will include a variety of ENERGY STAR-qualified lighting products currently available at retailers in Indiana including:

- Standard units
- Specialty units
- LED fixtures
- Exterior lighting controls

The team cross-referenced measures from the Market Potential Study with measures included in the Residential Lighting Program. As measures from the Residential Lighting Program also appear in other Vectren residential programs, the team also compared the rate of sales in other programs to the Residential Lighting Program. From this analysis, the team estimated that measures from the Residential Lighting Program have market potential well above Action Plan participation estimates.

The program, as designed, takes the Energy Independence and Security Act (EISA) policies into account. A backstop efficiency ruling is slated to take effect in 2020 and will shift the baseline efficiency of most screw-in LED bulbs from halogens to CFLs. Though there is speculation about the timeline and likelihood of this regulation taking effect, the team conservatively assumed the EISA backstop for standard LED bulbs would take effect in 2020 and the EISA backstop for specialty bulbs would take effect in 2021. The team also assumed that non-compliant products would still be sold for up to one year after the regulations take effect, as suggested by the Uniform Methods Project.[41] Therefore, the Residential Lighting Program will discontinue standard LED incentives beginning in 2022 and for specialty lighting products in 2023.

The following table provides summary of the Residential Lighting Program energy impacts and budget.

[41] https://www.nrel.gov/docs/fy18osti/70472.pdf

TABLE 3-1 RESIDENTIAL LIGHTING – IMPACTS AND BUDGET

	2019	2020	2021	2022	2023	2024
Number of Participants	239,866	262,832	91,708	12,231	14,089	15,913
Energy Savings (kWh)	8,088,914	8,704,288	3,259,915	807,282	977,297	1,146,410
Summer Peak Demand Savings (kW)	905	875	256	19	20	274
Total Program Budget	$750,433	$747,018	$595,484	$217,370	$238,324	$259,061
Per Participant Energy Savings (kWh)	34	33	36	66	69	72
Per Participant Demand Savings (kW)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
Per Participant Average Incentive	$2	$2	$4	$6	$7	$7
Weighted Average Measure Life	15	15	14	9	9	9
Incremental Technology Cost	$4	$4	$6	$26	$26	$26
Net-to-Gross Ratio	84%	79%	76%	84%	84%	84%

Note: Number of participants, energy savings, and demand savings estimates based primarily on Market Potential Study results. Program budget estimate based on current schedule of work and projected rising costs from Vectren Program Cost and Measure Data spreadsheet. Per unit savings estimates based on the Market Potential Study results. Per participant energy savings, per participant demand savings, and incremental technology cost weighted by participant. Weighted average measure life and net to gross ratio weighted by kWh.

RESIDENTIAL PRESCRIPTIVE

The Residential Prescriptive Program is designed to incent customers to purchase energy efficient equipment by covering part of the incremental cost. The program also offers home weatherization rebates to residential customers for attic and wall insulation. If a product vendor or contractor chooses to do so, they can present rebates as an "instant discount" to Vectren's residential customers on their invoice. Vectren will oversee the program and work with an implementation partner on delivery.

Any residential customer located in the Vectren South electric service territory is eligible to participate in the program. For the equipment rebates, the applicant must reside in a single-family home or multi-family complex with up to 12 units. Only single-family homes are eligible for insulation measures.

Measures included in the program will change over time as baselines change, new technologies become available, and customer needs are identified. Measures include:

- ASHP Tune Ups
- Air Purifiers
- Air Source Heat Pumps
- Attic Insulation
- Central Air Conditioners
- Duct Sealing
- Ductless Heat Pumps
- Duel Fuel Air Source Heat Pumps
- ENERGY STAR Electric Clothes Washers (new in 2020)
- ENEGY STAR Dehumidifiers, Electric Clothes Dryers and Room Air Conditioners (new in 2020)
- Heat Pump Water Heaters

- Nest On-Line Store Thermostats
- Wi-Fi Thermostats
- Smart/CEE Tier3 Clothes Washers (new in 2020)
- Smart Programmable Thermostats
- Variable Speed Pool Pumps
- Wall Insulation
- Air Conditioning Tune Ups

The team cross-referenced measures from the Market Potential Study with measures included in the existing Residential Prescriptive Program. As measures from the Residential Prescriptive Program also appear in other Vectren residential programs, the team also compared the rate of sales in other programs to the Residential Prescriptive Program. From this analysis, the team found that several Residential Prescriptive Program measures had already reached the full RAP estimated in the Market Potential Study (such as attic insulation), and the team capped future participation at the rates estimated by the potential study.

A major change to the electric Residential Prescriptive program is the removal of the ECM HVAC motor and pool heaters measure due to changes in standards, low NTG, and low benefit-cost testing.

There are many measures are new to the program, including: dehumidifiers, clothes washers, clothes dryers, room air conditioners, water heaters, and tankless water heaters. The team provided escalating estimates for participation for these measures over the duration of the Action Plan.

The following table provides summary of the Residential Prescriptive Program energy impacts and budget.

TABLE 3-2 RESIDENTIAL PRESCRIPTIVE – IMPACTS AND BUDGET (ELECTRIC)

Number of Participants	7,966	8,276	8,303	8,140	7,892	8,136
Energy Savings kWh	2,465,148	2,618,629	2,722,283	2,793,920	2,860,501	2,974,980
Peak Demand kW	691	662	737	812	889	961
Total Program Budget	$1,020,073	$1,039,726	$1,080,683	$1,114,066	$1,145,852	$1,187,492
Per Participant Energy Savings (kWh)	309	316	328	343	362	366
Per Participant Demand Savings (kW)	0.09	0.08	0.09	0.10	0.11	0.12
Per Participant Average Incentive	$79	$78	$82	$87	$93	$94
Weighted Average Measure Life	13	13	14	14	14	14
Incremental Technology Cost	$148	$146	$160	$174	$191	$199
Net-to-Gross Ratio	50%	51%	51%	52%	53%	53%

Note: Number of participants, energy savings, and demand savings estimates based primarily on Market Potential Study results. Program budget estimate based on current schedule of work and projected rising costs from Vectren Program Cost and Measure Data spreadsheet. Per unit savings estimates based on the Market Potential Study results. Per participant energy savings, per participant demand savings, and incremental technology cost weighted by participant. Weighted average measure life and net to gross ratio weighted by kWh.

RESIDENTIAL NEW CONSTRUCTION

The Residential New Construction (RNC) program will produce long-term electric and gas savings by encouraging the construction of single-family homes, duplexes, or end-unit townhomes with only one shared wall that are inspected and evaluated through the Home Efficiency Rating System (HERS). Two incentive levels have been defined by the HERS Index score the house achieves. As of 2018, Gold Star homes must achieve a HERS rating of 61 to 63. Platinum Star homes must meet a HERS rating of 60 or less.

Any customer or home builder constructing a home and meeting the program specifications in the Vectren South electric service territory is eligible to participate in the program. Program incentives are designed to be paid to both all-electric and combination homes that have natural gas heating and water heating. It is important to note that the program is structured such that an incentive will not be paid for an all-electric home that has natural gas available to the home site. Incentives can be paid to either the home builder or the customer/account holder. Incentives are based on the rating tier qualification. As part of the Quality Assurance/Quality Control process, the HERS Assessment is completed by a certified third party HERS Rater. As part of the Quality Assurance/Quality Control process, the vendor provided 100% paper verification that the equipment/products purchased meet the program efficiency standards.

The Market Potential Study indicated that the market for the Residential New Construction Program is shrinking in Vectren South and is expanding in Vectren North. The team used previous program participation to calibrate rates from the Market Potential Study.

The housing market is sensitive to market conditions and unforeseen economic circumstances may impact this program in the future.

The following table provides summary of the Residential New Construction Program energy impacts and budget.

TABLE 3-3 RESIDENTIAL NEW CONSTRUCTION – IMPACTS AND BUDGET

Number of Homes	86	77	75	73	71	70
Energy Savings kWh	188,624	168,932	164,892	160,852	156,812	154,792
Peak Demand kW	121	109	106	104	102	100
Total Program Budget	$71,825	$77,405	$73,074	$69,824	$67,500	$66,176
Per Participant Energy Savings (kWh)	2,193	2,194	2,199	2,203	2,209	2,211
Per Participant Demand Savings (kW)	1.41	1.41	1.42	1.42	1.43	1.43
Per Participant Average Incentive	$195	$195	$196	$196	$197	$197
Weighted Average Measure Life	25	25	25	25	25	25
Incremental Technology Cost	$2,352	$2,353	$2,361	$2,370	$2,379	$2,384
Net-to-Gross Ratio	50%	50%	50%	50%	50%	50%

Note: Participant and energy savings estimates based primarily on Market Potential Study results. Program budget estimate based on current schedule of work and projected rising costs from Vectren Program Cost and Measure Data spreadsheet. Per

unit savings estimates based on the Market Potential Study results. Per participant energy savings, per participant demand savings, and incremental technology cost weighted by participant. Weighted average measure life and net to gross ratio weighted by kWh.

HOME ENERGY ASSESSMENT

The Home Energy Assessment (HEA) Program is offered jointly by Vectren South Gas and Electric. This program provides customers with an on-site energy assessment, providing direct installation of energy-efficient measures including high efficiency water fixtures, LED bulbs and smart thermostats. Assessors will perform a walk-through assessment of the home, collecting data for use in identifying cost-effective energy-efficient improvements and appropriate direct install measures. Assessors will then provide an audit report to the customer while assessors are onsite to outline other retrofit opportunities within the home.

Vectren South residential customers with electric service at a single-family residence, provided the home was not built within the past five years and has not had an audit within the last three years, are eligible to participate in the program. Additionally, the home should either be owner-occupied or, if renter-occupied, where occupants have the electric service in their name.

The direct install measures available for installation at no cost include:

- Audit & Education
- Kitchen & Bathroom Aerators
- Filter Whistle
- LED bulbs
- High efficiency Showerhead
- Pipe Wrap
- Water Heater Temperature Setback
- Smart Thermostat

The team cross-referenced measures from the Market Potential Study with measures included in the Home Energy Assessment Program. As measures from the Home Energy Assessment program also appear in other Vectren residential programs, the team also compared the rate of sales in other programs to the Home Energy Assessment Program. From this analysis, the team estimated that measures from the Home Energy Assessment Program have market potential well above Action Plan participation estimates.

The impact of the EISA backstop was considered in the inclusion of LED bulbs in the Home Energy Assessment program and affects the program beginning in 2024. Because of the direct install nature of the program, it was assumed that inefficient lighting will continue to be present in customer homes throughout the timeframe of the Action Plan. Thus, inefficient lighting found in customer homes would be eligible for replacement, though fewer inefficient bulbs would be found in customer homes after 2023.

The following table provides summary of the Home Energy Assessment Program energy impacts and budget.

TABLE 3-4 HOME ENERGY ASSESSMENT – IMPACTS AND BUDGET

Number of Participants	300	350	420	504	504	504
Energy Savings kWh	519,393	605,959	727,151	872,581	840,768	790,845
Peak Demand kW	55	65	78	93	89	83
Total Program Budget	$245,050	$263,131	$268,438	$272,733	$277,097	$281,530
Per Participant Energy Savings (kWh)	1,731	1,731	1,731	1,731	1,668	1,569
Per Participant Demand Savings (kW)	0.18	0.18	0.18	0.18	0.18	0.16
Weighted Average Measure Life	13	13	13	13	13	13
Net-to-Gross Ratio	101%	101%	101%	101%	101%	101%

Note: Number of participants estimated based on interview with the current program implementer, JE Shekell. Per unit savings estimated based on 2018 Operating Plan. Program costs estimated based on current SOW and projected rising costs described by JE Shekell. Kwh and kw savings estimated by dividing total savings by total participants. Incremental technology cost estimated by summing the incremental cost of each piece of equipment and divided by number of participants. Weighted average measure life and net to gross ratio weighted by kWh.

3.5 INCOME-QUALIFIED WEATHERIZATION

The Income-Qualified Weatherization Program (IQW) is designed to provide direct install measures and weatherization upgrades to low-income homes that otherwise would not have been able to afford the energy saving measures. The program provides direct installation of energy-saving measures and educates consumers on ways to reduce energy consumption. Eligible customers will have opportunity to receive deeper retrofit measures including refrigerators, attic insulation, duct sealing, and air infiltration reduction. Vectren will oversee the program and partner with an implementation contractor to deliver the program. A list of high consumption customers who have received Energy Assistance Program (EAP) funds within the past 12 months will be used to help prioritize those customers. In addition to utilizing the EAP List, implementers will utilize census data to target low-income areas within Vectren territory.In future years, the IQW program will shift focus to providing a more quality and in-depth approach. The focus will be to provide deeper retrofit measures where needed to fewer participants, thus reaping greater savings and benefits to the customer.

Collaboration and coordination between gas and electric low-income programs along with state and federal funding is recommended to provide the greatest efficiencies among all programs. The challenge of meeting the goals set for this program have centered on health and safety as well as customer cancellations and scheduling. Vectren is committed to finding innovative solutions to these areas. A health and safety (H&S) budget has been established and we continue to work on improving methods of customer engagement with various confirmations via phone and email reminders prior to the appointment. Vectren will look for ways to do more of a qualitative approach within this program to ensure the maximum savings is reached and H&S issues are addressed appropriately.

Measures available for installation will vary based on the home and include:

- LED bulbs/lamps (interior/exterior)
- High Efficiency Showerheads (Standard or Handheld)
- High efficiency faucet aerators
- Filter whistles
- Infiltration reduction
- Attic insulation

- Duct repair, seal and insulation
- Refrigerator replacement
- Smart thermostats
- Water Heater Temperature Setback

The team cross-referenced measures from the Market Potential Study with measures included in IQW. As measures from IQW also appear in other Vectren residential programs, the team also compared the rate of sales in other programs to IQW. From this analysis, the team estimated that measures from IQW have market potential well above Action Plan participation estimates.

Measures for the Income-Qualified Weatherization Program do not need to be cost-effective at the program level and therefore the Market Potential Study did not screen measures based on a cost-effectiveness test. The team chose measures that they felt would provide the most value to customers. The team chose a "quality over quantity" approach and provided more services to each individual customer than in previous program years. To ensure that the program did not overwhelm other energy efficiency program priorities, the team ensured that the overall program budget did not vastly exceed previous program budgets. The team dropped smart power strips from the program as they had a very low cost-effectiveness score and seemed to provide less value than other measures.

The impact of the EISA backstop was considered in the inclusion of income-qualified LED bulbs in the program beginning in 2024. It was assumed that inefficient lighting will continue to be present in customer homes throughout the timeframe of the Action Plan. Thus, inefficient lighting found in customer homes would be eligible for replacement, though fewer inefficient bulbs would be found in customer homes after 2023.

The following table provides summary of IQW energy impacts and budget.

TABLE 3-5 INCOME-QUALIFIED WEATHERIZATION – IMPACTS AND BUDGET

Number of Participants	539	566	594	623	653	685
Energy Savings kWh	778,285	823,215	869,076	917,290	967,302	1,018,544
Peak Demand kW	443	467	492	519	546	575
Total Program Budget	$1,295,376	$1,314,050	$1,333,023	$1,352,299	$1,371,884	$1,391,782
Per Participant Energy Savings (kWh)	1,444	1,454	1,463	1,472	1,481	1,487
Per Participant Demand Savings (kW)	0.82	0.83	0.83	0.83	0.84	0.84
Weighted Average Measure Life	16	16	16	16	16	16
Incremental Technology Cost	$809	$822	$833	$850	$867	$880
Net-to-Gross Ratio	100%	100%	100%	100%	100%	100%

Note: Energy savings, and demand savings estimates primarily based on the Market Potential Study results and 2018 Operating Plan estimates and projected rising costs from 2018-20 filed Energy Efficiency Plan and Vectren Program Cost and Measure Data spreadsheet. Number of participants based on historical program participation. Per participant energy and demand savings calculated by dividing total savings by participation. Weighted average measure life and net to gross weighted by kWh. Incremental cost calculated by summing the incremental cost of each piece of equipment and divided by number of participants.

ENERGY-EFFICIENT SCHOOLS

Description

The Energy-Efficient Schools Program is designed to produce cost-effective electric and gas savings by educating students and their families about conservation and the efficient use of electricity. The program consists of a school education program for fifth grade students attending schools served by Vectren South. To help in this effort, each child that participates will receive a take-home energy kit with various energy-saving measures for their parents to install in the home. The kits, along with the in-school teaching materials, are designed to make a lasting impression on the students and help them learn ways to conserve energy. Selected fifth grade students/schools in the Vectren South electric service territory are eligible for the program.

The kits for students will include:

- High efficiency showerheads
- High efficiency kitchen aerators
- High efficiency bathroom aerators
- LED bulbs
- LED nightlights
- Filter whistles

Participation Estimates and Market Potential Study

Though the Market Potential Study estimated savings, only customers with enrolled fifth grade students will participate in the program. As such, the Market Potential Study did not serve as a useful estimate for future Energy-Efficient Schools Program participation. The team relied on previous participation and discussions with the implementer to arrive at useful estimates.

Program Assumptions

The team assumed that previous participation is a good indicator of future participation and, in consultation with the implementer, assumed that the program had a little room to grow from the 2018-2020 filed Energy Efficiency plan. The Energy-Efficient Schools Program will discontinue standard LED incentives beginning in 2022 to account for the EISA backstop.

Summary of Energy Impacts and Budget

The following table provides summary of the Energy-Efficient Schools Program energy impacts and budget.

TABLE 3-6 ENERGY-EFFICIENT SCHOOLS – IMPACTS AND BUDGET

	2019	2020	2021	2022	2023	2024
Number of Participants	2,600	2,600	2,600	2,600	2,600	2,600
Energy Savings kWh	1,149,200	1,149,200	670,800	670,800	670,800	670,800
Peak Demand kW	137	137	94	94	94	94
Total Program Budget	$133,789	$137,776	$113,080	$119,460	$127,916	$138,891
Per Participant Demand Savings (kWh)	442	442	258	258	258	258
Per Participant Demand Savings (kW)	0.05	0.05	0.04	0.04	0.04	0.04
Weighted Average Measure Life	12	12	10	10	10	10

Net-to-Gross Ratio	100%	100%	100%	100%	100%	100%

Note: Number of participants, energy savings, and demand savings estimates primarily based on the 2018-20 filed Energy Efficiency Plan. and the 2018 Operating Plan. Program costs primarily based on current SOW and projected rising costs from 2018-20 filed Energy Efficiency Plan and Vectren Program Cost and Measure Data spreadsheet. Per participant energy savings and demand savings calculated by dividing total savings by total participation. Weighted measure life and net to gross ratio are weighted by kWh.

RESIDENTIAL BEHAVIOR SAVINGS

The Residential Behavioral Savings Program (RBS) motivates behavior change and provides relevant, targeted information to the consumer through regularly scheduled, direct contact via mailed and emailed home energy reports. The measures for this program consist of a Home Energy Report and web portal, which anonymously compares customers' energy use with that of other customers with similar-sized home and demographics, usage history comparisons, goal setting tools, and progress trackers. Customers can view the past twelve months of their energy usage and compare and contrast their energy consumption and costs with others in the same neighborhood. The logic for the program is that once a consumer understands better how they use energy, they can then start conserving energy. Residential customers who receive electric service from Vectren South are eligible for this integrated natural gas and electric EE program.

The program will be delivered by an implementation vendor and include energy reports and a web portal. Customers typically receive between 4-6 reports annually. Additionally, customers receive monthly emails. These reports provide updates on energy consumption patterns compared to similar homes and provide energy savings strategies to reduce energy use. These reports can also promote other Vectren programs to interested customers. The web portal is an interactive system for customers to perform a self-audit, monitor energy usage over time, access energy saving tips, and be connected to other Vectren South gas and electric programs. A third-party evaluator will complete the evaluation of this program.

In 2021, Vectren plans on introducing a new targeted income cohort of participants into the program. Vectren will work with the implementation contractor and the third-party evaluator to determine a participant and non-participant group for this new cohort.

The team assumed that restrictions stipulated within the current RBS implementation contract would continue through the timeframe of the Action Plan. As specified by the contract, Vectren can increase the number of treatment customers to the original contracted amount (49,000). The team ensured that this 49,000-participant estimate was below the estimate provided by the Market Potential Study.

The team assumed that past program performance is a reasonable indicator of future performance. As the third-party evaluator estimates savings for RBS using a billing analysis, the savings resulting from the program may shift from year to year, depending on the behavior of the program participants in any given year. The program also faces the risk of customers losing interest in the program and no longer attempting to curb their energy usage.

The following table provides summary of RBS energy impacts and budget.

TABLE 3-7 RESIDENTIAL BEHAVIOR SAVINGS – IMPACTS AND BUDGET

Number of Participants	49,000	49,000	49,000	49,000	49,000	49,000
Energy Savings kWh	7,049,208	7,049,208	7,049,208	7,049,208	7,049,208	7,049,208
Peak Demand kW	1,574	1,574	1,574	1,574	1,574	1,574
Total Program Budget	$364,203	$349,507	$355,099	$360,781	$366,554	$372,418
Per Participant Energy Savings (kWh)	144	144	144	144	144	144
Per Participant Demand Savings (kW)	0.03	0.03	0.03	0.03	0.03	0.03
Weighted Average Measure Life	1	1	1	1	1	1
Net-to-Gross Ratio	100%	100%	100%	100%	100%	100%

Note: Number of participants, energy savings, and demand savings estimates primarily based on the 2018-20 filed Energy Efficiency Plan. and the 2018 Operating Plan. Program costs primarily based on current SOW and projected rising costs from 2018-20 filed Energy Efficiency Plan and Vectren Program Cost and Measure Data spreadsheet. Per participant energy savings and demand savings calculated by dividing total savings by total participation. Weighted measure life and net to gross ratio are weighted by kWh.

APPLIANCE RECYCLING

The Residential Appliance Recycling Program encourages customers to recycle their old inefficient refrigerators, freezers, and air conditioners in an environmentally safe manner. The program recycles these appliances so that they no longer use electricity and it keeps 95% of the appliance out of landfills.

Any residential customer with an operable secondary refrigerator, freezer, or air conditioner unit receiving electric service from Vectren South is eligible to participate in the program.

Vectren works directly with an implementer to administer this program. Recycled units are logged and tracked to assure proper handling and disposal. The utility monitors the activity for disposal. Customer satisfaction surveys are also used to understand the customer experience with the program.

Measures include:

- Refrigerator recycling
- Freezer recycling
- Room air conditioner recycling (new in 2020)

The team cross-referenced measures from the Market Potential Study with measures included in the Appliance Recycling Program. From this analysis, the team estimated that measures from the Appliance Recycling Program have market potential well above Action Plan participation estimates.

After reviewing the results of the Market Potential Study and conducting an interview with the current program implementer, the team decided to add room air conditioner recycling to the program. Based on the Market Potential Study, the team also projected growth in the Appliance Recycling Program in the region over the span of the Action Plan.

The following table provides summary of the Appliance Recycling Program energy impacts and budget.

TABLE 3-8 APPLIANCE RECYCLING – IMPACTS AND BUDGET

Number of Participants	1,251	1,344	1,425	1,435	1,372	1,253
Energy Savings kWh	1,179,811	1,285,473	1,360,636	1,366,149	1,300,910	1,180,913
Peak Demand kW	171	173	185	188	184	172
Total Program Budget	$245,057	$267,086	$283,589	$287,865	$279,320	$260,438
Per Participant Energy Savings (kWh)	943	956	955	952	948	942
Per Participant Demand Savings (kW)	0.14	0.13	0.13	0.13	0.13	0.14
Per Participant Average Incentive	$49	$50	$49	$49	$49	$49
Weighted Average Measure Life	8	8	8	8	8	8
Net-to-Gross Ratio	71%	71%	71%	71%	71%	71%

Note: Number of participants, energy savings, and demand savings estimated primarily based on the Market Potential Study and 2018 Operating Plan. Program costs estimated using the Market Potential Study, the current SOW, and projected rising costs from 2018-20 filed Energy Efficiency Plan and Program Cost and Participant Data spreadsheet. Per unit savings estimated based on 2018 Operating Plan. weighted average measure life and net to gross ratio weighted by kWh. Per participant incentive and incremental technology cost weighted by participant.

FOOD BANK

The Food Bank Program provides LED bulbs and high efficiency showerheads to food pantries in Vectren South's electric service territory. This program targets hard-to-reach, low-income customers in the Vectren South electric territory. All food pantry recipients must provide proof of income qualification to receive the food baskets.

Each participating food pantry will place a bundle of four LED bulbs and a single high efficiency showerhead in food packages. The program implementer purchases equipment from a manufacturer and the equipment is shipped in bulk to the partner food bank. Food banks then distribute the equipment to the respective food pantries in its network. Pantries include equipment when assembling food packages and equipment is provided to food recipients. Any customer visiting a food pantry in Vectren South's electric territory is eligible to participate in the program.

Measures include:

- LED bulbs
- High efficiency showerheads (new in 2021)

Though the Market Potential Study estimated savings resulting from income-qualified measures, only a small portion of income-qualified customers will become food pantry recipients. As such, the Market Potential Study did not serve as a useful estimate for future Food Bank Program participation.

Vectren expressed interest in continuing a Food Bank program after the EISA backstop was implemented. The team examined possible new measures and determined that showerheads could provide significant energy savings for food pantry recipients. The team used savings values from other income-qualified programs as a proxy for savings from the Food Bank Program.

The following table provides summary of the Food Bank Program energy impacts and budget.

TABLE 3-9 FOOD BANK – IMPACTS AND BUDGET

Number of Participants	-	6,312	6,312	3,156	3,156	3,156
Energy Savings kWh	-	1,564,332	816,353	649,158	649,158	649,158
Peak Demand kW	-	172	69	47	47	47
Total Program Budget	-	$113,041	$39,651	$30,735	$31,227	$31,727
Per Participant Energy Savings (kWh)	-	248	129	206	206	206
Per Participant Demand Savings (kW)	-	0.03	0.01	0.01	0.01	0.01
Weighted Average Measure Life	-	11	11	7	5	5
Net-to-Gross Ratio	-	100%	100%	100%	100%	100%

Note: Number of participants, energy savings, and demand savings estimated based on 2018 Operating Plan. Program costs estimated based on current SOW, projected rising costs from 2018-20 filed Energy Efficiency Plan, and Vectren Program Cost and Measure Data spreadsheet. Per unit energy savings and per unit demand savings calculated by dividing total savings by the total number of participants. Weighted average measure life and net to gross ratio weighted by kWh. Incremental technology cost calculated by summing the incremental cost of each piece of equipment and dividing by the total number of participants.

HOME ENERGY MANAGEMENT SYSTEMS

The Home Energy Management Systems (HEMS) program is a behavioral program that provides real time energy usage data to encourage customers to take action to reduce energy consumption. The objectives of this program include:

- Motivate customers to save energy by increasing customer awareness and engagement around energy consumption and their utility bill
- Increase customer knowledge of and participation in Company programs including, but not limited to, energy efficiency programs and advanced data analytics
- Deliver energy and demand savings

The HEMS program will be piloted using advanced metering infrastructure (AMI) data to communicate energy usage to customers. The platform will utilize a smart phone application to communicate with customers about their home energy usage and provide suggestions for ways customers can save energy. To enhance customer engagement, participants in the program will receive a smart thermostat at no cost, if they do not currently have one installed in their home. Pending EM&V Report results, the program will potentially be rolled out to additional participants.

Given a successful pilot and positive EM&V Report results of the HEMS program, Vectren plans to scale the program to include additional features. The additional features would allow customers to install a device that provides real-time home energy usage data.

All Vectren South electric customers are eligible to participate in this program.

The Market Potential Study provided estimates on various smart home technologies including home energy management systems. The program model is very specific and initially only relies on a phone application, the energy management systems estimate in the Market Potential Study may not accurately reflect the total market size available to the Home Energy Management Systems Program.

The team relied on savings estimates from the implementation contractor. The team compared estimates provided by the implementation contractor to the estimated savings presented in the Market Potential Study and found that the implementation contractor estimates were well within the bounds of the Market Potential Study estimates.

The team utilized savings estimates provided by a HEMS vendor as well as publicly available evaluation documents of home energy management systems. The vendor indicated that they had evaluation-verified savings estimates, although the evaluation results were not currently public. The team acknowledges that savings estimates provided by the implementing contractor are susceptible to bias and, thus, chose a conservative estimate to provide counterbalance.

The following table provides summary of the Home Energy Management Systems Program energy impacts and budget.

TABLE 3-10 HOME ENERGY MANAGEMENT SYSTEMS – IMPACTS AND BUDGET

Number of Participants	-	1,000	1,000	1,000	1,000	1,000
Energy Savings kWh	-	515,000	515,000	515,000	515,000	515,000
Peak Demand kW	-	80	80	80	80	80
Total Program Budget	$80,100	$223,162	$230,326	$245,493	$256,702	$277,914
Per Participant Energy Savings (kWh)	-	515	515	515	515	515
Per Participant Demand Savings (kW)	-	0.08	0.08	0.08	0.08	0.08
Weighted Average Measure Life	-	6	6	6	6	6
Net-to-Gross Ratio	-	100%	100%	100%	100%	100%

Note: Number of participants, energy savings, demand savings, and program costs estimated based on interviews with the implementer. The team assumed the same weighted average measure life as the current behavioral program. The net to gross ratio is weighted by kWh.

The following table provides summary of the cumulative participants in the Home Energy Management Systems Program over the course of the Action Plan.

TABLE 3-10 HOME ENERGY MANAGEMENT SYSTEMS – PARTICIPANTS AND CUMULATIVE PARTICIPANTS

Number of Participants	-	1,000	1,000	1,000	1,000	1,000
Cumulative Number of Participants	-	1,000	2,000	3,000	4,000	5,000

BRING YOUR OWN THERMOSTAT

The Bring Your Own Thermostat Program (BYOT) is a further expansion of the Residential Smart/Wi-Fi thermostat initiative approved in 2016. BYOT allows customers who have or will purchase their own thermostat from multiple potential vendors to participate in demand response (DR) and other load curtailing programs managed through the utility. The program allows the utility to avoid the costs of hardware, installation, and maintenance associated with traditional load control methods.

By taking advantage of two-way communicating smart Wi-Fi thermostats, BYOT programs can help utilities reduce acquisition costs for load curtailment programs and improve customer satisfaction. Through the use of smart/Wi-Fi enabled thermostats, the utility can remotely verify how many customers are connected to the network at any given time and determine which thermostats are participating in DR events.

Any residential customer who receives electric service from Vectren South at a single-family residence is eligible to participate in the program. Customers will receive a one-time enrollment incentive of $75 and a bill credit of $5 during the months of June through September. The enrollment incentive, the amount which was determined based on research of other utility BYOT programs, will be provided in the first year to new enrollees only.

The Market Potential Study indicated that there is substantial room in the market for this program.

SMART CYCLE

Since 1992, Vectren South has operated a Direct Load Control (DLC) program called Summer Cycler that reduces residential and small commercial air-conditioning and water heating electricity loads during summer peak hours.

The Smart Cycle program will replace traditional DLC switches with smart thermostats over time, as the benefits associated with smart thermostats far outweigh the benefits associated with DLC switches. Smart thermostats provide an alternative to traditional residential load control switches as well as enhance the way customers manage and understand their home energy use. By installing connected devices in customer homes rather than using one-way signal switches, Vectren will be able to provide its customer base with deeper energy savings opportunities and shift future energy focus to customer engagement rather than traditional program goals and rules. The most recent Vectren electric DSM evaluation has demonstrated that smart thermostats outperform standard programmable thermostats and are a practical option to transition into future customer engagement strategies.

Customers in the Vectren South territory who currently participate in the DLC Summer Cycler Program and have access to Wi-Fi are eligible for the program. Customers receive a professionally-installed Wi-Fi thermostat at no additional cost and a monthly bill credit of $5 during the months of June through September. The current monthly credit for Summer Cycler is also $5; therefore, the annual bill credit by customer does not change.

The Market Potential Study indicates that there is market potential well above Action Plan participation estimates in this program.

COMMERCIAL AND INDUSTRIAL PRESCRIPTIVE

The Commercial & Industrial (C&I) Prescriptive Program is designed to provide financial incentives on qualifying products to produce greater energy savings in the C&I market. The rebates are designed to promote lower electric energy consumption, assist customers in managing their energy costs, and build a sustainable market around energy efficiency (EE). Program participation is achieved by offering incentives structured to cover a portion of the customer's incremental cost of installing prescriptive efficiency measures. Any participating commercial or industrial customer receiving electric service from Vectren South is eligible to participate in the program.

Top performing measures include:

- High-efficiency lighting and lighting controls
- HVAC equipment such as air conditioners, air-source heat pumps, chillers, boilers, and furnaces

New measures will include:

- Smart thermostats
- Refrigerator strip curtains
- High-efficiency hand dryers
- Efficient low-temperature compressors for refrigerators
- Refrigeration tune-ups
- Duct sealing

The full list of measures can be found in the measure library in Appendix K.

The program is delivered primarily through trade allies. Vectren South and its implementation partners work with the trade allies to make them aware of the offerings and help them promote the program to their customers. The implementation partner will provide training and technical support to the trade allies to become familiar with the EE technologies offered through the program. The program will be managed by the same implementation provider as the C&I Custom Program so that customers can seamlessly receive assistance and all incentives can be efficiently processed through a single procedure.

Incentives are provided to customers to reduce the difference in first cost between the lower-efficiency technology and the high-efficiency option. There is no fixed incentive percentage amount based on the difference in price because some technologies are newer and need higher amounts. Others have been available in the marketplace longer and do not need as much incentive to motivate customers. To verify the correct equipment was installed, site visits will be made on 5% of the installations, as well as all projects receiving incentive greater than $20,000.

The team cross-referenced measures from the Market Potential Study with measures included in the C&I Prescriptive Program. As measures from the C&I Prescriptive Program also appear in the Small Business Program, the team also compared the rate of sales in this program to the C&I Prescriptive Program. From this analysis, the team estimated that most measures from the C&I Prescriptive Program have market potential well above Action Plan participation estimates. For a select few measures (high-bay and low-bay LED lighting, refrigerated LEDs, commercial dishwashers, and 90% TE boilers sized at or above 1,000 MBH), the Market Potential Study provided a lower estimate of future participants than previously experienced by the program. The team capped participation at the total number of participants estimated in the potential study for these measures.

Advances in technology pose a risk to estimates for the C&I Prescriptive Program, although the size, scope, and directionality of that impact are difficult to define. The team developed estimates to address the largest risks to program savings: overall participation and NTG. The team modeled previous NTG estimates and tried to fit Action Plan NTGs to the trend of these historical NTG estimates.

Due to low cost-effectiveness scores in the Market Potential Study, the team dropped plug load sensors, smart power strips, window film, 90% AFUE boilers sized at less than 400 MBH, gas convection ovens, gas griddles, fluorescent lighting, and steam boilers.

The following table provides summary of the C&I Prescriptive Program energy impacts and budget.

TABLE 3-11 COMMERCIAL AND INDUSTRIAL PRESCRIPTIVE – IMPACTS AND BUDGET

Number of Participants	42,431	48,449	52,971	55,283	55,739	53,882
Energy Savings kWh	14,490,335	15,981,655	17,154,963	17,821,076	18,058,503	17,825,085
Peak Demand kW	3,808	4,131	4,383	4,524	4,573	4,514
Total Program Budget	$2,047,886	$2,163,627	$2,239,173	$2,262,354	$2,245,657	$2,189,060
Per Participant Energy Savings (kWh)	342	330	324	322	324	330
Per Participant Demand Savings (kW)	0.09	0.08	0.08	0.08	0.08	0.08
Per Participant Average Incentive	$32	$29	$27	$26	$25	$25
Weighted Average Measure Life	15	15	15	15	14	14
Incremental Technology Cost	$91	$85	$79	$74	$70	$66
Net-to-Gross Ratio	80%	80%	80%	80%	80%	80%

Note: Number of participants, energy savings, and demand savings estimates based primarily on Market Potential Study results and on estimates from Market Potential Study and 2017 EM&V report. Program budget estimate based on current schedule of work and projected rising costs from Vectren Program Cost and Measure Data spreadsheet. Per unit savings estimates based on the Market Potential Study results. Per participant energy savings, per participant demand savings, and incremental technology cost weighted by participant. Linear LED lighting incentives and incremental costs are discounted by 33% from 2020 to 2025 based on findings from the DOE's Energy Savings Forecast of Solid-State Lighting in General Illumination Applications 2016 report. Weighted average measure life and net to gross ratio weighted by kWh.

COMMERCIAL AND INDUSTRIAL CUSTOM

The C&I Custom Program promotes the implementation of customized energy-saving projects at qualifying customer facilities. Incentives promoted through this program serve to reduce the cost of implementing energy-reducing projects and upgrading to high-efficiency equipment. Due to the nature of Vectren's custom program, a wide variety of projects are eligible, including conventional custom retrofit projects, new construction (Commercial New Construction) projects, and major renovation (Building Tune-Up) projects. Beginning in 2020, Vectren will pilot a Strategic Energy Management component, an Advanced Lighting Controls component, and a Midstream HVAC component. As the design of the pilots will depend on Vectren-specific market research into C&I customers, the team did not establish the precise program design of the pilots nor the precise incentive structure.

Any participating commercial or industrial customer receiving electric service from Vectren South is eligible to participate in the C&I Custom Program. In addition to this requirement, the Building Tune-Up component also requires buildings to be at least 50,000 square feet. For the pilot components, the implementer will target a small group of participants to test the viability of the concept in Vectren territory.

3.14.1.1 Conventional Custom Projects

Similar to previous program years, customers may propose new custom retrofit projects. Customers or trade allies with a proposed project complete an application form with the energy savings calculations for the project. The implementation team reviews all calculations and, where appropriate, completes site visits to assess and document pre-installation conditions. The implementer then informs that their project has been pre-approved and their funds are reserved for the project. Implementation engineering staff review the final project information as installed and verify the energy savings. Incentives are then paid on the verified savings. Given the variability and uniqueness of each project, all projects are pre-approved. Pre- and post-installation visits to the site to verify installation and savings are performed as defined by the program implementation partner. Monitoring and verification may occur on the largest projects. This component provides incentives based on the kWh saved as calculated by the engineering analysis.

3.14.1.2 Commercial New Construction

The Commercial New Construction (CNC) component promotes energy-efficient designs with the goal of developing projects that are more energy efficient than current Indiana building code. This program applies to new construction and major renovation projects. Major renovation is defined as the replacement of at least two systems within an existing space (e.g., lighting, HVAC, controls, building envelope). The program provides incentives as part of the facility design process to explore opportunities in modeling EE options to craft an optimal package of investments. The program also offers customers the opportunity to receive prescriptive or custom rebates toward eligible equipment in order to reduce the higher capital cost for an energy efficient solution.

To help overcome financial challenge of designing energy-efficient new construction projects, Vectren offers a Standard Energy Design Assistance ("EDA"). This provides additional engineering expertise during the design phase to identify energy-saving opportunities. C&I projects for buildings greater than 100,000 square feet still in the conceptual design phase qualify for Vectren South's Enhanced EDA incentives which include energy modeling. The Vectren South implementation partner staff expert works with the design team through the conceptual design, schematic design, and design development processes, providing advice and counsel on measures that should be considered and EE modeling issues. Incentives are paid after the design team submits completed construction documents for review to verify that the facility design reflects the minimum energy savings requirements.

CNC provides incentives to help offset some of the expenses for the design team's participation in the EDA process with the design team incentive. The design team incentive is a fixed amount based on the new/renovated conditioned square footage and is paid when the proposed EE projects associated with the construction documents exceed a minimum energy savings threshold. The program also offers customers the opportunity to receive prescriptive or custom rebates toward eligible equipment in order to reduce the higher capital cost for the EE solutions.

3.14.1.3 Building Tune-Up (BTU)

The BTU component provides a targeted, turnkey, and cost-effective retro-commissioning solution for small- to mid-sized customer facilities. It is designed as a comprehensive customer solution that will identify, validate, quantify, and encourage the installation of both operational and capital measures. The majority of these measures will be no- or low-cost with low payback periods and will capture energy savings from a previously untapped source: building automation systems.

The BTU component is designed to encourage high levels of implementation by customers seeking to optimize the operation of their existing HVAC system. BTU typically targets customers with buildings between 50,000 square feet and 150,000 square feet. Facility energy assessments are offered to customers who are eligible and motivated to

implement multiple energy efficiency measures. BTU specifically targets measures that provide no- and low-cost operational savings. Most measures involve optimizing the building automation system (BAS) settings, but the program also investigates related capital measures, like controls, operations, processes, and HVAC. The implementation partner works collaboratively with Vectren South staff to recruit and screen customers for receiving facility energy assessments.

The following table describes the specific savings requirements related to each incentive:

TABLE 3-12 INCENTIVE SAVINGS REQUIREMENTS

Small <25,000	$750	25,000 kWh
Medium 25,000 - 100,000	$2,250	75,000 kWh
Large >100,000	$3,750	150,000 kWh
Enhance Large >100,000	$5,000	10% beyond code

3.14.1.4 Strategic Energy Management Pilot

The Strategic Energy Management Pilot (SEM) is a guided operations and maintenance program with benchmarking and regular follow-up meetings to chart customer performance. The implementer will recruit customers to participate in the program and achieve energy savings for their facilities. The implementer will then measure their performance over time (usually a period of 6 months or a year) using energy billing data to determine the amount of energy savings the customer achieved and provide incentives to the customer accordingly. Depending on market research, the SEM pilot may also include cohorts of participants and inter-cohort and intra-cohort competition. Vectren may require the SEM pilot to fit Department of Energy (DOE) 50,001 Ready specifications. This DOE program model attempts to standardize programs across states and jurisdictions to give companies with facilities in more than one utility jurisdiction the opportunity to participate in SEM programs using similar qualification criteria and with similar program applications.

3.14.1.5 Advanced Lighting Controls Pilot

The Advanced Lighting Controls Pilot (ALC) will incentivize networked lighting control systems that include daylighting and/or occupancy sensors in the lighting fixtures. Like conventional custom projects, engineers will review project applications to establish conventional energy savings. Unlike the conventional custom projects, ALC projects may also include additional estimates for reduced hours-of-use or hours of lower energy use resulting from daylighting and/or occupancy sensors in the networked lighting.

3.14.1.6 Midstream HVAC Pilot

The Midstream HVAC Pilot will provide incentives to actors at the distributor level (firms positioned between the manufacturer and the end user). The pilot will provide incentives for HVAC equipment such as package units, heat pumps, room AC, split systems, and chillers.

Through midstream HVAC incentives, the program aims to influence the equipment that distributors stock, fine-tune incentives to fit desired program outcomes, and address the needs of the replace-on-burnout market. Because distributors have a large influence on the HVAC equipment that C&I customers eventually install, the pilot will be able to encourage distributors to supply more energy-efficient options. Midstream HVAC incentives can be more easily adjusted, as C&I customers receive the discount at the time of equipment purchase, not after a lengthy application process. Because C&I customers receive a discount at the time of purchase, the pilot may influence more quick-fire purchasing decisions such as replace-on-burnout purchases. C&I customers will not be encumbered by a lengthy application process to replace their defunct HVAC equipment.

The Market Potential Study identified room in C&I markets, but due to the unique nature of each custom program project, it is difficult to compare Market Potential Study opportunity to Action Plan estimates.

The team assumed that average participation rates from the C&I Custom Program would produce a rough estimate of participation for the program in the future. Due to the wide variations in program savings and number of participating projects over the years, this estimate has a very wide error bound.

The following table provides summary of the C&I Custom Program energy impacts and budget.

TABLE 3-13 COMMERCIAL AND INDUSTRIAL CUSTOM – IMPACTS AND BUDGET

Number of Participants	196	196	196	196	196	196
Energy Savings kWh	6,107,234	6,107,234	6,107,234	6,107,234	6,107,234	6,107,234
Peak Demand kW	740	740	740	740	740	740
Total Program Budget	$896,299	$902,775	$909,355	$916,040	$922,832	$929,733
Per Participant Energy Savings (kWh)	31,159	31,159	31,159	31,159	31,159	31,159
Per Participant Demand Savings (kW)	3.78	3.78	3.78	3.78	3.78	3.78
Per Participant Average Incentive	$2,508	$2,508	$2,508	$2,508	$2,508	$2,508
Weighted Average Measure Life	16	16	16	16	16	16
Incremental Technology Cost	$26,185	$26,185	$26,185	$26,185	$26,185	$26,185
Net-to-Gross Ratio	100%	100%	100%	100%	100%	100%

Note: Number of participants, energy savings, and program costs estimated based on program estimates for the 2015-2017 energy efficiency scorecards. Demand savings estimated based on the 2018 Operating Plan. Weighted average measure life and net to gross ratio weighted by kWh.

SMALL BUSINESS ENERGY SOLUTIONS

The Small Business Energy Solutions Program (SBES) provides value by directly installing EE products such as high-efficiency lighting, pre-rinse sprayers, refrigeration controls, electrically-commutated motors, smart thermostats, and vending machine controls. The program helps small businesses and multi-family customers identify and install cost-effective energy-saving measures by providing an onsite energy assessment customized for their business.
Any participating Vectren South business customer with a maximum peak energy demand of less than 400 kW is eligible to participate in the program. Additionally, multi-family building owners with Vectren general electric service may qualify for the program, including apartment buildings, condominiums, cooperatives, duplexes, quadraplexes, townhomes, nursing homes, and retirement communities.

Trained trade ally energy advisors provide energy assessments to business customers with less than 400 kW peak demand and to multi-family buildings. The program implementer issues an annual Request for Qualification (RFQ) to select the trade allies with the best ability to provide high-quality and cost-effective service to small businesses and provide training to SBES trade allies on the program process, with an emphasis on improving energy efficiency sales.

Trade allies walk through small businesses and record site characteristics and energy efficiency opportunities at no cost to the customer. They provide an energy assessment report that details customer-specific opportunities, costs, energy savings, incentives, and simple payback periods. The trade ally then reviews the report with the customer, presenting the program benefits and process, while addressing any questions.

The program has two types of measures provided. The first type of measures are installed at no cost to the customer. They include, but are not limited to, the following:

- LEDs
- Wifi-enabled thermostats
- Programmable thermostats
- High efficiency pre-rinse sprayers
- Faucet aerators
- Weather stripping (exterior door)

The second types of measures require the customer to pay a portion of the labor and materials. These measures include:

- Interior LED lighting
- Exterior LED lighting
- EC Motors
- Anti-sweat heater controls
- Refrigerated LED lighting and case covers
- Lighting control
- Vending machine control
- Smart thermostats

In addition to the no-cost measures identified during the audit, the program also pays a cash incentive on every recommended and implemented improvement identified through the assessment. Incentive rates may change over time and vary with special initiatives.

Onsite verification is provided for the first three projects completed by each trade ally, in addition to the program standard of 5% of all completed projects and all projects receiving incentives greater than $20,000. These verifications allow the program to validate energy savings, in addition to providing an opportunity to ensure trade allies provide high-quality customer services and the incentivized equipment satisfies program requirements.

The Market Potential Study identified savings for the overall C&I sectors but provided less-specific estimates for the small business sector. As participation in the program is small, the team assumed that historic participation trends would continue through the timeline of the action plan.

The team reviewed estimates for the impact of the EISA backstop in other jurisdictions and found that the EISA backstop will have a much smaller impact on C&I programs compared to residential programs. This research also indicated that small businesses will face a larger impact from the backstop as their lighting characteristics more closely resemble the residential market. Because of this impact, the team assumed decreasing participation in lighting measures impacted by the EISA backstop after 2021.

The team dropped fluorescent lighting from the program as the technology will be superseded by linear LEDs and savings from LEDs are much more substantial.

The following table provides summary of SBES energy impacts and budget.

TABLE 3-14 SMALL BUSINESS ENERGY SOLUTIONS – IMPACTS AND BUDGET

Number of Participants	381	382	382	382	383	383
Energy Savings kWh	2,940,932	2,944,615	2,949,771	2,952,715	2,957,870	2,963,026
Peak Demand kW	213	213	213	213	213	213
Total Program Budget	$768,835	$763,876	$758,758	$752,586	$747,582	$742,637
Per Participant Energy Savings (kWh)	7,719	7,708	7,722	7,730	7,723	7,736
Per Participant Demand Savings (kW)	0.56	0.56	0.56	0.56	0.56	0.56
Per Participant Average Incentive	$1,439	$1,412	$1,390	$1,365	$1,338	$1,315
Weighted Average Measure Life	15	15	15	15	15	15
Incremental Technology Cost	$312	$311	$310	$310	$309	$308
Net-to-Gross Ratio	91%	91%	91%	91%	91%	91%

Note: Number of participants, energy savings, and demand savings estimated based on the 2018 Operating Plan. Program costs estimated using the current program SOW and projected rising costs from 2018-20 filed Energy Efficiency Plan and Vectren Program Cost and Measure Data spreadsheet. Per participant average incentive and incremental technology cost estimated by summing the values for each piece of equipment and dividing by the number of participants. Linear LED lighting incentives and incremental costs are discounted by 33% from 2020 to 2025 based on findings from the DOE's Energy Savings Forecast of Solid-State Lighting in General Illumination Applications 2016 report. Weighted average measure life and net to gross ratio are weighted by kWh.

CONSERVATION VOLTAGE REDUCTION

Conservation Voltage Reduction (CVR) achieves energy conservation through automated monitoring and control of voltage levels provided on distribution circuits. End use customers realize lower energy and demand consumption when CVR is applied to the distribution circuit from which they are served.

CVR is both a DR and an EE program. It targets distribution circuits, in part to reduce the peak demand experienced on Vectren's electrical power supply system. The voltage reduction stemming from the CVR program operates to effectively reduce consumption during the times in which system peaks are set and as a result directly reduces peak demand. CVR also cost-effectively reduces the level of ongoing energy consumption by end-use devices located on the customer side of the utility meter, as many end-use devices consume less energy with lower voltages consistently applied. Like an equipment maintenance service program, the voltage optimization allows the customer's equipment to operate at optimum levels which saves energy without requiring direct customer intervention or change.

Delivery of the CVR Program will be achieved through the installation of control logic, telecommunication equipment, and voltage control equipment in order to control the voltage bandwidth on CVR circuits within voltage compliance levels required by the Indiana Utility Regulatory Commission.

The team assumed similar participation in conservation voltage reduction as in previous years.

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This appendix catalogs many of the data sources used in this study, grouped by major activity. In general, GDS attempted to utilize Vectren-specific data, where available. When Vectren-specific data was not available or reliable, GDS leveraged secondary data from nearby or regional sources.

MARKET RESEARCH

Market research studies were used to understand home and business characteristics and equipment stock characteristics. Vectren supplied GDS with several residential market research studies, and GDS conducted primary research in the small commercial sector to gather additional equipment and efficiency characteristics.

- The electric measure analysis was largely informed by a 2016 baseline survey of Vectren South customers. Nearly 500 responses to this survey provided a strong basis for many of the Vectren South electric measure baseline and efficient saturation estimates. A 2015 CFL and LED baseline study helped inform the saturation estimates for the lighting end use. A 2017 electric baseline thermostat survey of Vectren customers was leveraged to better characterize the increased prominence of smart and Wi-Fi-enabled thermostats.
- GDS collected data in 38 commercial facilities to better understand electric and natural gas equipment saturation and efficiency characteristics.
- : Vectren survey data was leveraged to determine the remaining factors for several end-uses, including motors, interior and exterior lighting and fixture measures.
- Including the DOE Industrial Electric Motor Systems Market Opportunities Report, the DOE Assessment of the Market for Compressed Air Efficiency Services, and EIA Industrial Demand Module of the National Energy Modeling System.
- Public Use Microdata Survey data was used to estimate the percent of low-income households (using annual household income and number of people per household) in the Vectren South and North territories.
- Energy Star shipment data provides a detailed historical estimate of the percent of shipped equipment/appliances that meet ENERGY STAR standards. Over the long-term, this serves as a proxy for the percent of the market that could be considered energy efficient.

FORECAST CALIBRATION

The forecast calibration effort was used to create a detailed segmentation of Vectren's load forecast and ensure that estimated savings would not overstate future potential. Vectren supplied GDS with the most recent load forecast.

- The 2016 Long-Term Electric Energy and Demand load forecast consists of the most recent ITRON load forecast completed for VEDI for 2016-2036. The natural gas forecast was provided directly from Vectren for the North and South territories from 2017 to 2027. Future years were escalated by a compound average annual growth rate.
- The 2017 historical commercial and industrial data utilized rate codes and existing NAICS code to segment historical sales by commercial building type and/or industry type.
- : GDS utilized a third-party dataset that provided additional commercial and industrial business information, including NAICS codes, to supplement the building/industry types codes supplied by Vectren
- GDS updated the ITRON load forecast to utilize more recent information for the East South-Central region from the EIA 2012 CBECS survey.

GDS used the 2014 study to further refine the industrial load forecast by end-use.

GDS developed residential building prototypes from the market research effort to develop detailed consumption estimates by end-use and calibrated these models to Vectren's residential load forecasts.

ENERGY EFFICIENCY MEASURE DATA

The energy efficiency measure analysis developed per unit savings, cost, and useful life assumptions for each energy efficiency measure in the residential, commercial, and industrial sectors. Preference was given to Vectren-specific evaluated savings and/or deemed savings/algorithms in the Indiana TRM.

For the development of savings estimates of measures already offered by Vectren, GDS either used the estimates from the most recent evaluation reports or used the evaluation methodology to develop forward looking savings projections.

In the absence of evaluation data, GDS attempted to leverage the Indiana TRM. Assumptions and algorithms were based off the IN TRM to the extent practical.

Historical incentive estimates and in some cases, incremental measure costs, were based on the Vectren Operating Plans.

In some cases, TRM's or deemed measure databases from other states were more applicable than the IN TRM due to more currently available estimates and the more appropriate use of updated federal standards. The Illinois TRM and the Michigan Energy Measures Database were the primary non-Indiana TRMs used.

In some cases, following the source hierarchy listed above was not enough to develop savings estimates. In these cases, GDS leveraged other secondary research documents such as ACEEE emerging technology reports.

DEMAND RESPONSE / CVR MEASURE ANALYSIS

The DR/CVR analysis developed per unit savings, cost, and useful life assumptions for select demand response programs, and included assumptions regarding future CVR potential from two additional substations.

Demand reductions were based on load reductions found in Vectren's existing demand response programs, and various secondary data sources including the FERC and other industry reports, including demand response potential studies.

In the absence of evaluation data, GDS attempted to leverage the Indiana TRM. Assumptions and algorithms were based off the IN TRM to the extent practical.

Comverge provided an estimate of the load control switch useful life.

Nest and Ecobee product data was used to develop equipment cost assumptions.

the absence

Energy and demand impacts for the CVR analysis

Energy and demand impacts for the CVR analysis

AVOIDED COST/ECONOMIC ANALYSIS

Avoided costs and related economic assumptions were used to assess cost-effectiveness. In addition, historical incentive levels were tied to willingness-to-participate (WTP) research to assess long-term market adoption in the achievable potential scenario.

Avoided cost values for electric energy, electric capacity, and avoided transmission and distribution (T&D) were provided by Vectren as part of an initial data request. Electric energy is based on an annual system marginal cost. For years outside of the avoided cost forecast timeframe, future year

avoided costs are escalated by the rate of inflation. Natural gas avoided costs are calculated using EIA Annual Outlook reference tables combined with demand rates and basis differentials provided by Vectren Gas Supply.

Includes the discount rate, inflation rate, line loss assumptions and reserve margin requirement. All economic assumptions were provided by Vectren and consistent with economic modeling assumptions used for other utility planning efforts.

Historical DSM costs and savings data from 2011 to 2017 were used to determine non-incentive program delivery costs as well as cross-cutting portfolio costs.

Vectren conducted over 300 surveys in the residential sector (online only) and 38 on-site surveys in the commercial sector regarding customer willingness-to-purchase energy efficient equipment at various incentive levels. This Vectren-specific customer data was used to determine long-term adoption rates by end-use for the MAP and RAP achievable potential scenarios.

Vectren Electric Residential Measure Assumptions

1001	Appliances	ENERGY STAR Air Purifier	SF	N/A	MO	733.0	67%	488.0	0.084	9.0	$70.00	$25.00	9.24	Air Purifier meeting ENERGY STAR spec
1002	Appliances	ENERGY STAR Refrigerator	SF	NLI	MO	569.0	9%	53.0	0.008	17.0	$40.00	$20.00	2.05	ES Qualified Refrigator (~9% more efficient)
1003	Appliances	Smart Refrigerator_ET	SF	NLI	MO	569.0	12%	70.0	0.011	17.0	$680.00	$340.00	0.16	ES Qualified Refrigerator w/ Smart Technology
1004	Appliances	ES Refrigerator Replacement	SF	LI	DI	1,193.0	35%	412.2	0.063	17.0	$580.00	$580.00	0.55	Replace Existing Refrigerator with ES Qualified Unit
1005	Appliances	Refrigerator Recycling	SF	N/A	Recycle	1,044.0	100%	1,044.0	0.140	8.0	$130.00	$130.00	3.14	Refrigerator Recycle (No Replacement)
1006	Appliances	ENERGY STAR Clothes Washer (Electrc WH/Dryer)	SF	N/A	MO	522.0	22%	112.4	0.430	14.0	$84.00	$40.00	1.95	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1007	Appliances	ENERGY STAR Clothes Washer (NG WH/E Dryer)	SF	N/A	MO	383.7	27%	101.8	0.390	14.0	$84.00	$40.00	1.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1008	Appliances	ENERGY STAR Clothes Washer (NG WH/NG Dryer)	SF	N/A	MO	42.3	44%	18.5	0.071	14.0	$84.00	$40.00	0.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1009	Appliances	Smart/CEE Tier3 Clothes Washer (Electrc WH/Dryer)_ET	SF	N/A	MO	522.0	40%	209.2	0.801	14.0	$141.00	$70.00	2.07	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1010	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/E Dryer)_ET	SF	N/A	MO	383.7	26%	100.9	0.386	14.0	$141.00	$70.00	1.33	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1011	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/NG Dryer)_ET	SF	N/A	MO	42.3	-3%	-1.2	-0.005	14.0	$141.00	$70.00	0.62	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1012	Appliances	ENERGY STAR Dishwasher (E WH)	SF	N/A	MO	307.0	12%	37.0	0.105	11.0	$76.00	$40.00	0.42	ES Qualified Dishwasher (v3.0)
1013	Appliances	ENERGY STAR Dishwasher (NG WH)	SF	N/A	MO	135.1	12%	16.3	0.046	11.0	$79.00	$40.00	0.27	ES Qualified Dishwasher (v3.0)
1014	Appliances	Smart Dishwasher (E WH)_ET	SF	N/A	MO	307.0	15%	45.5	0.129	11.0	$395.00	$200.00	0.10	Smart ES Qualified Dishwasher (v3.0)
1015	Appliances	Smart Dishwasher (NG WH)_ET	SF	N/A	MO	135.1	15%	20.0	0.057	11.0	$395.00	$200.00	0.07	Smart ES Qualified Dishwasher (v3.0)
1016	Appliances	ENERGY STAR Dehumidifier	SF	N/A	MO	904.6	20%	180.9	0.111	12.0	$9.52	$5.00	24.59	ES Qualified Dehumidifer (L/kWh = 2.0)
1017	Appliances	ENERGY STAR Freezer	SF	N/A	MO	349.5	10%	35.1	0.006	22.0	$35.00	$20.00	1.64	ES Qualified Freezer (10% more Efficient than NAECA)
1018	Appliances	Freezer Recycling	SF	N/A	Recycle	927.0	100%	927.0	0.100	8.0	$130.00	$130.00	2.62	Freezer Recycle (No Replacement)
1019	Appliances	ENERGY STAR Clothes Dryer (Electric)	SF	NLI	MO	768.9	21%	160.4	0.567	16.0	$152.00	$75.00	1.52	ES Qualified Dryer (CEF=3.93)
1020	Appliances	ENERGY STAR Clothes Dryer (NG)	SF	NLI	MO	123.0	21%	25.7	0.091	16.0	$152.00	$75.00	0.57	ES Qualified Dryer (CEF=3.93)
1021	Appliances	Smart Clothes Dryer (Electric)_ET	SF	NLI	MO	768.9	26%	202.7	0.716	16.0	$236.00	$120.00	1.20	Smart ES Qualified Dryer (5.5% additional energy savings)
1022	Appliances	Smart Clothes Dryer (NG)_ET	SF	NLI	MO	123.0	26%	32.4	0.115	16.0	$236.00	$120.00	0.45	Smart ES Qualified Dryer (5.5% additional energy savings)
1023	Appliances	Heat Pump Dryer	SF	NLI	MO	768.9	73%	558.0	1.972	12.0	$412.00	$205.00	1.57	Heat Pump Dryer (CEF=10.4)
1024	Appliances	Dryer Vent Cleaning (Electric)	SF	LI	DI	768.9	6%	42.3	0.149	2.0	$80.00	$80.00	0.06	Dryer Vent Cleaning (5.5% Savings)
1025	Appliances	Dryer Vent Cleaning (NG)	SF	LI	DI	123.0	6%	6.8	0.024	2.0	$80.00	$80.00	0.02	Dryer Vent Cleaning (5.5% Savings)
1026	Appliances	ENERGY STAR Water Cooler	SF	N/A	MO	105.9	46%	48.6	0.006	10.0	$17.00	$10.00	2.22	ES Water Cooler (Cold Water Only)
1027	Appliances	ENERGY STAR Air Purifier	SF	N/A	NC	733.0	67%	488.0	0.084	9.0	$70.00	$25.00	9.24	Air Purifier meeting ENERGY STAR spec
1028	Appliances	ENERGY STAR Refrigerator	SF	N/A	NC	569.0	9%	53.0	0.008	17.0	$40.00	$20.00	2.05	ES Qualified Refrigator (~9% more efficient)
1029	Appliances	Smart Refrigerator_ET	SF	N/A	NC	569.0	12%	70.0	0.011	17.0	$680.00	$340.00	0.16	ES Qualified Refrigerator w/ Smart Technology
1030	Appliances	ENERGY STAR Clothes Washer (Electrc WH/Dryer)	SF	N/A	NC	522.0	22%	112.4	0.430	14.0	$84.00	$40.00	1.95	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)

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1031	Appliances	ENERGY STAR Clothes Washer (NG WH/E Dryer)	SF	N/A	NC	383.7	27%	101.8	0.390	14.0	$84.00	$40.00	1.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1032	Appliances	ENERGY STAR Clothes Washer (NG WH/NG Dryer)	SF	N/A	NC	42.3	44%	18.5	0.071	14.0	$84.00	$40.00	0.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1033	Appliances	Smart/CEE Tier3 Clothes Washer (Electrc WH/Dryer)_ET	SF	N/A	NC	522.0	40%	209.2	0.801	14.0	$141.00	$70.00	2.07	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1034	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/E Dryer)_ET	SF	N/A	NC	383.7	26%	100.9	0.386	14.0	$141.00	$70.00	1.33	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1035	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/NG Dryer)_ET	SF	N/A	NC	42.3	-3%	-1.2	-0.005	14.0	$141.00	$70.00	0.62	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1036	Appliances	ENERGY STAR Dishwasher (E WH)	SF	N/A	NC	307.0	12%	37.0	0.105	11.0	$76.00	$40.00	0.42	ES Qualified Dishwasher (v3.0)
1037	Appliances	ENERGY STAR Dishwasher (NG WH)	SF	N/A	NC	135.1	12%	16.3	0.046	11.0	$79.00	$40.00	0.27	ES Qualified Dishwasher (v3.0)
1038	Appliances	Smart Dishwasher (E WH)_ET	SF	N/A	NC	307.0	15%	45.5	0.129	11.0	$395.00	$200.00	0.10	Smart ES Qualified Dishwasher (v3.0)
1039	Appliances	Smart Dishwasher (NG WH)_ET	SF	N/A	NC	135.1	15%	20.0	0.057	11.0	$395.00	$200.00	0.07	Smart ES Qualified Dishwasher (v3.0)
1040	Appliances	ENERGY STAR Dehumidifier	SF	N/A	NC	904.6	20%	180.9	0.111	12.0	$9.52	$5.00	24.59	ES Qualified Dehumidifer (L/kWh = 2.0)
1041	Appliances	ENERGY STAR Freezer	SF	N/A	NC	349.5	10%	35.1	0.006	22.0	$35.00	$20.00	1.64	ES Qualified Freezer (10% more Efficient than NAECA)
1042	Appliances	ENERGY STAR Clothes Dryer (Electric)	SF	N/A	NC	768.9	21%	160.4	0.567	16.0	$152.00	$75.00	1.52	ES Qualified Dryer (CEF=3.93)
1043	Appliances	ENERGY STAR Clothes Dryer (NG)	SF	N/A	NC	123.0	21%	25.7	0.091	16.0	$152.00	$75.00	0.57	ES Qualified Dryer (CEF=3.93)
1044	Appliances	Smart Clothes Dryer (Electric)_ET	SF	N/A	NC	768.9	26%	202.7	0.716	16.0	$236.00	$120.00	1.20	Smart ES Qualified Dryer (5.5% additional energy savings)
1045	Appliances	Smart Clothes Dryer (NG)_ET	SF	N/A	NC	123.0	26%	32.4	0.115	16.0	$236.00	$120.00	0.45	Smart ES Qualified Dryer (5.5% additional energy savings)
1046	Appliances	Heat Pump Dryer	SF	N/A	NC	768.9	73%	558.0	1.972	12.0	$412.00	$205.00	1.57	Heat Pump Dryer (CEF=10.4)
1047	Appliances	ENERGY STAR Water Cooler	SF	N/A	NC	105.9	46%	48.6	0.006	10.0	$17.00	$10.00	2.22	ES Water Cooler (Cold Water Only)
1048	Appliances	ENERGY STAR Air Purifier	MF	N/A	MO	733.0	67%	488.0	0.084	9.0	$70.00	$25.00	9.24	Air Purifier meeting ENERGY STAR spec
1049	Appliances	ENERGY STAR Refrigerator	MF	NLI	MO	569.0	9%	53.0	0.008	17.0	$40.00	$20.00	2.05	ES Qualified Refrigator (~9% more efficient)
1050	Appliances	Smart Refrigerator_ET	MF	NLI	MO	569.0	12%	70.0	0.011	17.0	$680.00	$340.00	0.16	ES Qualified Refrigerator w/ Smart Technology
1051	Appliances	ES Refrigerator Replacement	MF	LI	DI	1,193.0	35%	412.2	0.063	17.0	$580.00	$580.00	0.56	Replace Existing Refrigerator with ES Qualified Unit
1052	Appliances	Refrigerator Recycling	MF	N/A	Recycle	1,044.0	100%	1,044.0	0.140	8.0	$130.00	$130.00	3.14	Refrigerator Recycle (No Replacement)
1053	Appliances	ENERGY STAR Clothes Washer (Electrc WH/Dryer)	MF	N/A	MO	522.0	22%	112.4	0.430	14.0	$84.00	$40.00	1.95	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1054	Appliances	ENERGY STAR Clothes Washer (NG WH/E Dryer)	MF	N/A	MO	383.7	27%	101.8	0.390	14.0	$84.00	$40.00	1.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1055	Appliances	ENERGY STAR Clothes Washer (NG WH/NG Dryer)	MF	N/A	MO	42.3	44%	18.5	0.071	14.0	$84.00	$40.00	0.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1056	Appliances	Smart/CEE Tier3 Clothes Washer (Electrc WH/Dryer)_ET	MF	N/A	MO	522.0	40%	209.2	0.801	14.0	$141.00	$70.00	2.07	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1057	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/E Dryer)_ET	MF	N/A	MO	383.7	26%	100.9	0.386	14.0	$141.00	$70.00	1.33	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)

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1058	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/NG Dryer)_ET	MF	N/A	MO	42.3	-3%	-1.2	-0.005	14.0	$141.00	$70.00	0.62	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1059	Appliances	ENERGY STAR Dishwasher (E WH)	MF	N/A	MO	307.0	12%	37.0	0.105	11.0	$76.00	$40.00	0.42	ES Qualified Dishwasher (v3.0)
1060	Appliances	ENERGY STAR Dishwasher (NG WH)	MF	N/A	MO	135.1	12%	16.3	0.046	11.0	$79.00	$40.00	0.27	ES Qualified Dishwasher (v3.0)
1061	Appliances	Smart Dishwasher (E WH)_ET	MF	N/A	MO	307.0	15%	45.5	0.129	11.0	$395.00	$200.00	0.10	Smart ES Qualified Dishwasher (v3.0)
1062	Appliances	Smart Dishwasher (NG WH)_ET	MF	N/A	MO	135.1	15%	20.0	0.057	11.0	$395.00	$200.00	0.07	Smart ES Qualified Dishwasher (v3.0)
1063	Appliances	ENERGY STAR Dehumidifier	MF	N/A	MO	904.6	27%	246.7	0.151	12.0	$75.00	$40.00	4.19	ES Qualified Dehumidifer (L/kWh = 2.2)
1064	Appliances	ENERGY STAR Freezer	MF	N/A	MO	349.5	10%	35.1	0.006	22.0	$35.00	$20.00	1.64	ES Qualified Freezer (10% more Efficient than NAECA)
1065	Appliances	Freezer Recycling	MF	N/A	Recycle	927.0	100%	927.0	0.100	8.0	$130.00	$130.00	2.62	Freezer Recycle (No Replacement)
1066	Appliances	ENERGY STAR Clothes Dryer (Electric)	MF	NLI	MO	768.9	21%	160.4	0.567	16.0	$152.00	$75.00	1.52	ES Qualified Dryer (CEF=3.93)
1067	Appliances	ENERGY STAR Clothes Dryer (NG)	MF	NLI	MO	123.0	21%	25.7	0.091	16.0	$152.00	$75.00	0.57	ES Qualified Dryer (CEF=3.93)
1068	Appliances	Smart Clothes Dryer (Electric)_ET	MF	NLI	MO	768.9	26%	202.7	0.716	16.0	$236.00	$120.00	1.20	Smart ES Qualified Dryer (5.5% additional energy savings)
1069	Appliances	Smart Clothes Dryer (NG)_ET	MF	NLI	MO	123.0	26%	32.4	0.115	16.0	$236.00	$120.00	0.45	Smart ES Qualified Dryer (5.5% additional energy savings)
1070	Appliances	Heat Pump Dryer	MF	NLI	MO	768.9	73%	558.0	1.972	12.0	$412.00	$205.00	1.57	Heat Pump Dryer (CEF=10.4)
1071	Appliances	Dryer Vent Cleaning (Electric)	MF	LI	DI	768.9	6%	42.3	0.149	2.0	$80.00	$80.00	0.06	Dryer Vent Cleaning (5.5% Savings)
1072	Appliances	Dryer Vent Cleaning (NG)	MF	LI	DI	123.0	6%	6.8	0.024	2.0	$80.00	$80.00	0.02	Smart ES Qualified Dryer (5.5% additional energy savings)
1073	Appliances	ENERGY STAR Water Cooler	MF	N/A	MO	105.9	46%	48.6	0.006	10.0	$17.00	$10.00	2.22	ES Water Cooler (Cold Water Only)
1074	Appliances	ENERGY STAR Air Purifier	MF	N/A	NC	733.0	67%	488.0	0.084	9.0	$70.00	$25.00	9.24	Air Purifier meeting ENERGY STAR spec
1075	Appliances	ENERGY STAR Refrigerator	MF	N/A	NC	569.0	9%	53.0	0.008	17.0	$40.00	$20.00	2.05	ES Qualified Refrigator (~9% more efficient)
1076	Appliances	Smart Refrigerator_ET	MF	N/A	NC	569.0	12%	70.0	0.011	17.0	$680.00	$340.00	0.16	ES Qualified Refrigerator w/ Smart Technology
1077	Appliances	ENERGY STAR Clothes Washer (Electrc WH/Dryer)	MF	N/A	NC	522.0	22%	112.4	0.430	14.0	$84.00	$40.00	1.95	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1078	Appliances	ENERGY STAR Clothes Washer (NG WH/E Dryer)	MF	N/A	NC	383.7	27%	101.8	0.390	14.0	$84.00	$40.00	1.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1079	Appliances	ENERGY STAR Clothes Washer (NG WH/NG Dryer)	MF	N/A	NC	42.3	44%	18.5	0.071	14.0	$84.00	$40.00	0.82	ES Qualified ClothesWasher (IMEF=2.23 ; 1.75 Baseline)
1080	Appliances	Smart/CEE Tier3 Clothes Washer (Electrc WH/Dryer)_ET	MF	N/A	NC	522.0	40%	209.2	0.801	14.0	$141.00	$70.00	2.07	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1081	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/E Dryer)_ET	*MF*	N/A	NC	383.7	26%	100.9	0.386	14.0	$141.00	$70.00	1.33	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1082	Appliances	Smart/CEE Tier3 Clothes Washer (NG WH/NG Dryer)_ET	*MF*	N/A	NC	42.3	-3%	-1.2	-0.005	14.0	$141.00	$70.00	0.62	CEE Tier 3 Qualified ClothesWasher (IMEF=2.92 ; 1.75 Baseline)
1083	Appliances	ENERGY STAR Dishwasher (E WH)	MF	N/A	NC	307.0	12%	37.0	0.105	11.0	$76.00	$40.00	0.42	ES Qualified Dishwasher (v3.0)
1084	Appliances	ENERGY STAR Dishwasher (NG WH)	MF	N/A	NC	135.1	12%	16.3	0.046	11.0	$79.00	$40.00	0.27	ES Qualified Dishwasher (v3.0)
1085	Appliances	Smart Dishwasher (E WH)_ET	MF	N/A	NC	307.0	15%	45.5	0.129	11.0	$395.00	$200.00	0.10	Smart ES Qualified Dishwasher (v3.0)

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1086	Appliances	Smart Dishwasher (NG WH)_ET	MF	N/A	NC	135.1	15%	20.0	0.057	11.0	$395.00	$200.00	0.07	Smart ES Qualified Dishwasher (v3.0)
1087	Appliances	ENERGY STAR Dehumidifier	MF	N/A	NC	904.6	27%	246.7	0.151	12.0	$75.00	$40.00	4.19	ES Qualified Dehumidifer (L/kWh = 2.2)
1088	Appliances	ENERGY STAR Freezer	MF	N/A	NC	349.5	10%	35.1	0.006	22.0	$35.00	$20.00	1.64	ES Qualified Freezer (10% more Efficient than NAECA)
1089	Appliances	ENERGY STAR Clothes Dryer (Electric)	MF	N/A	NC	768.9	21%	160.4	0.567	16.0	$152.00	$75.00	1.52	ES Qualified Dryer (CEF=3.93)
1090	Appliances	ENERGY STAR Clothes Dryer (NG)	MF	N/A	NC	123.0	21%	25.7	0.091	16.0	$152.00	$75.00	0.57	ES Qualified Dryer (CEF=3.93)
1091	Appliances	Smart Clothes Dryer (Electric)_ET	MF	N/A	NC	768.9	26%	202.7	0.716	16.0	$236.00	$120.00	1.20	Smart ES Qualified Dryer (5.5% additional energy savings)
1092	Appliances	Smart Clothes Dryer (NG)_ET	MF	N/A	NC	123.0	26%	32.4	0.115	16.0	$236.00	$120.00	0.45	Smart ES Qualified Dryer (5.5% additional energy savings)
1093	Appliances	Heat Pump Dryer	MF	N/A	NC	768.9	73%	558.0	1.972	12.0	$412.00	$205.00	1.57	Heat Pump Dryer (CEF=10.4)
1094	Appliances	ENERGY STAR Water Cooler	MF	N/A	NC	105.9	46%	48.6	0.006	10.0	$17.00	$10.00	2.22	ES Water Cooler (Cold Water Only)
2001	Audit	Audit Recommendations (elec) - Single-family	SF	NLI	Retrofit	19,402.4	0%	32.0	0.006	1.0	$80.00	$80.00	0.02	Walk through audit and recommendations for behavioral and installation measures
2002	Audit	Audit Recommendations (elec) - Single-family	SF	LI	DI	19,402.4	0%	32.0	0.006	1.0	$80.00	$80.00	0.02	Walk through audit and recommendations for behavioral and installation measures
2003	Audit	Audit Recommendations (elec) - Multifamily	MF	NLI	Retrofit	12,314.1	0%	32.0	0.005	1.0	$80.00	$80.00	0.02	Walk through audit and recommendations for behavioral and installation measures
2004	Audit	Audit Recommendations (elec) - Multifamily	MF	LI	DI	12,314.1	0%	32.0	0.005	1.0	$80.00	$80.00	0.02	Walk through audit and recommendations for behavioral and installation measures
2005	Audit	Audit Recommendations (elec) - Mobile	*Mobile*	NLI	Retrofit	19,402.4	0%	32.0	0.006	1.0	$80.00	$80.00	0.02	Walk through audit and recommendations for behavioral and installation measures
2006	Audit	Audit Recommendations (elec) - Mobile	*Mobile*	LI	DI	19,402.4	0%	32.0	0.006	1.0	$80.00	$80.00	0.02	Walk through audit and recommendations for behavioral and installation measures
2007	Audit	Audit Recommendations (gas) - Single-family	SF	NLI	Retrofit	9,318.6	0%	32.0	0.007	1.0	$80.00	$80.00	0.07	Walk through audit and recommendations for behavioral and installation measures
2008	Audit	Audit Recommendations (gas) - Single-family	SF	LI	DI	9,318.6	0%	32.0	0.007	1.0	$80.00	$80.00	0.07	Walk through audit and recommendations for behavioral and installation measures
2009	Audit	Audit Recommendations (gas) - Multifamily	MF	NLI	Retrofit	6,821.7	0%	32.0	0.005	1.0	$80.00	$80.00	0.07	Walk through audit and recommendations for behavioral and installation measures
2010	Audit	Audit Recommendations (gas) - Multifamily	MF	LI	DI	6,821.7	0%	32.0	0.005	1.0	$80.00	$80.00	0.07	Walk through audit and recommendations for behavioral and installation measures
2011	Audit	Audit Recommendations (gas) - Mobile	Mobile	NLI	Retrofit	9,318.6	0%	32.0	0.007	1.0	$80.00	$80.00	0.07	Walk through audit and recommendations for behavioral and installation measures
2012	Audit	Audit Recommendations (gas) - Mobile	Mobile	LI	DI	9,318.6	0%	32.0	0.007	1.0	$80.00	$80.00	0.07	Walk through audit and recommendations for behavioral and installation measures
3001	Behavioral	Home Energy Reports (Heat pump)	SF	N/A	Opt-Out	16,590.8	2%	265.5	0.049	1.0	$7.85	$7.90	1.68	Pre-pay billing

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3002	Behavioral	Home Energy Reports (Electric furnace/CAC)	SF	N/A	Opt-Out	21,954.3	2%	351.3	0.061	1.0	$7.85	$7.90	2.13	Distribution of home energy reports encouraging adoption of energy-savings improvements
3003	Behavioral	Pre-pay (Heat pump)	SF	N/A	Opt-In	16,590.8	11%	1,825.0	0.334	3.0	$40.00	$0.00	3E+08	Pre-pay billing
3004	Behavioral	Pre-pay (Electric furnace/CAC)	SF	N/A	Opt-In	21,954.3	11%	2,415.0	0.353	3.0	$40.00	$0.00	3.E+08	Pre-pay billing
3005	Behavioral	Home Energy Management System (Heat pump)	SF	N/A	Retrofit	16,590.8	3%	532.6	0.097	5.0	$90.00	$45.00	2.66	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3006	Behavioral	Home Energy Management System (Electric furnace/CAC)	SF	N/A	Retrofit	21,954.3	3%	704.7	0.103	5.0	$90.00	$45.00	3.38	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3007	Behavioral	Home Energy Reports (Heat pump)	SF	N/A	NC	15,337.8	2%	245.4	0.036	1.0	$7.85	$7.90	1.55	Pre-pay billing
3008	Behavioral	Pre-pay (Heat pump)	SF	N/A	NC	15,337.8	11%	1,687.2	0.245	3.0	$40.00	$0.00	2.E+08	Pre-pay billing
3009	Behavioral	Home Energy Management System (Heat pump)	SF	N/A	NC	15,337.8	3%	365.0	0.044	5.0	$90.00	$45.00	1.75	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3010	Behavioral	Home Energy Reports (Heat pump)	MF	N/A	Opt-Out	11,369.4	2%	181.9	0.022	1.0	$7.85	$7.90	1.10	Pre-pay billing
3011	Behavioral	Home Energy Reports (Electric furnace/CAC)	MF	N/A	Opt-Out	13,171.6	2%	210.7	0.025	1.0	$7.85	$7.90	1.27	Distribution of home energy reports encouraging adoption of energy-savings improvements
3012	Behavioral	Pre-pay (Heat pump)	MF	N/A	Opt-In	11,369.4	11%	1,250.6	0.150	3.0	$40.00	$0.00	2.E+08	Pre-pay billing
3013	Behavioral	Pre-pay (Electric furnace/CAC)	MF	N/A	Opt-In	13,171.6	11%	1,448.9	0.169	3.0	$40.00	$0.00	2E+08	Pre-pay billing
3014	Behavioral	Home Energy Management System (Heat pump)	MF	N/A	Retrofit	11,369.4	3%	422.8	0.049	5.0	$90.00	$45.00	1.97	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3015	Behavioral	Home Energy Management System (Electric furnace/CAC)	MF	N/A	Retrofit	13,171.6	3%	492.3	0.071	5.0	$90.00	$45.00	2.39	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3016	Behavioral	Home Energy Reports (Heat pump)	MF	N/A	NC	10,959.2	2%	175.3	0.021	1.0	$7.85	$7.90	1.05	Pre-pay billing
3017	Behavioral	Pre-pay (Heat pump)	MF	N/A	NC	10,959.2	11%	1,205.5	0.146	3.0	$40.00	$0.00	2E+08	Pre-pay billing
3018	Behavioral	Home Energy Management System (Heat pump)	MF	N/A	NC	10,959.2	3%	351.8	0.043	5.0	$90.00	$45.00	1.67	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3019	Behavioral	Home Energy Reports (Gas furnace/CAC)	SF	N/A	Opt-Out	9,318.6	1%	121.1	0.045	1.0	$7.85	$7.90	1.48	Distribution of home energy reports encouraging adoption of energy-savings improvements
3020	Behavioral	Pre-pay (Gas furnace/CAC)	SF	N/A	Opt-In	9,318.6	11%	1,025.0	0.377	3.0	$40.00	$0.00	3.E+08	Pre-pay billing
3021	Behavioral	Home Energy Management System (Gas furnace/CAC)	SF	N/A	Retrofit	9,318.6	3%	299.1	0.110	5.0	$90.00	$45.00	2.98	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3022	Behavioral	Home Energy Reports (Gas furnace/CAC)	SF	N/A	NC	8,582.1	1%	111.6	0.032	1.0	$7.85	$7.90	1.09	Distribution of home energy reports encouraging adoption of energy-savings improvements
3023	Behavioral	Pre-pay (Gas furnace/CAC)	SF	N/A	NC	8,582.1	11%	944.0	0.269	3.0	$40.00	$0.00	2E+08	Pre-pay billing
3024	Behavioral	Home Energy Management System (Gas furnace/CAC)	SF	N/A	NC	8,582.1	3%	275.5	0.078	5.0	$90.00	$45.00	2.18	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home

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3025	Behavioral	Home Energy Reports (Gas furnace/CAC)	*MF*	N/A	Opt-Out	6,821.7	1%	88.7	0.022	1.0	$7.85	$7.90	0.91	Distribution of home energy reports encouraging adoption of energy-savings improvements
3026	Behavioral	Pre-pay (Gas furnace/CAC)	*MF*	N/A	Opt-In	6,821.7	11%	750.4	0.183	3.0	$40.00	$0.00	2.E+08	Pre-pay billing
3027	Behavioral	Home Energy Management System (Gas furnace/CAC)	*MF*	N/A	Retrofit	6,821.7	3%	219.0	0.053	5.0	$90.00	$45.00	1.82	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
3028	Behavioral	Home Energy Reports (Gas furnace/CAC)	*MF*	N/A	NC	10,165.2	1%	132.1	0.021	1.0	$7.85	$7.90	0.96	Distribution of home energy reports encouraging adoption of energy-savings improvements
3029	Behavioral	Pre-pay (Gas furnace/CAC)	*MF*	N/A	NC	10,165.2	11%	1,118.2	0.180	5.0	$40.00	$0.00	3E+08	Pre-pay billing
3030	Behavioral	Home Energy Management System (Gas furnace/CAC)	*MF*	N/A	NC	10,165.2	3%	326.3	0.053	5.0	$90.00	$45.00	1.90	HEMS are hardware and software systems that can control and monitor one or more energy uses in the home
4001	HVAC Equipment	ASHP Tune Up	*SF*	NLI	Retrofit	6,321.2	5%	316.1	0.152	5.0	$64.00	$64.00	1.53	Air source heat pump tune up
4002	HVAC Equipment	Air Source Heat Pump 16 SEER - Heat pump baseline	*SF*	NLI	MO	6,321.2	9%	566.2	0.612	18.0	$870.00	$300.00	2.47	16 SEER 9.0 hspf air source heat pump
4003	HVAC Equipment	Air Source Heat Pump 16 SEER - Furnace baseline	*SF*	NLI	MO	11,684.8	51%	5,929.7	0.922	18.0	$2,121.00	$300.00	13.12	16 SEER 9.0 hspf air source heat pump
4004	HVAC Equipment	AC Tune Up	*SF*	NLI	Retrofit	2,713.0	5%	135.6	0.161	5.0	$64.00	$64.00	1.11	Central air conditioner tune-up
4005	HVAC Equipment	Central Air Conditioner 16 SEER	*SF*	NLI	MO	2,713.0	18%	483.4	0.508	18.0	$400.00	$200.00	3.41	16 SEER central air conditioner
4006	HVAC Equipment	Smart Thermostat - Heat pump baseline	*SF*	NLI	Retrofit	6,321.2	10%	658.6	0.000	15.0	$154.00	$60.00	5.26	Smart thermostat
4007	HVAC Equipment	WIFI Thermostat - Heat pump baseline	SF	NLI	Retrofit	6,321.2	6%	377.8	0.000	15.0	$103.20	$50.00	3.62	Wifi (non-smart) thermostat
4008	HVAC Equipment	Smart Thermostat - Furnace baseline	SF	NLI	Retrofit	11,684.8	11%	1,239.0	0.000	15.0	$154.00	$60.00	9.89	Smart thermostat
4009	HVAC Equipment	WIFI Thermostat - Furnace baseline	SF	NLI	Retrofit	11,684.8	5%	568.0	0.000	15.0	$103.20	$50.00	5.44	Wifi (non-smart) thermostat
4010	HVAC Equipment	Filter Whistle	SF	NLI	Retrofit	9,132.9	4%	319.7	0.109	15.0	$1.64	$1.64	139.02	Whistle to remind owners to change air filter
4011	HVAC Equipment	ASHP Tune Up	SF	LI	DI	6,321.2	5%	316.1	0.152	5.0	$64.00	$64.00	1.53	Air source heat pump tune up
4012	HVAC Equipment	Air Source Heat Pump 16 SEER - Heat pump baseline	SF	LI	DI	6,321.2	9%	566.2	0.612	18.0	$5,400.00	$5,400.00	0.14	16 SEER 9.0 hspf air source heat pump
4013	HVAC Equipment	Air Source Heat Pump 16 SEER - Furnace baseline	SF	LI	DI	11,684.8	51%	5,929.7	0.922	18.0	$5,400.00	$5,400.00	0.73	16 SEER 9.0 hspf air source heat pump
4014	HVAC Equipment	AC Tune Up	SF	LI	DI	2,713.0	5%	135.6	0.161	5.0	$64.00	$64.00	1.11	Central air conditioner tune-up
4015	HVAC Equipment	Central Air Conditioner 16 SEER	SF	LI	DI	2,713.0	18%	483.4	0.508	18.0	$3,500.00	$3,500.00	0.20	16 SEER central air conditioner
4016	HVAC Equipment	Smart Thermostat - Heat pump baseline	SF	LI	DI	6,321.2	10%	658.6	0.000	15.0	$154.00	$154.00	2.05	Smart thermostat
4017	HVAC Equipment	WIFI Thermostat - Heat pump baseline	SF	LI	DI	6,321.2	6%	377.8	0.000	15.0	$103.20	$103.20	1.75	Wifi (non-smart) thermostat
4018	HVAC Equipment	Smart Thermostat - Furnace baseline	SF	LI	DI	11,684.8	11%	1,239.0	0.000	15.0	$154.00	$154.00	3.85	Smart thermostat
4019	HVAC Equipment	WIFI Thermostat - Furnace baseline	SF	LI	DI	11,684.8	5%	568.0	0.000	15.0	$103.20	$103.20	2.64	Wifi (non-smart) thermostat
4020	HVAC Equipment	Filter Whistle	SF	LI	DI	9,132.9	4%	319.7	0.109	15.0	$1.64	$1.64	139.02	Whistle to remind owners to change air filter

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4021	HVAC Equipment	Air Source Heat Pump 18 SEER - Heat pump baseline	SF	NLI	MO	6,321.2	17%	1,058.6	0.770	18.0	$1,156.00	$500.00	2.33	18 SEER air source heat pump
4022	HVAC Equipment	Ductless Heat Pump 17 SEER 9.5 HSPF - Heat pump baseline	SF	NLI	MO	6,321.2	6%	349.5	2.740	18.0	$1,666.67	$500.00	4.51	17 SEER / 9.5 hspf ductless heat pump
4023	HVAC Equipment	Ductless Heat Pump 19 SEER 9.5 HSPF - Heat pump baseline	SF	NLI	MO	6,321.2	7%	427.5	2.650	18.0	$2,333.33	$500.00	4.46	19 SEER / 9.5 hspf ductless heat pump
4024	HVAC Equipment	Ductless Heat Pump 21 SEER 10.0 HSPF - Heat pump baseline	SF	NLI	MO	6,321.2	8%	523.0	2.589	18.0	$2,833.33	$500.00	4.47	21 SEER / 10.0 hspf ductless heat pump
4025	HVAC Equipment	Ductless Heat Pump 23 SEER 10.0 HSPF - Heat pump baseline	SF	NLI	MO	6,321.2	9%	575.2	2.542	18.0	$3,333.33	$500.00	4.46	23 SEER / 10.0 hspf ductless heat pump
4026	HVAC Equipment	Dual Fuel Air Source Heat Pump 16 SEER - Heat pump baseline	SF	NLI	MO	6,321.2	45%	2,871.9	0.612	18.0	$1,000.00	$300.00	2.24	16 SEER Dual-fuel heat pump
4027	HVAC Equipment	Dual Fuel Air Source Heat Pump 18 SEER - Heat pump baseline	SF	NLI	MO	6,321.2	50%	3,171.0	0.770	18.0	$1,286.00	$500.00	1.97	18 SEER Dual-fuel heat pump
4028	HVAC Equipment	Ground Source Heat Pump - Heat pump baseline	SF	NLI	MO	6,321.2	8%	491.2	-0.213	18.0	$3,609.00	$1,000.00	0.12	Geothermal heat pump
4029	HVAC Equipment	Air Source Heat Pump 18 SEER - Furnace baseline	SF	NLI	MO	11,684.8	55%	6,422.1	1.059	18.0	$2,407.00	$500.00	8.71	18 SEER air source heat pump
4030	HVAC Equipment	Ductless Heat Pump 17 SEER 9.5 HSPF - Furnace baseline	SF	NLI	MO	11,684.8	26%	2,988.6	2.915	18.0	$1,666.67	$500.00	7.85	17 SEER / 9.5 hspf ductless heat pump
4031	HVAC Equipment	Ductless Heat Pump 19 SEER 9.5 HSPF - Furnace baseline	SF	NLI	MO	11,684.8	26%	3,066.6	2.825	18.0	$2,333.33	$500.00	7.80	19 SEER / 9.5 hspf ductless heat pump
4032	HVAC Equipment	Ductless Heat Pump 21 SEER 10.0 HSPF - Furnace baseline	SF	NLI	MO	11,684.8	27%	3,207.2	2.765	18.0	$2,833.33	$500.00	7.86	21 SEER / 10.0 hspf ductless heat pump
4033	HVAC Equipment	Ductless Heat Pump 23 SEER 10.0 HSPF - Furnace baseline	SF	NLI	MO	11,684.8	28%	3,259.3	2.718	18.0	$3,333.33	$500.00	7.85	23 SEER / 10.0 hspf ductless heat pump
4034	HVAC Equipment	Dual Fuel Air Source Heat Pump 16 SEER - Furnace baseline	SF	NLI	MO	11,684.8	70%	8,235.5	0.922	18.0	$2,848.00	$300.00	12.88	16 SEER Dual-fuel heat pump
4035	HVAC Equipment	Dual Fuel Air Source Heat Pump 18 SEER - Furnace baseline	SF	NLI	MO	11,684.8	73%	8,534.6	1.059	18.0	$3,134.00	$500.00	8.36	18 SEER Dual-fuel heat pump
4036	HVAC Equipment	Ground Source Heat Pump - Furnace baseline	SF	NLI	MO	11,684.8	50%	5,854.7	0.082	18.0	$3,609.00	$1,000.00	3.31	Geothermal heat pump
4037	HVAC Equipment	Central Air Conditioner 18 SEER	SF	NLI	MO	2,713.0	30%	823.3	0.950	18.0	$800.00	$400.00	2.97	18 SEER central air conditioner
4038	HVAC Equipment	ECM HVAC Motor	SF	NLI	Retrofit	9,132.9	5%	412.0	0.000	10.0	$97.00	$50.00	2.73	Electrically commutated motor
4039	HVAC Equipment	ENERGY STAR Room Air Conditioner	SF	N/A	MO	489.9	10%	49.0	0.110	9.0	$40.00	$10.00	4.83	ENERGY STAR Room Air Conditioner in place of standard efficiency alternative
4040	HVAC Equipment	Smart Room AC_ET	SF	N/A	MO	489.9	3%	14.7	0.033	9.0	$205.00	$60.00	0.24	Window-mounted AC unit with smart capability
4041	HVAC Equipment	Smart Room AC - controls retrofit_ET	SF	N/A	Retrofit	489.9	3%	14.7	0.033	9.0	$110.00	$30.00	0.48	Smart control retrofit kit
4042	HVAC Equipment	Room Air Conditioner Recycling	SF	N/A	Recycle	656.3	100%	656.3	1.475	3.0	$129.00	$40.00	6.17	Recycling of tertiary room air conditioner
4043	HVAC Equipment	Programmable Thermostat - Heat pump baseline	SF	N/A	Retrofit	6,321.2	4%	229.0	0.000	15.0	$35.00	$10.00	10.97	Programmable thermostat
4044	HVAC Equipment	Programmable Thermostat - Furnace baseline	SF	N/A	Retrofit	11,684.8	3%	354.6	0.000	15.0	$35.00	$10.00	16.99	Programmable thermostat

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4045	HVAC Equipment	Smart Vents/Sensors_ET	SF	N/A	Retrofit	9,132.9	10%	913.3	0.313	15.0	$800.00	$400.00	1.63	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
4046	HVAC Equipment	Smart Ceiling Fan_ET	SF	N/A	Retrofit	2,643.1	8%	198.2	0.235	20.0	$2,400.00	$1,000.00	0.31	Smart ceiling fans save energy by turning off when rooms are unoccupied and by helping the home's central HVAC maintain indoor comfort
4047	HVAC Equipment	Whole House Attic Fan	SF	N/A	Retrofit	2,643.1	13%	338.0	0.000	20.0	$546.60	$275.00	0.74	Whole house attic fan
4048	HVAC Equipment	Attic Fan	SF	N/A	Retrofit	2,643.1	10%	264.3	0.000	20.0	$120.48	$40.00	3.96	Attic fans can reduce the need for AC by reducing heat transfer from the attic through the ceiling of the house
4049	HVAC Equipment	Air Source Heat Pump 16 SEER - Heat pump baseline	SF	N/A	NC	4,984.5	8%	419.9	0.405	18.0	$870.00	$300.00	1.97	16 SEER 9.0 hspf air source heat pump
4050	HVAC Equipment	Air Source Heat Pump 18 SEER - Heat pump baseline	SF	N/A	NC	4,984.5	17%	825.1	0.576	18.0	$1,156.00	$500.00	1.92	18 SEER air source heat pump
4051	HVAC Equipment	Ductless Heat Pump 17 SEER 9.5 HSPF - Heat pump baseline	SF	N/A	NC	4,984.5	6%	319.4	1.931	18.0	$1,666.67	$500.00	3.57	17 SEER / 9.5 hspf ductless heat pump
4052	HVAC Equipment	Ductless Heat Pump 19 SEER 9.5 HSPF - Heat pump baseline	SF	N/A	NC	4,984.5	8%	397.4	1.841	18.0	$2,333.33	$500.00	3.51	19 SEER / 9.5 hspf ductless heat pump
4053	HVAC Equipment	Ductless Heat Pump 21 SEER 10.0 HSPF - Heat pump baseline	SF	N/A	NC	4,984.5	10%	485.0	1.780	18.0	$2,833.33	$500.00	3.51	21 SEER / 10.0 hspf ductless heat pump
4054	HVAC Equipment	Ductless Heat Pump 23 SEER 10.0 HSPF - Heat pump baseline	SF	N/A	NC	4,984.5	11%	537.1	1.733	18.0	$3,333.33	$500.00	3.48	23 SEER / 10.0 hspf ductless heat pump
4055	HVAC Equipment	Dual Fuel Air Source Heat Pump 16 SEER - Heat pump baseline	SF	N/A	NC	4,984.5	36%	1,797.4	0.405	18.0	$1,000.00	$300.00	2.09	16 SEER Dual-fuel heat pump
4056	HVAC Equipment	Dual Fuel Air Source Heat Pump 18 SEER - Heat pump baseline	SF	N/A	NC	4,984.5	42%	2,083.8	0.576	18.0	$1,286.00	$500.00	1.86	18 SEER Dual-fuel heat pump
4057	HVAC Equipment	Ground Source Heat Pump - Heat pump baseline	SF	N/A	NC	4,984.5	7%	368.9	-0.084	18.0	$3,609.00	$1,000.00	0.14	Geothermal heat pump
4058	HVAC Equipment	Central Air Conditioner 16 SEER	SF	N/A	NC	2,364.4	18%	432.6	0.429	18.0	$400.00	$200.00	3.06	16 SEER central air conditioner
4059	HVAC Equipment	Central Air Conditioner 18 SEER	SF	N/A	NC	2,364.4	30%	711.3	0.716	18.0	$800.00	$400.00	2.57	18 SEER central air conditioner
4060	HVAC Equipment	ENERGY STAR Room Air Conditioner	SF	N/A	NC	489.9	10%	49.0	0.110	9.0	$40.00	$10.00	4.83	ENERGY STAR Room Air Conditioner in place of standard efficiency alternative
4061	HVAC Equipment	Smart Room AC_ET	SF	N/A	NC	489.9	3%	14.7	0.033	9.0	$205.00	$60.00	0.24	Window-mounted AC unit with smart capability
4062	HVAC Equipment	Programmable Thermostat - Heat pump baseline	SF	N/A	NC	4,984.5	4%	185.1	0.000	15.0	$35.00	$10.00	8.87	Programmable thermostat
4063	HVAC Equipment	Smart Thermostat - Heat pump baseline	SF	N/A	NC	4,984.5	10%	517.9	0.000	15.0	$154.00	$60.00	4.14	Smart thermostat
4064	HVAC Equipment	WIFI Thermostat - Heat pump baseline	SF	N/A	NC	4,984.5	6%	306.6	0.000	15.0	$103.20	$50.00	2.94	Wifi (non-smart) thermostat
4065	HVAC Equipment	Filter Whistle	SF	N/A	NC	4,984.5	4%	174.5	0.078	15.0	$1.64	$1.64	86.34	Whistle to remind owners to change air filter

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4066	HVAC Equipment	Smart Vents/Sensors_ET	SF	N/A	NC	4,984.5	10%	498.4	0.223	15.0	$800.00	$400.00	1.01	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
4067	HVAC Equipment	ASHP Tune Up	MF	NLI	Retrofit	3,171.0	5%	158.5	0.068	5.0	$64.00	$64.00	0.82	Air source heat pump tune up
4068	HVAC Equipment	Air Source Heat Pump 16 SEER - Heat pump baseline	MF	NLI	MO	3,171.0	7%	217.1	0.182	18.0	$870.00	$300.00	0.90	16 SEER 9.0 hspf air source heat pump
4069	HVAC Equipment	Air Source Heat Pump 16 SEER - Furnace baseline	MF	NLI	MO	4,973.1	41%	2,019.3	0.391	18.0	$2,121.00	$300.00	4.80	16 SEER 9.0 hspf air source heat pump
4070	HVAC Equipment	AC Tune Up	MF	NLI	Retrofit	2,017.5	5%	100.9	0.077	5.0	$64.00	$64.00	0.71	Central air conditioner tune-up
4071	HVAC Equipment	Central Air Conditioner 16 SEER	MF	NLI	MO	2,017.5	19%	382.4	0.259	18.0	$400.00	$200.00	2.30	16 SEER central air conditioner
4072	HVAC Equipment	Smart Thermostat - Heat pump baseline	MF	NLI	Retrofit	3,171.0	10%	324.3	0.000	15.0	$154.00	$60.00	2.59	Smart thermostat
4073	HVAC Equipment	WIFI Thermostat - Heat pump baseline	MF	NLI	Retrofit	3,171.0	7%	226.4	0.000	15.0	$103.20	$50.00	2.17	Wifi (non-smart) thermostat
4074	HVAC Equipment	Smart Thermostat - Furnace baseline	MF	NLI	Retrofit	4,973.1	10%	518.2	0.000	15.0	$154.00	$60.00	4.14	Smart thermostat
4075	HVAC Equipment	WIFI Thermostat - Furnace baseline	MF	NLI	Retrofit	4,973.1	6%	297.1	0.000	15.0	$103.20	$50.00	2.85	Wifi (non-smart) thermostat
4076	HVAC Equipment	Filter Whistle	MF	NLI	Retrofit	4,115.7	4%	144.0	0.051	15.0	$1.64	$1.64	68.64	Whistle to remind owners to change air filter
4077	HVAC Equipment	ASHP Tune Up	MF	LI	DI	3,171.0	5%	158.5	0.068	5.0	$64.00	$64.00	0.82	Air source heat pump tune up
4078	HVAC Equipment	Air Source Heat Pump 16 SEER - Heat pump baseline	MF	LI	DI	3,171.0	7%	217.1	0.182	18.0	$5,400.00	$5,400.00	0.05	16 SEER 9.0 hspf air source heat pump
4079	HVAC Equipment	Air Source Heat Pump 16 SEER - Furnace baseline	MF	LI	DI	4,973.1	41%	2,019.3	0.391	18.0	$5,400.00	$5,400.00	0.27	16 SEER 9.0 hspf air source heat pump
4080	HVAC Equipment	AC Tune Up	MF	LI	DI	2,017.5	5%	100.9	0.077	5.0	$64.00	$64.00	0.71	Central air conditioner tune-up
4081	HVAC Equipment	Central Air Conditioner 16 SEER	MF	LI	DI	2,017.5	19%	382.4	0.259	18.0	$3,500.00	$3,500.00	0.13	16 SEER central air conditioner
4082	HVAC Equipment	Smart Thermostat - Heat pump baseline	MF	LI	DI	3,171.0	10%	324.3	0.000	15.0	$154.00	$154.00	1.01	Smart thermostat
4083	HVAC Equipment	WIFI Thermostat - Heat pump baseline	MF	LI	DI	3,171.0	7%	226.4	0.000	15.0	$103.20	$103.20	1.05	Wifi (non-smart) thermostat
4084	HVAC Equipment	Smart Thermostat - Furnace baseline	MF	LI	DI	4,973.1	10%	518.2	0.000	15.0	$154.00	$154.00	1.61	Smart thermostat
4085	HVAC Equipment	WIFI Thermostat - Furnace baseline	MF	LI	DI	4,973.1	6%	297.1	0.000	15.0	$103.20	$103.20	1.38	Wifi (non-smart) thermostat
4086	HVAC Equipment	Filter Whistle	MF	LI	DI	4,115.7	4%	144.0	0.051	15.0	$1.64	$1.64	68.64	Whistle to remind owners to change air filter
4087	HVAC Equipment	Air Source Heat Pump 18 SEER - Heat pump baseline	MF	NLI	MO	3,171.0	16%	500.3	0.330	18.0	$1,156.00	$500.00	1.10	18 SEER air source heat pump
4088	HVAC Equipment	Ductless Heat Pump 17 SEER 9.5 HSPF - Heat pump baseline	MF	NLI	MO	3,171.0	9%	270.4	1.065	18.0	$1,666.67	$500.00	2.34	17 SEER / 9.5 hspf ductless heat pump
4089	HVAC Equipment	Ductless Heat Pump 19 SEER 9.5 HSPF - Heat pump baseline	MF	NLI	MO	3,171.0	11%	348.4	0.975	18.0	$2,333.33	$500.00	2.25	19 SEER / 9.5 hspf ductless heat pump
4090	HVAC Equipment	Ductless Heat Pump 21 SEER 10.0 HSPF - Heat pump baseline	MF	NLI	MO	3,171.0	13%	422.8	0.914	18.0	$2,833.33	$500.00	2.22	21 SEER / 10.0 hspf ductless heat pump

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4091	HVAC Equipment	Ductless Heat Pump 23 SEER 10.0 HSPF - Heat pump baseline	MF	NLI	MO	3,171.0	15%	475.0	0.867	18.0	$3,333.33	$500.00	2.19	23 SEER / 10.0 hspf ductless heat pump
4092	HVAC Equipment	Dual Fuel Air Source Heat Pump 16 SEER - Heat pump baseline	MF	NLI	MO	3,171.0	29%	918.5	0.182	18.0	$1,000.00	$300.00	0.82	16 SEER Dual-fuel heat pump
4093	HVAC Equipment	Dual Fuel Air Source Heat Pump 18 SEER - Heat pump baseline	MF	NLI	MO	3,171.0	36%	1,141.1	0.330	18.0	$1,286.00	$500.00	0.99	18 SEER Dual-fuel heat pump
4094	HVAC Equipment	Air Source Heat Pump 18 SEER - Furnace baseline	MF	NLI	MO	4,973.1	46%	2,302.4	0.535	18.0	$2,407.00	$500.00	3.45	18 SEER air source heat pump
4095	HVAC Equipment	Ductless Heat Pump 17 SEER 9.5 HSPF - Furnace baseline	MF	NLI	MO	4,973.1	23%	1,137.5	1.242	18.0	$1,666.67	$500.00	3.64	17 SEER / 9.5 hspf ductless heat pump
4096	HVAC Equipment	Ductless Heat Pump 19 SEER 9.5 HSPF - Furnace baseline	MF	NLI	MO	4,973.1	24%	1,215.5	1.152	18.0	$2,333.33	$500.00	3.56	19 SEER / 9.5 hspf ductless heat pump
4097	HVAC Equipment	Ductless Heat Pump 21 SEER 10.0 HSPF - Furnace baseline	MF	NLI	MO	4,973.1	26%	1,304.1	1.091	18.0	$2,833.33	$500.00	3.54	21 SEER / 10.0 hspf ductless heat pump
4098	HVAC Equipment	Ductless Heat Pump 23 SEER 10.0 HSPF - Furnace baseline	MF	NLI	MO	4,973.1	27%	1,356.3	1.044	18.0	$3,333.33	$500.00	3.51	23 SEER / 10.0 hspf ductless heat pump
4099	HVAC Equipment	Dual Fuel Air Source Heat Pump 16 SEER - Furnace baseline	MF	NLI	MO	4,973.1	55%	2,720.7	0.391	18.0	$2,848.00	$300.00	4.72	16 SEER Dual-fuel heat pump
4100	HVAC Equipment	Dual Fuel Air Source Heat Pump 18 SEER - Furnace baseline	MF	NLI	MO	4,973.1	59%	2,943.3	0.535	18.0	$3,134.00	$500.00	3.33	18 SEER Dual-fuel heat pump
4101	HVAC Equipment	Central Air Conditioner 18 SEER	MF	NLI	MO	2,017.5	31%	631.3	0.470	18.0	$800.00	$400.00	1.91	18 SEER central air conditioner
4102	HVAC Equipment	ECM HVAC Motor	MF	NLI	Retrofit	4,115.7	10%	412.0	0.000	10.0	$97.00	$50.00	2.73	Electrically commutated motor
4103	HVAC Equipment	ENERGY STAR Room Air Conditioner	MF	N/A	MO	489.9	10%	49.0	0.110	9.0	$40.00	$10.00	4.83	ENERGY STAR Room Air Conditioner in place of standard efficiency alternative
4104	HVAC Equipment	Smart Room AC_ET	MF	N/A	MO	489.9	3%	14.7	0.033	9.0	$205.00	$60.00	0.24	Window-mounted AC unit with smart capability
4105	HVAC Equipment	Smart Room AC - controls retrofit_ET	MF	N/A	Retrofit	489.9	3%	14.7	0.033	9.0	$110.00	$30.00	0.48	Smart control retrofit kit
4106	HVAC Equipment	Room Air Conditioner Recycling	MF	N/A	Recycle	656.3	100%	656.3	1.475	3.0	$129.00	$40.00	6.17	Recycling of tertiary room air conditioner
4107	HVAC Equipment	Programmable Thermostat - Heat pump baseline	MF	N/A	Retrofit	3,171.0	4%	134.3	0.000	15.0	$35.00	$10.00	6.43	Programmable thermostat
4108	HVAC Equipment	Programmable Thermostat - Furnace baseline	MF	N/A	Retrofit	4,973.1	4%	180.1	0.000	15.0	$35.00	$10.00	8.63	Programmable thermostat
4109	HVAC Equipment	Smart Vents/Sensors_ET	MF	N/A	Retrofit	4,115.7	10%	411.6	0.145	15.0	$800.00	$400.00	0.80	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
4110	HVAC Equipment	Smart Ceiling Fan_ET	MF	N/A	Retrofit	1,943.4	7%	145.8	0.109	20.0	$2,400.00	$1,000.00	0.20	Smart ceiling fans save energy by turning off when rooms are unoccupied and by helping the home's central HVAC maintain indoor comfort
4111	HVAC Equipment	Whole House Attic Fan	MF	N/A	Retrofit	1,943.4	17%	338.0	0.000	20.0	$546.60	$275.00	0.74	Whole house attic fan
4112	HVAC Equipment	Attic Fan	MF	N/A	Retrofit	1,943.4	10%	194.3	0.000	20.0	$120.48	$40.00	2.91	Attic fans can reduce the need for AC by reducing heat transfer from the attic through the ceiling of the home

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4113	HVAC Equipment	Air Source Heat Pump 16 SEER - Heat pump baseline	MF	N/A	NC	2,870.1	6%	185.4	0.185	18.0	$870.00	$300.00	0.81	16 SEER 9.0 hspf air source heat pump
4114	HVAC Equipment	Air Source Heat Pump 18 SEER - Heat pump baseline	MF	N/A	NC	2,870.1	16%	445.7	0.329	18.0	$1,156.00	$500.00	1.00	18 SEER air source heat pump
4115	HVAC Equipment	Ductless Heat Pump 17 SEER 9.5 HSPF - Heat pump baseline	MF	N/A	NC	2,870.1	9%	265.3	1.031	18.0	$1,666.67	$500.00	2.12	17 SEER / 9.5 hspf ductless heat pump
4116	HVAC Equipment	Ductless Heat Pump 19 SEER 9.5 HSPF - Heat pump baseline	MF	N/A	NC	2,870.1	12%	343.3	0.941	18.0	$2,333.33	$500.00	2.04	19 SEER / 9.5 hspf ductless heat pump
4117	HVAC Equipment	Ductless Heat Pump 21 SEER 10.0 HSPF - Heat pump baseline	MF	N/A	NC	2,870.1	15%	416.4	0.880	18.0	$2,833.33	$500.00	2.02	21 SEER / 10.0 hspf ductless heat pump
4118	HVAC Equipment	Ductless Heat Pump 23 SEER 10.0 HSPF - Heat pump baseline	MF	N/A	NC	2,870.1	16%	468.6	0.833	18.0	$3,333.33	$500.00	1.99	23 SEER / 10.0 hspf ductless heat pump
4119	HVAC Equipment	Dual Fuel Air Source Heat Pump 16 SEER - Heat pump baseline	MF	N/A	NC	2,870.1	28%	815.1	0.185	18.0	$1,000.00	$300.00	0.73	16 SEER Dual-fuel heat pump
4120	HVAC Equipment	Dual Fuel Air Source Heat Pump 18 SEER - Heat pump baseline	MF	N/A	NC	2,870.1	36%	1,020.9	0.329	18.0	$1,286.00	$500.00	0.89	18 SEER Dual-fuel heat pump
4121	HVAC Equipment	Central Air Conditioner 16 SEER	MF	N/A	NC	1,897.8	20%	378.3	0.295	18.0	$400.00	$200.00	2.36	16 SEER central air conditioner
4122	HVAC Equipment	Central Air Conditioner 18 SEER	MF	N/A	NC	1,897.8	32%	602.1	0.498	18.0	$800.00	$400.00	1.87	18 SEER central air conditioner
4123	HVAC Equipment	ENERGY STAR Room Air Conditioner	MF	N/A	NC	489.9	10%	49.0	0.110	9.0	$40.00	$10.00	4.83	ENERGY STAR Room Air Conditioner in place of standard efficiency alternative
4124	HVAC Equipment	Smart Room AC_ET	MF	N/A	NC	489.9	3%	14.7	0.033	9.0	$205.00	$60.00	0.24	Window-mounted AC unit with smart capability
4125	HVAC Equipment	Programmable Thermostat - Heat pump baseline	MF	N/A	NC	2,870.1	4%	122.7	0.000	15.0	$35.00	$10.00	5.88	Programmable thermostat
4126	HVAC Equipment	Smart Thermostat - Heat pump baseline	MF	N/A	NC	2,870.1	10%	293.2	0.000	15.0	$154.00	$60.00	2.34	Smart thermostat
4127	HVAC Equipment	WIFI Thermostat - Heat pump baseline	MF	N/A	NC	2,870.1	7%	207.0	0.000	15.0	$103.20	$50.00	1.98	Wifi (non-smart) thermostat
4128	HVAC Equipment	Filter Whistle	MF	N/A	NC	2,870.1	4%	100.5	0.046	15.0	$1.64	$1.64	51.70	Whistle to remind owners to change air filter
4129	HVAC Equipment	Smart Vents/Sensors_ET	MF	N/A	NC	2,870.1	10%	287.0	0.133	15.0	$800.00	$400.00	0.61	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
4130	HVAC Equipment	Smart Thermostat - Gas / CAC	SF	NLI	Retrofit	2,939.6	10%	292.7	0.000	15.0	$154.00	$60.00	7.41	Smart thermostat
4131	HVAC Equipment	WIFI Thermostat - Gas / CAC	SF	NLI	Retrofit	2,939.6	9%	258.0	0.000	15.0	$103.20	$50.00	4.36	Wifi (non-smart) thermostat
4132	HVAC Equipment	Filter Whistle	SF	NLI	Retrofit	2,939.6	3%	95.2	0.120	15.0	$1.64	$1.64	105.83	Whistle to remind owners to change air filter
4133	HVAC Equipment	Smart Thermostat - Gas / CAC	SF	LI	DI	2,939.6	10%	292.7	0.000	15.0	$154.00	$154.00	2.89	Smart thermostat
4134	HVAC Equipment	WIFI Thermostat - Gas / CAC	SF	LI	DI	2,939.6	9%	258.0	0.000	15.0	$103.20	$103.20	2.11	Wifi (non-smart) thermostat
4135	HVAC Equipment	Filter Whistle	SF	LI	DI	2,939.6	3%	95.2	0.120	15.0	$1.64	$1.64	105.83	Whistle to remind owners to change air filter
4136	HVAC Equipment	Programmable Thermostat - Gas / CAC	SF	N/A	Retrofit	2,939.6	5%	149.8	0.000	15.0	$35.00	$10.00	13.49	Programmable thermostat

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4137	HVAC Equipment	Smart Vents/Sensors_ET	SF	N/A	Retrofit	2,939.6	10%	294.0	0.343	15.0	$800.00	$400.00	1.60	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
4138	HVAC Equipment	Programmable Thermostat - Gas / CAC	SF	N/A	NC	2,479.3	5%	129.5	0.000	18.0	$35.00	$10.00	11.87	Programmable thermostat
4139	HVAC Equipment	Smart Thermostat - Gas / CAC	SF	N/A	NC	2,479.3	10%	245.9	0.000	15.0	$154.00	$60.00	5.28	Smart thermostat
4140	HVAC Equipment	WIFI Thermostat - Gas / CAC	SF	N/A	NC	2,479.3	9%	223.6	0.000	15.0	$103.20	$50.00	3.38	Wifi (non-smart) thermostat
4141	HVAC Equipment	Filter Whistle	SF	N/A	NC	2,479.3	3%	81.9	0.107	15.0	$1.64	$1.64	83.65	Whistle to remind owners to change air filter
4142	HVAC Equipment	Smart Vents/Sensors_ET	SF	N/A	NC	2,479.3	10%	247.9	0.305	15.0	$800.00	$400.00	1.21	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
4143	HVAC Equipment	Smart Thermostat - Gas / CAC	MF	NLI	Retrofit	2,163.0	10%	213.2	0.000	15.0	$154.00	$60.00	3.27	Smart thermostat
4144	HVAC Equipment	WIFI Thermostat - Gas / CAC	MF	NLI	Retrofit	2,163.0	9%	202.7	0.000	15.0	$103.20	$50.00	2.53	Wifi (non-smart) thermostat
4145	HVAC Equipment	Filter Whistle	MF	NLI	Retrofit	2,163.0	3%	73.4	0.058	15.0	$1.64	$1.64	61.32	Whistle to remind owners to change air filter
4146	HVAC Equipment	Smart Thermostat - Gas / CAC	MF	LI	DI	2,163.0	10%	213.2	0.000	15.0	$154.00	$154.00	1.27	Smart thermostat
4147	HVAC Equipment	WIFI Thermostat - Gas / CAC	MF	LI	DI	2,163.0	9%	202.7	0.000	15.0	$103.20	$103.20	1.22	Wifi (non-smart) thermostat
4148	HVAC Equipment	Filter Whistle	MF	LI	DI	2,163.0	3%	73.4	0.058	15.0	$1.64	$1.64	61.32	Whistle to remind owners to change air filter
4149	HVAC Equipment	Programmable Thermostat - Gas / CAC	MF	N/A	Retrofit	2,163.0	5%	117.0	0.000	15.0	$35.00	$10.00	7.56	Programmable thermostat
4150	HVAC Equipment	Smart Vents/Sensors_ET	MF	N/A	Retrofit	2,163.0	10%	216.3	0.166	15.0	$800.00	$400.00	0.83	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
4151	HVAC Equipment	Programmable Thermostat - Gas / CAC	MF	N/A	NC	1,964.8	5%	106.0	0.000	15.0	$35.00	$10.00	7.20	Programmable thermostat
4152	HVAC Equipment	Smart Thermostat - Gas / CAC	MF	N/A	NC	1,964.8	10%	193.8	0.000	15.0	$154.00	$60.00	3.25	Smart thermostat
4153	HVAC Equipment	WIFI Thermostat - Gas / CAC	MF	N/A	NC	1,964.8	9%	183.6	0.000	15.0	$103.20	$50.00	2.40	Wifi (non-smart) thermostat
4154	HVAC Equipment	Filter Whistle	MF	N/A	NC	1,964.8	3%	66.5	0.057	15.0	$1.64	$1.64	57.41	Whistle to remind owners to change air filter
4155	HVAC Equipment	Smart Vents/Sensors_ET	MF	N/A	NC	1,964.8	10%	196.5	0.164	15.0	$800.00	$400.00	0.79	Smart vents relay temperature and occupancy information to a smart thermostat (or other control device) to reduce energy waste in unoccupied areas of the home
5001	Lighting	LED 9W (Standard)	SF	NLI	MO	37.5	86%	32.2	0.040	15.0	$1.01	$0.76	25.14	Standard LED Replacing Standard Halogen/CFL Bulb
5002	Lighting	LED 5W Globe (Specialty)	SF	NLI	MO	28.7	84%	24.1	0.023	15.0	$4.00	$3.00	4.36	Specialty LED Replacing Specialty Halogen/Incandescent Bulb

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5003	Lighting	LED R30 Dimmable (Reflector)	SF	NLI	MO	40.1	83%	33.1	0.041	15.0	$5.34	$4.01	4.98	Reflector LED Replacing Standard Halogen/Incandescent Bulb
5004	Lighting	LED Fixtures	SF	NLI	MO	82.0	74%	60.8	0.061	15.0	$20.25	$5.06	8.26	Residential Occupancy Sensors (DIRECT INSTALL)
5005	Lighting	Linear LED	SF	NLI	Retrofit	23.5	44%	10.3	0.014	9.0	$7.00	$5.25	0.73	T8 Linear Tube Fluorescent Replacing T12 LTF
5006	Lighting	Residential Occupancy Sensors	SF	NLI	Retrofit	108.9	35%	38.1	0.048	10.0	$30.00	$7.50	2.46	Residential Occupancy Sensors
5007	Lighting	Smart Lighting Switch_ET	SF	NLI	Retrofit	106.5	35%	37.3	0.047	10.0	$25.00	$6.25	2.88	Residential Occupancy Sensors
5008	Lighting	LED Nightlights	SF	NLI	Retrofit	14.6	93%	13.6	0.005	16.0	$2.75	$0.69	10.02	LED Nightlights Replacing Incandescent Nightlights
5009	Lighting	LED 13W (Exterior)	SF	NLI	MO	126.7	83%	105.2	0.048	15.0	$4.76	$4.00	12.59	Exterior LED Replacing Exterior Halogen/CFL Bulb
5010	Lighting	Exterior Lighting Controls	SF	NLI	Retrofit	178.1	35%	62.3	0.028	10.0	$30.00	$7.50	2.75	Residential Occupancy Sensors
5011	Lighting	DI LED 9W (Standard)	SF	NLI	DI	37.5	86%	32.2	0.040	15.0	$3.00	$3.00	6.35	Standard LED Replacing Standard Halogen/CFL Bulb
5012	Lighting	DI LED 5W Globe (Specialty)	SF	NLI	DI	28.7	84%	24.1	0.023	15.0	$5.00	$5.00	2.62	Specialty LED Replacing Specialty Halogen/Incandescent Bulb (DIRECT INSTALL)
5013	Lighting	DI LED R30 Dimmable (Reflector)	SF	NLI	DI	39.0	83%	32.3	0.040	15.0	$8.63	$8.63	2.25	Reflector LED Replacing Standard Halogen/Incandescent Bulb (DIRECT INSTALL)
5014	Lighting	DI LED Nightlights	SF	NLI	DI	14.6	93%	13.6	0.005	16.0	$2.75	$2.75	2.50	LED Nightlights Replacing Incandescent Nightlights (DIRECT INSTALL)
5015	Lighting	DI LED 9W (Standard)	SF	LI	DI	37.5	86%	32.2	0.040	15.0	$3.00	$3.00	6.35	Standard LED Replacing Standard Halogen/CFL Bulb
5016	Lighting	DI LED 5W Globe (Specialty)	SF	LI	DI	28.7	84%	24.1	0.023	15.0	$5.00	$5.00	2.62	Specialty LED Replacing Specialty Halogen/Incandescent Bulb (DIRECT INSTALL)
5017	Lighting	DI LED R30 Dimmable (Reflector)	SF	LI	DI	39.0	83%	32.3	0.040	15.0	$8.63	$8.63	2.25	Reflector LED Replacing Standard Halogen/Incandescent Bulb (DIRECT INSTALL)
5018	Lighting	DI LED Nightlights	SF	LI	DI	14.6	93%	13.6	0.005	16.0	$2.75	$2.75	2.50	LED Nightlights Replacing Incandescent Nightlights (DIRECT INSTALL)
5019	Lighting	DI LED 13W (Exterior)	SF	LI	DI	126.7	83%	105.2	0.048	15.0	$6.76	$6.76	7.45	Exterior LED Replacing Exterior Halogen/CFL Bulb
5020	Lighting	LED 9W (Standard)	SF	N/A	NC	37.5	86%	32.2	0.040	15.0	$1.01	$0.76	25.14	Standard LED Replacing Standard Halogen/CFL Bulb
5021	Lighting	LED 5W Globe (Specialty)	SF	N/A	NC	28.7	84%	24.1	0.023	15.0	$4.00	$3.00	4.36	Specialty LED Replacing Specialty Halogen/Incandescent Bulb
5022	Lighting	LED R30 Dimmable (Reflector)	SF	N/A	NC	40.1	83%	33.1	0.041	15.0	$5.34	$4.01	4.98	Reflector LED Replacing Standard Halogen/Incandescent Bulb
5023	Lighting	LED Fixtures	SF	N/A	NC	82.0	74%	60.8	0.061	15.0	$20.25	$5.06	8.26	Residential Occupancy Sensors (DIRECT INSTALL)
5024	Lighting	Linear LED	SF	N/A	NC	23.5	44%	10.3	0.014	9.0	$2.50	$1.88	2.06	T8 Linear Tube Fluorescent Replacing T12 LTF
5025	Lighting	Residential Occupancy Sensors	SF	N/A	NC	108.9	35%	38.1	0.048	10.0	$30.00	$7.50	2.46	Residential Occupancy Sensors
5026	Lighting	Smart Lighting Switch_ET	SF	N/A	NC	106.5	35%	37.3	0.047	10.0	$25.00	$6.25	2.88	Residential Occupancy Sensors
5027	Lighting	LED Nightlights	SF	N/A	NC	14.6	93%	13.6	0.005	16.0	$2.75	$0.69	10.02	LED Nightlights Replacing Incandescent Nightlights
5028	Lighting	LED 13W (Exterior)	SF	N/A	NC	126.7	83%	105.2	0.048	15.0	$4.76	$4.00	12.59	Exterior LED Replacing Exterior Halogen/CFL Bulb
5029	Lighting	Exterior Lighting Controls	SF	N/A	NC	178.1	35%	62.3	0.028	10.0	$30.00	$7.50	2.75	Residential Occupancy Sensors

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5030	Lighting	LED 9W (Standard)	MF	NLI	MO	37.5	86%	32.2	0.040	15.0	$1.01	$0.76	25.14	Standard LED Replacing Standard Halogen/CFL Bulb
5031	Lighting	LED 5W Globe (Specialty)	MF	NLI	MO	28.7	84%	24.1	0.023	15.0	$4.00	$3.00	4.36	Specialty LED Replacing Specialty Halogen/Incandescent Bulb
5032	Lighting	LED R30 Dimmable (Reflector)	MF	NLI	MO	40.1	83%	33.1	0.041	15.0	$5.34	$4.01	4.98	Reflector LED Replacing Standard Halogen/Incandescent Bulb
5033	Lighting	LED Fixtures	MF	NLI	MO	82.0	74%	60.8	0.061	15.0	$20.25	$5.06	8.26	Residential Occupancy Sensors (DIRECT INSTALL)
5034	Lighting	Linear LED	MF	NLI	Retrofit	23.5	44%	10.3	0.014	9.0	$7.00	$5.25	0.73	T8 Linear Tube Fluorescent Replacing T12 LTF
5035	Lighting	Residential Occupancy Sensors	MF	NLI	Retrofit	108.9	35%	38.1	0.048	10.0	$30.00	$7.50	2.46	Residential Occupancy Sensors
5036	Lighting	Smart Lighting Switch_ET	MF	NLI	Retrofit	106.5	35%	37.3	0.047	10.0	$25.00	$6.25	2.88	Residential Occupancy Sensors
5037	Lighting	LED Nightlights	MF	NLI	Retrofit	14.6	93%	13.6	0.005	16.0	$2.75	$0.69	10.02	LED Nightlights Replacing Incandescent Nightlights
5038	Lighting	LED 13W (Exterior)	MF	NLI	MO	126.7	83%	105.2	0.048	15.0	$4.76	$4.00	12.59	Exterior LED Replacing Exterior Halogen/CFL Bulb
5039	Lighting	Exterior Lighting Controls	MF	NLI	Retrofit	178.1	35%	62.3	0.028	10.0	$30.00	$7.50	2.75	Residential Occupancy Sensors
5040	Lighting	DI LED 9W (Standard)	MF	NLI	DI	37.5	86%	32.2	0.040	15.0	$3.00	$3.00	6.35	Standard LED Replacing Standard Halogen/CFL Bulb
5041	Lighting	DI LED 5W Globe (Specialty)	MF	NLI	DI	28.7	84%	24.1	0.023	15.0	$5.00	$5.00	2.62	Specialty LED Replacing Specialty Halogen/Incandescent Bulb (DIRECT INSTALL)
5042	Lighting	DI LED R30 Dimmable (Reflector)	MF	NLI	DI	39.0	83%	32.3	0.040	15.0	$8.63	$8.63	2.25	Reflector LED Replacing Standard Halogen/Incandescent Bulb (DIRECT INSTALL)
5043	Lighting	DI LED Nightlights	MF	NLI	DI	14.6	93%	13.6	0.005	16.0	$2.75	$2.75	2.50	LED Nightlights Replacing Incandescent Nightlights (DIRECT INSTALL)
5044	Lighting	DI LED 9W (Standard)	MF	LI	DI	37.5	86%	32.2	0.040	15.0	$3.00	$3.00	6.35	Standard LED Replacing Standard Halogen/CFL Bulb
5045	Lighting	DI LED 5W Globe (Specialty)	MF	LI	DI	28.7	84%	24.1	0.023	15.0	$5.00	$5.00	2.62	Specialty LED Replacing Specialty Halogen/Incandescent Bulb (DIRECT INSTALL)
5046	Lighting	DI LED R30 Dimmable (Reflector)	MF	LI	DI	39.0	83%	32.3	0.040	15.0	$8.63	$8.63	2.25	Reflector LED Replacing Standard Halogen/Incandescent Bulb (DIRECT INSTALL)
5047	Lighting	DI LED Nightlights	MF	LI	DI	14.6	93%	13.6	0.005	16.0	$2.75	$2.75	2.50	LED Nightlights Replacing Incandescent Nightlights (DIRECT INSTALL)
5048	Lighting	DI LED 13W (Exterior)	MF	LI	DI	126.7	83%	105.2	0.048	15.0	$6.76	$6.76	7.45	Exterior LED Replacing Exterior Halogen/CFL Bulb
5049	Lighting	LED 9W (Standard)	MF	N/A	NC	37.5	86%	32.2	0.040	15.0	$1.01	$0.76	25.14	Standard LED Replacing Standard Halogen/CFL Bulb
5050	Lighting	LED 5W Globe (Specialty)	MF	N/A	NC	28.7	84%	24.1	0.023	15.0	$4.00	$3.00	4.36	Specialty LED Replacing Specialty Halogen/Incandescent Bulb
5051	Lighting	LED R30 Dimmable (Reflector)	MF	N/A	NC	40.1	83%	33.1	0.041	15.0	$5.34	$4.01	4.98	Reflector LED Replacing Standard Halogen/Incandescent Bulb
5052	Lighting	LED Fixtures	MF	N/A	NC	82.0	74%	60.8	0.061	15.0	$20.25	$5.06	8.26	Residential Occupancy Sensors (DIRECT INSTALL)
5053	Lighting	Linear LED	MF	N/A	NC	23.5	44%	10.3	0.014	9.0	$2.50	$1.88	2.06	T8 Linear Tube Fluorescent Replacing T12 LTF
5054	Lighting	Residential Occupancy Sensors	MF	N/A	NC	108.9	35%	38.1	0.048	10.0	$30.00	$7.50	2.46	Residential Occupancy Sensors
5055	Lighting	Smart Lighting Switch_ET	MF	N/A	NC	106.5	35%	37.3	0.047	10.0	$25.00	$6.25	2.88	Residential Occupancy Sensors

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5056	Lighting	LED Nightlights	MF	N/A	NC	14.6	93%	13.6	0.005	16.0	$2.75	$0.69	10.02	LED Nightlights Replacing Incandescent Nightlights
5057	Lighting	LED 13W (Exterior)	MF	N/A	NC	126.7	83%	105.2	0.048	15.0	$4.76	$4.00	12.59	Exterior LED Replacing Exterior Halogen/CFL Bulb
5058	Lighting	Exterior Lighting Controls	MF	N/A	NC	178.1	35%	62.3	0.028	10.0	$30.00	$7.50	2.75	Residential Occupancy Sensors
6001	Miscellaneous	Pool Heater	SF	N/A	MO	9,785.1	12%	1,173.5	0.000	10.0	$3,333.33	$1,000.00	0.39	Installation of high efficiency pool pump heater
6002	Miscellaneous	Pool Heater - Solar System	SF	N/A	MO	9,785.1	38%	3,736.8	0.000	10.0	$3,500.00	$1,000.00	1.24	This measure replaces a conventional pool heater with a solar system
6003	Miscellaneous	Hot Tub/Spa	SF	N/A	MO	0.0	0%	417.3	0.048	15.0	$350.00	$122.50	2.11	Installation of an efficient hot tub / spa
6004	Miscellaneous	Variable Speed Pool Pump	SF	N/A	MO	1,363.5	86%	1,172.6	2.068	10.0	$750.00	$300.00	7.62	Installation of variable speed pool pump
6005	Miscellaneous	Pool Timer	SF	N/A	Retrofit	0.0	0%	129.0	0.063	25.0	$115.00	$30.00	6.38	Installation of pool pump timer
6006	Miscellaneous	Well Pump	SF	N/A	MO	0.0	0%	187.0	0.022	20.0	$110.00	$30.00	4.80	Installation of high efficiency well pump in place of typical efficiency unit
6007	Miscellaneous	Pool Heater	SF	N/A	NC	9,785.1	12%	1,173.5	0.000	10.0	$3,333.33	$1,000.00	0.39	Installation of high efficiency pool pump heater
6008	Miscellaneous	Pool Heater - Solar System	SF	N/A	NC	9,785.1	35%	3,437.0	0.000	10.0	$3,500.00	$1,000.00	1.14	Installation of a solar pool heater instead of a conventional pool heater
6009	Miscellaneous	Hot Tub/Spa	SF	N/A	NC	0.0	0%	417.3	0.048	15.0	$350.00	$110.00	2.35	Installation of an efficient hot tub / spa
6010	Miscellaneous	Variable Speed Pool Pump	SF	N/A	NC	1,363.5	86%	1,172.6	2.068	10.0	$750.00	$300.00	7.62	Installation of variable speed pool pump
6011	Miscellaneous	Pool Timer	SF	N/A	NC	0.0	0%	108.3	0.063	25.0	$50.00	$20.00	8.85	Installation of pool pump timer
6012	Miscellaneous	Well Pump	SF	N/A	NC	0.0	0%	187.0	0.022	20.0	$110.00	$30.00	4.80	Installation of high efficiency well pump in place of typical efficiency unit
7001	New Construction	Gold Star: HERS Index Score ≤ 63 - Electric Heated	SF	N/A	NC	15,337.8	37%	5,675.0	0.824	25.0	$2,504.19	$700.00	6.78	Construction of home meeting Gold Star standard (HERS <=63)
7002	New Construction	Platinum Star: HERS Index Score ≤ 60 - Electric Heated	SF	N/A	NC	15,337.8	40%	6,135.1	0.891	25.0	$3,079.19	$800.00	6.41	Construction of home meeting Platinum Star standard (HERS <=60)
7003	New Construction	Gold Star: HERS Index Score ≤ 63 - Electric Heated	MF	N/A	NC	10,959.2	37%	4,054.9	0.491	25.0	$2,504.19	$1,000.00	3.32	Construction of home meeting Gold Star standard (HERS <=63)
7004	New Construction	Platinum Star: HERS Index Score ≤ 60 - Electric Heated	MF	N/A	NC	10,959.2	40%	4,383.7	0.531	25.0	$3,079.19	$1,000.00	3.59	Construction of home meeting Platinum Star standard (HERS <=60)
7005	New Construction	Gold Star: HERS Index Score ≤ 63 - Gas Heated	SF	N/A	NC	8,582.1	37%	3,175.4	0.904	25.0	$1,573.27	$175.00	23.67	Construction of home meeting Gold Star standard (HERS <=63)
7006	New Construction	Platinum Star: HERS Index Score ≤ 60 - Gas Heated	SF	N/A	NC	8,582.1	40%	3,432.8	0.977	25.0	$1,778.27	$200.00	22.40	Construction of home meeting Platinum Star standard (HERS <=60)
7007	New Construction	Gold Star: HERS Index Score ≤ 63 - Gas Heated	MF	N/A	NC	10,165.2	37%	3,761.1	0.605	25.0	$1,573.27	$775.00	4.72	Construction of home meeting Gold Star standard (HERS <=63)
7008	New Construction	Platinum Star: HERS Index Score ≤ 60 - Gas Heated	MF	N/A	NC	10,165.2	40%	4,066.1	0.655	25.0	$1,778.27	$900.00	4.40	Construction of home meeting Platinum Star standard (HERS <=60)
8001	Plug Loads	Smart Power Strips - Tier 1	SF	NLI	Retrofit	197.0	12%	23.0	0.003	4.0	$35.00	$35.00	0.10	Use of a smart strip instead of a standard power strip
8002	Plug Loads	Smart Power Strips - Tier 1	SF	LI	DI	197.0	12%	23.0	0.003	4.0	$35.00	$35.00	0.10	Use of a smart strip instead of a standard power strip
8003	Plug Loads	Efficient Laptop	SF	N/A	MO	50.3	72%	36.0	0.004	4.0	$8.00	$5.00	1.22	Installation of high-efficiency laptop computers in homes with laptop computers
8004	Plug Loads	Efficient Monitor	SF	N/A	MO	66.2	61%	40.2	0.020	5.0	$10.00	$5.00	3.83	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with desktop computers
8005	Plug Loads	Efficient Personal Computer	SF	N/A	MO	238.5	32%	77.0	0.023	4.0	$8.00	$5.00	3.34	Installation of high-efficiency desktop computers in homes with desktop computers

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Measure #	End Use	Measure Name	Home Type	Income Type	Replacement Type	Base Annual Energy	% Elec Savings	Annual kWh Savings	Per Unit Summer Peak kW	Useful Life	Total Measure Cost	Standard Incentive Amount	UCT Ratio	Measure Description
8006	Plug Loads	Efficient Multifunction	SF	N/A	MO	70.1	66%	46.4	0.011	6.0	$1.00	$5.00	2.71	Installation of high efficiency multifunction device instead of a standard efficiency unit
8007	Plug Loads	Efficient TV	SF	N/A	MO	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 televistion
8008	Plug Loads	Smart Television	SF	N/A	MO	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 televistion
8009	Plug Loads	Smart Power Strips - Tier 2	SF	N/A	Retrofit	678.0	36%	244.1	0.028	4.0	$80.00	$20.00	1.92	Use of a advanced power strip instead of a standard power strip
8010	Plug Loads	Smart Plug or Outlet_ET	SF	N/A	Retrofit	678.0	0%	0.0	0.000	4.0	$20.00	$10.00	0.00	Installation of smart plug to control plug loads
8011	Plug Loads	Efficient Laptop	SF	N/A	NC	50.3	72%	36.0	0.004	4.0	$8.00	$5.00	1.22	Installation of high-efficiency laptop computers in homes with laptop computers
8012	Plug Loads	Efficient Monitor	SF	N/A	NC	66.2	61%	40.2	0.020	5.0	$10.00	$5.00	3.83	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with desktop computers
8013	Plug Loads	Efficient Personal Computer	SF	N/A	NC	238.5	32%	77.0	0.023	4.0	$8.00	$5.00	3.34	Installation of high-efficiency desktop computers in homes with desktop computers
8014	Plug Loads	Efficient Multifunction	SF	N/A	NC	70.1	66%	46.4	0.011	6.0	$1.00	$5.00	2.71	Installation of high efficiency multifunction device instead of a standard efficiency unit
8015	Plug Loads	Efficient TV	SF	N/A	NC	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 televistion
8016	Plug Loads	Smart Television	SF	N/A	NC	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 televistion
8017	Plug Loads	Smart Power Strips - Tier 1	SF	N/A	NC	197.0	12%	23.0	0.003	4.0	$35.00	$35.00	0.10	Use of a smart strip instead of a standard power strip
8018	Plug Loads	Smart Power Strips - Tier 2	SF	N/A	NC	678.0	36%	244.1	0.028	4.0	$80.00	$20.00	1.92	Use of a advanced power strip instead of a standard power strip
8019	Plug Loads	Smart Plug or Outlet_ET	SF	N/A	NC	678.0	0%	0.0	0.000	4.0	$20.00	$10.00	0.00	Installation of smart plug to control plug loads
8020	Plug Loads	Smart Power Strips - Tier 1	MF	NLI	Retrofit	197.0	12%	23.0	0.003	4.0	$35.00	$35.00	0.10	Use of a smart strip instead of a standard power strip
8021	Plug Loads	Smart Power Strips - Tier 1	MF	LI	DI	197.0	12%	23.0	0.003	4.0	$35.00	$35.00	0.10	Use of a smart strip instead of a standard power strip
8022	Plug Loads	Efficient Laptop	MF	N/A	MO	50.3	72%	36.0	0.004	4.0	$8.00	$5.00	1.22	Installation of high-efficiency laptop computers in homes with laptop computers
8023	Plug Loads	Efficient Monitor	MF	N/A	MO	66.2	61%	40.2	0.020	5.0	$10.00	$5.00	3.83	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with desktop computers
8024	Plug Loads	Efficient Personal Computer	MF	N/A	MO	238.5	32%	77.0	0.023	4.0	$8.00	$5.00	3.34	Installation of high-efficiency desktop computers in homes with desktop computers
8025	Plug Loads	Efficient Multifunction	MF	N/A	MO	70.1	66%	46.4	0.011	6.0	$1.00	$5.00	2.71	Installation of high efficiency multifunction device instead of a standard efficiency unit
8026	Plug Loads	Efficient TV	MF	N/A	MO	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 televistion
8027	Plug Loads	Smart Television	MF	N/A	MO	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 televistion
8028	Plug Loads	Smart Power Strips - Tier 2	MF	N/A	Retrofit	678.0	36%	244.1	0.028	4.0	$80.00	$20.00	1.92	Use of a advanced power strip instead of a standard power strip
8029	Plug Loads	Smart Plug or Outlet_ET	MF	N/A	Retrofit	678.0	0%	0.0	0.000	4.0	$20.00	$10.00	0.00	Installation of smart plug to control plug loads

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8030	Plug Loads	Efficient Laptop	MF	N/A	NC	50.3	72%	36.0	0.004	4.0	$8.00	$5.00	1.22	Installation of high-efficiency laptop computers in homes with laptop computers
8031	Plug Loads	Efficient Monitor	MF	N/A	NC	66.2	61%	40.2	0.020	5.0	$10.00	$5.00	3.83	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with desktop computers
8032	Plug Loads	Efficient Personal Computer	MF	N/A	NC	238.5	32%	77.0	0.023	4.0	$8.00	$5.00	3.34	Installation of high-efficiency desktop computers in homes with desktop computers
8033	Plug Loads	Efficient Multifunction	MF	N/A	NC	70.1	66%	46.4	0.011	6.0	$1.00	$5.00	2.71	Installation of high efficiency multifunction device instead of a standard efficiency unit
8034	Plug Loads	Efficient TV	MF	N/A	NC	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 television
8035	Plug Loads	Smart Television	MF	N/A	NC	664.4	27%	179.4	0.098	6.0	$10.00	$5.00	10.48	ENERGY STAR 7.0 television
8036	Plug Loads	Smart Power Strips - Tier 1	MF	N/A	NC	197.0	12%	23.0	0.003	4.0	$35.00	$35.00	0.10	Use of a smart strip instead of a standard power strip
8037	Plug Loads	Smart Power Strips - Tier 2	MF	N/A	NC	678.0	36%	244.1	0.028	4.0	$80.00	$20.00	1.92	Use of a advanced power strip instead of a standard power strip
8038	Plug Loads	Smart Plug or Outlet_ET	MF	N/A	NC	678.0	0%	0.0	0.000	4.0	$20.00	$10.00	0.00	Installation of smart plug to control plug loads
9001	HVAC Shell	Duct Sealing - Average Sealing - Heat pump	SF	NLI	Retrofit	7,269.4	3%	242.8	0.064	20.0	$200.00	$175.00	1.14	15% to 10% leakage
9002	HVAC Shell	Duct Sealing - Inadequate Sealing - Heat pump	SF	NLI	Retrofit	7,376.9	5%	397.5	0.158	20.0	$350.00	$300.00	1.21	20% to 15% leakage
9003	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Heat pump	SF	NLI	Retrofit	7,502.4	14%	1,013.0	0.414	20.0	$1,442.50	$1,000.00	0.94	25% to 15% leakage
9004	HVAC Shell	Wall Insulation - Heat pump	SF	NLI	Retrofit	8,887.1	29%	2,565.9	0.867	25.0	$2,746.80	$450.00	5.67	R0 to R11 wall insulation
9005	HVAC Shell	Air Sealing Average Sealing - Heat pump	SF	NLI	Retrofit	6,321.2	11%	709.6	0.179	15.0	$624.65	$200.00	2.32	10 ACH 50 to 7 ACH 50
9006	HVAC Shell	Air Sealing Inadequate Sealing - Heat pump	SF	NLI	Retrofit	7,284.2	13%	963.0	0.251	15.0	$967.20	$200.00	3.15	14 ACH 50 to 10 ACH 50
9007	HVAC Shell	Air Sealing Poor Sealing - Heat pump	SF	NLI	Retrofit	8,949.1	19%	1,664.9	0.389	15.0	$967.20	$200.00	5.46	20 ACH 50 to 14 ACH 50
9008	HVAC Shell	Attic Insulation - Average Insulation - Heat pump	SF	NLI	Retrofit	6,321.2	3%	190.5	0.067	25.0	$1,259.70	$450.00	0.43	R30 to R60
9009	HVAC Shell	Attic Insulation - Inadequate Insulation - Heat pump	SF	NLI	Retrofit	6,568.9	7%	438.2	0.172	25.0	$1,744.20	$450.00	1.04	R19 to R60
9010	HVAC Shell	Attic Insulation - Poor Insulation - Heat pump	SF	NLI	Retrofit	6,932.3	11%	761.0	0.321	25.0	$1,550.40	$450.00	1.84	R11 to R49
9011	HVAC Shell	Duct Sealing - Average Sealing - Electric furnace	SF	NLI	Retrofit	13,437.5	3%	411.6	0.036	20.0	$200.00	$175.00	1.59	15% to 10% leakage
9012	HVAC Shell	Duct Sealing - Inadequate Sealing - Electric furnace	SF	NLI	Retrofit	13,620.9	5%	677.9	0.109	20.0	$350.00	$300.00	1.65	20% to 15% leakage
9013	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Electric furnace	SF	NLI	Retrofit	13,842.1	13%	1,759.1	0.282	20.0	$1,442.50	$1,000.00	1.29	25% to 15% leakage
9014	HVAC Shell	Wall Insulation - Electric furnace	SF	NLI	Retrofit	17,267.5	32%	5,582.7	0.887	25.0	$2,746.80	$450.00	10.41	R0 to R11 wall insulation
9015	HVAC Shell	Air Sealing Average Sealing - Electric furnace	SF	NLI	Retrofit	11,684.8	14%	1,598.5	0.215	15.0	$624.65	$200.00	4.58	10 ACH 50 to 7 ACH 50
9016	HVAC Shell	Air Sealing Inadequate Sealing - Electric furnace	SF	NLI	Retrofit	13,876.8	16%	2,192.0	0.294	15.0	$967.20	$200.00	6.27	14 ACH 50 to 10 ACH 50
9017	HVAC Shell	Air Sealing Poor Sealing - Electric furnace	SF	NLI	Retrofit	17,296.5	20%	3,419.8	0.378	15.0	$967.20	$200.00	9.63	20 ACH 50 to 14 ACH 50

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9018	HVAC Shell	Attic Insulation - Average Insulation - Electric furnace	SF	NLI	Retrofit	11,684.8	3%	349.3	0.052	25.0	$1,259.70	$450.00	0.65	R30 to R60
9019	HVAC Shell	Attic Insulation - Inadequate Insulation - Electric furnace	SF	NLI	Retrofit	12,144.6	7%	809.2	0.133	25.0	$1,744.20	$450.00	1.53	R19 to R60
9020	HVAC Shell	Attic Insulation - Poor Insulation - Electric furnace	SF	NLI	Retrofit	12,884.7	11%	1,476.9	0.278	25.0	$1,550.40	$450.00	2.87	R11 to R49
9021	HVAC Shell	Duct Sealing - Average Sealing - Heat pump	SF	LI	DI	7,269.4	3%	242.8	0.064	20.0	$200.00	$200.00	1.00	15% to 10% leakage
9022	HVAC Shell	Duct Sealing - Inadequate Sealing - Heat pump	SF	LI	DI	7,376.9	5%	397.5	0.158	20.0	$350.00	$350.00	1.04	20% to 15% leakage
9023	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Heat pump	SF	LI	DI	7,502.4	14%	1,013.0	0.414	20.0	$1,442.50	$1,442.50	0.65	25% to 15% leakage
9024	HVAC Shell	Wall Insulation - Heat pump	SF	LI	DI	8,887.1	29%	2,565.9	0.867	25.0	$2,746.80	$2,746.80	0.93	R0 to R11 wall insulation
9025	HVAC Shell	Air Sealing Average Sealing - Heat pump	SF	LI	DI	6,321.2	11%	709.6	0.179	15.0	$624.65	$624.65	0.74	10 ACH 50 to 7 ACH 50
9026	HVAC Shell	Air Sealing Inadequate Sealing - Heat pump	SF	LI	DI	7,284.2	13%	963.0	0.251	15.0	$967.20	$967.20	0.65	14 ACH 50 to 10 ACH 50
9027	HVAC Shell	Air Sealing Poor Sealing - Heat pump	SF	LI	DI	8,949.1	19%	1,664.9	0.389	15.0	$967.20	$967.20	1.13	20 ACH 50 to 14 ACH 50
9028	HVAC Shell	Attic Insulation - Average Insulation - Heat pump	SF	LI	DI	6,321.2	3%	190.5	0.067	25.0	$1,259.70	$1,259.70	0.16	R30 to R60
9029	HVAC Shell	Attic Insulation - Inadequate Insulation - Heat pump	SF	LI	DI	6,568.9	7%	438.2	0.172	25.0	$1,744.20	$1,744.20	0.27	R19 to R60
9030	HVAC Shell	Attic Insulation - Poor Insulation - Heat pump	SF	LI	DI	6,932.3	11%	761.0	0.3	25.0	$1,550.40	$1,550.40	0.53	R11 to R49
9031	HVAC Shell	Duct Sealing - Average Sealing - Electric furnace	SF	LI	DI	13,437.5	3%	411.6	0.036	20.0	$200.00	$200.00	1.39	15% to 10% leakage
9032	HVAC Shell	Duct Sealing - Inadequate Sealing - Electric furnace	SF	LI	DI	13,620.9	5%	677.9	0.109	20.0	$350.00	$350.00	1.42	20% to 15% leakage
9033	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Electric furnace	SF	LI	DI	13,842.1	13%	1,759.1	0.282	20.0	$1,442.50	$1,442.50	0.89	25% to 15% leakage
9034	HVAC Shell	Wall Insulation - Electric furnace	SF	LI	DI	17,267.5	32%	5,582.7	0.887	25.0	$2,746.80	$2,746.80	1.71	R0 to R11 wall insulation
9035	HVAC Shell	Air Sealing Average Sealing - Electric furnace	SF	LI	DI	11,684.8	14%	1,598.5	0.215	15.0	$624.65	$624.65	1.47	10 ACH 50 to 7 ACH 50
9036	HVAC Shell	Air Sealing Inadequate Sealing - Electric furnace	SF	LI	DI	13,876.8	16%	2,192.0	0.294	15.0	$967.20	$967.20	1.30	14 ACH 50 to 10 ACH 50
9037	HVAC Shell	Air Sealing Poor Sealing - Electric furnace	SF	LI	DI	17,296.5	20%	3,419.8	0.378	15.0	$967.20	$967.20	1.99	20 ACH 50 to 14 ACH 50
9038	HVAC Shell	Attic Insulation - Average Insulation - Electric furnace	SF	LI	DI	11,684.8	3%	349.3	0.052	25.0	$1,259.70	$1,259.70	0.23	R30 to R60
9039	HVAC Shell	Attic Insulation - Inadequate Insulation - Electric furnace	SF	LI	DI	12,144.6	7%	809.2	0.133	25.0	$1,744.20	$1,744.20	0.40	R19 to R60
9040	HVAC Shell	Attic Insulation - Poor Insulation - Electric furnace	SF	LI	DI	12,884.7	11%	1,476.9	0.278	25.0	$1,550.40	$1,550.40	0.83	R11 to R49
9041	HVAC Shell	Radiant Barrier - Heat pump	SF	N/A	Retrofit	6,321.2	1%	82.5	0.1	20.0	$416.67	$130.00	0.90	Installation of radiant barrier
9042	HVAC Shell	Cool Roof - Heat pump	SF	N/A	Retrofit	6,321.2	2%	111.1	0.1	20.0	$3,876.00	$1,000.00	0.18	Installation of cool roof
9043	HVAC Shell	Wall Sheathing - Heat pump	SF	N/A	Retrofit	6,321.2	14%	879.9	0.269	20.0	$2,943.00	$1,000.00	0.77	R12 polyiso
9044	HVAC Shell	ENERGY STAR Windows - Heat pump	SF	N/A	Retrofit	6,321.2	9%	548.8	0.372	25.0	$13,601.25	$1,000.00	0.74	U=0.30; SHGC=0.40
9045	HVAC Shell	Basement Sidewall Insulation - Heat pump	SF	N/A	Retrofit	6,678.1	5%	356.9	0.033	25.0	$2,720.00	$1,000.00	0.28	R0 to R13 sidewall insulation

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9046	HVAC Shell	Floor Insulation Above Crawlspace - Heat pump	SF	N/A	Retrofit	6,359.1	1%	37.9	-0.044	25.0	$316.20	$90.00	0.00	R13 floor insulation
9047	HVAC Shell	ENERGY STAR Door - Heat pump	SF	N/A	Retrofit	6,321.2	2%	129.9	0.046	25.0	$388.00	$120.00	1.10	Fiberglasss
9048	HVAC Shell	Smart Window Coverings - Shade/Blind/Controller/Sensor - Heat pump_ET	SF	N/A	Retrofit	6,321.2	16%	979.8	0.471	7.0	$14,875.00	$1,000.00	0.41	Smart shades
9049	HVAC Shell	Smart Window Coverings - Film/Transformer - Heat pump_ET	SF	N/A	Retrofit	6,321.2	16%	979.8	0.471	7.0	$8,160.75	$1,000.00	0.41	Smart films
9050	HVAC Shell	Radiant Barrier - Electric furnace	SF	N/A	Retrofit	11,684.8	1%	102.2	0.065	20.0	$416.67	$130.00	0.91	Installation of radiant barrier
9051	HVAC Shell	Cool Roof - Electric furnace	SF	N/A	Retrofit	11,684.8	0%	-21.1	0.079	20.0	$3,876.00	$1,000.00	0.06	Installation of cool roof
9052	HVAC Shell	Wall Sheathing - Electric furnace	SF	N/A	Retrofit	11,684.8	16%	1,837.2	0.2	20.0	$2,943.00	$1,000.00	1.31	R12 polyiso
9053	HVAC Shell	ENERGY STAR Windows - Electric furnace	SF	N/A	Retrofit	11,684.8	7%	798.3	0.3	25.0	$13,601.25	$1,000.00	0.89	U=0.30; SHGC=0.40
9054	HVAC Shell	Basement Sidewall Insulation - Electric furnace	SF	N/A	Retrofit	12,616.3	7%	931.6	0.031	25.0	$2,720.00	$1,000.00	0.67	R0 to R13 sidewall insulation
9055	HVAC Shell	Floor Insulation Above Crawlspace - Electric furnace	SF	N/A	Retrofit	11,922.5	2%	237.7	-0.028	25.0	$316.20	$90.00	1.54	R13 floor insulation
9056	HVAC Shell	ENERGY STAR Door - Electric furnace	SF	N/A	Retrofit	11,684.8	2%	227.3	0.035	25.0	$388.00	$120.00	1.58	Fiberglasss
9057	HVAC Shell	Smart Window Coverings - Shade/Blind/Controller/Sensor - Electric furnace_ET	SF	N/A	Retrofit	11,684.8	16%	1,811.1	0.498	7.0	$14,875.00	$1,000.00	0.62	Smart shades
9058	HVAC Shell	Smart Window Coverings - Film/Transformer - Electric furnace_ET	SF	N/A	Retrofit	11,684.8	16%	1,811.1	0.498	7.0	$8,160.75	$1,000.00	0.62	Smart films
9059	HVAC Shell	Duct Sealing - Average Sealing - Heat pump	MF	NLI	Retrofit	3,646.6	8%	300.6	0.140	20.0	$200.00	$175.00	1.81	15% to 10% leakage
9060	HVAC Shell	Duct Sealing - Inadequate Sealing - Heat pump	MF	NLI	Retrofit	3,815.6	16%	624.5	0.281	20.0	$350.00	$300.00	2.20	20% to 15% leakage
9061	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Heat pump	MF	NLI	Retrofit	4,021.6	41%	1,630.6	0.741	20.0	$981.00	$500.00	3.46	25% to 15% leakage
9062	HVAC Shell	Wall Insulation - Heat pump	MF	NLI	Retrofit	4,066.7	22%	895.7	0.261	25.0	$1,159.20	$450.00	2.04	R0 to R11 wall insulation
9063	HVAC Shell	Air Sealing Average Sealing - Heat pump	MF	NLI	Retrofit	3,171.0	7%	207.6	0.0	15.0	$309.69	$200.00	0.57	10 ACH 50 to 7 ACH 50
9064	HVAC Shell	Air Sealing Inadequate Sealing - Heat pump	MF	NLI	Retrofit	3,580.6	11%	409.6	0.1	15.0	$479.52	$200.00	1.35	14 ACH 50 to 10 ACH 50
9065	HVAC Shell	Air Sealing Poor Sealing - Heat pump	MF	NLI	Retrofit	4,306.5	17%	725.9	0.152	15.0	$479.52	$200.00	2.42	20 ACH 50 to 14 ACH 50
9066	HVAC Shell	Attic Insulation - Average Insulation - Heat pump	MF	NLI	Retrofit	3,171.0	3%	102.4	0.045	25.0	$1,298.70	$450.00	0.27	R30 to R60
9067	HVAC Shell	Attic Insulation - Inadequate Insulation - Heat pump	MF	NLI	Retrofit	3,295.1	7%	226.5	0.101	25.0	$1,798.20	$450.00	0.60	R19 to R60
9068	HVAC Shell	Attic Insulation - Poor Insulation - Heat pump	MF	NLI	Retrofit	3,479.2	11%	393.2	0.178	25.0	$1,598.40	$450.00	1.04	R11 to R49
9069	HVAC Shell	Duct Sealing - Average Sealing - Electric furnace	MF	NLI	Retrofit	5,719.1	8%	457.5	0.203	20.0	$200.00	$175.00	2.71	15% to 10% leakage
9070	HVAC Shell	Duct Sealing - Inadequate Sealing - Electric furnace	MF	NLI	Retrofit	5,935.5	13%	799.9	0.319	20.0	$350.00	$300.00	2.68	20% to 15% leakage
9071	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Electric furnace	MF	NLI	Retrofit	6,195.8	33%	2,072.8	0.861	20.0	$981.00	$500.00	4.24	25% to 15% leakage

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9072	HVAC Shell	Wall Insulation - Electric furnace	MF	NLI	Retrofit	6,808.6	27%	1,835.5	0.274	25.0	$1,159.20	$450.00	3.52	R0 to R11 wall insulation
9073	HVAC Shell	Air Sealing Average Sealing - Electric furnace	MF	NLI	Retrofit	4,973.1	11%	531.4	0.025	15.0	$309.69	$200.00	1.38	10 ACH 50 to 7 ACH 50
9074	HVAC Shell	Air Sealing Inadequate Sealing - Electric furnace	MF	NLI	Retrofit	5,850.0	15%	876.9	0.094	15.0	$479.52	$200.00	2.50	14 ACH 50 to 10 ACH 50
9075	HVAC Shell	Air Sealing Poor Sealing - Electric furnace	MF	NLI	Retrofit	7,325.7	20%	1,475.7	0.162	15.0	$479.52	$200.00	4.26	20 ACH 50 to 14 ACH 50
9076	HVAC Shell	Attic Insulation - Average Insulation - Electric furnace	MF	NLI	Retrofit	4,973.1	4%	200.1	0.063	25.0	$1,298.70	$450.00	0.46	R30 to R60
9077	HVAC Shell	Attic Insulation - Inadequate Insulation - Electric furnace	MF	NLI	Retrofit	5,177.1	8%	404.1	0.123	25.0	$1,798.20	$450.00	0.92	R19 to R60
9078	HVAC Shell	Attic Insulation - Poor Insulation - Electric furnace	MF	NLI	Retrofit	5,506.9	13%	695.7	0.205	25.0	$1,598.40	$450.00	1.58	R11 to R49
9079	HVAC Shell	Duct Sealing - Average Sealing - Heat pump	MF	LI	DI	3,646.6	8%	300.6	0.140	20.0	$200.00	$200.00	1.58	15% to 10% leakage
9080	HVAC Shell	Duct Sealing - Inadequate Sealing - Heat pump	MF	LI	DI	3,815.6	16%	624.5	0.281	20.0	$350.00	$350.00	1.89	20% to 15% leakage
9081	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Heat pump	MF	LI	DI	4,021.6	41%	1,630.6	0.741	20.0	$981.00	$981.00	1.76	25% to 15% leakage
9082	HVAC Shell	Wall Insulation - Heat pump	MF	LI	DI	4,066.7	22%	895.7	0.261	25.0	$1,159.20	$1,159.20	0.79	R0 to R11 wall insulation
9083	HVAC Shell	Air Sealing Average Sealing - Heat pump	MF	LI	DI	3,171.0	7%	207.6	0.017	15.0	$309.69	$309.69	0.37	10 ACH 50 to 7 ACH 50
9084	HVAC Shell	Air Sealing Inadequate Sealing - Heat pump	MF	LI	DI	3,580.6	11%	409.6	0.087	15.0	$479.52	$479.52	0.56	14 ACH 50 to 10 ACH 50
9085	HVAC Shell	Air Sealing Poor Sealing - Heat pump	MF	LI	DI	4,306.5	17%	725.9	0.152	15.0	$479.52	$479.52	1.01	20 ACH 50 to 14 ACH 50
9086	HVAC Shell	Attic Insulation - Average Insulation - Heat pump	MF	LI	DI	3,171.0	3%	102.4	0.045	25.0	$1,298.70	$1,298.70	0.09	R30 to R60
9087	HVAC Shell	Attic Insulation - Inadequate Insulation - Heat pump	MF	LI	DI	3,295.1	7%	226.5	0.101	25.0	$1,798.20	$1,798.20	0.15	R19 to R60
9088	HVAC Shell	Attic Insulation - Poor Insulation - Heat pump	MF	LI	DI	3,479.2	11%	393.2	0.178	25.0	$1,598.40	$1,598.40	0.29	R11 to R49
9089	HVAC Shell	Duct Sealing - Average Sealing - Electric furnace	MF	LI	DI	5,719.1	8%	457.5	0.203	20.0	$200.00	$200.00	2.37	15% to 10% leakage
9090	HVAC Shell	Duct Sealing - Inadequate Sealing - Electric furnace	MF	LI	DI	5,935.5	13%	799.9	0.319	20.0	$350.00	$350.00	2.30	20% to 15% leakage
9091	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Electric furnace	MF	LI	DI	6,195.8	33%	2,072.8	0.861	20.0	$981.00	$981.00	2.16	25% to 15% leakage
9092	HVAC Shell	Wall Insulation - Electric furnace	MF	LI	DI	6,808.6	27%	1,835.5	0.274	25.0	$1,159.20	$1,159.20	1.36	R0 to R11 wall insulation
9093	HVAC Shell	Air Sealing Average Sealing - Electric furnace	MF	LI	DI	4,973.1	11%	531.4	0.025	15.0	$309.69	$309.69	0.89	10 ACH 50 to 7 ACH 50
9094	HVAC Shell	Air Sealing Inadequate Sealing - Electric furnace	MF	LI	DI	5,850.0	15%	876.9	0.094	15.0	$479.52	$479.52	1.04	14 ACH 50 to 10 ACH 50
9095	HVAC Shell	Air Sealing Poor Sealing - Electric furnace	MF	LI	DI	7,325.7	20%	1,475.7	0.162	15.0	$479.52	$479.52	1.78	20 ACH 50 to 14 ACH 50
9096	HVAC Shell	Attic Insulation - Average Insulation - Electric furnace	MF	LI	DI	4,973.1	4%	200.1	0.063	25.0	$1,298.70	$1,298.70	0.16	R30 to R60
9097	HVAC Shell	Attic Insulation - Inadequate Insulation - Electric furnace	MF	LI	DI	5,177.1	8%	404.1	0.123	25.0	$1,798.20	$1,798.20	0.23	R19 to R60
9098	HVAC Shell	Attic Insulation - Poor Insulation - Electric furnace	MF	LI	DI	5,506.9	13%	695.7	0.205	25.0	$1,598.40	$1,598.40	0.44	R11 to R49
9099	HVAC Shell	Radiant Barrier - Heat pump	MF	N/A	Retrofit	3,171.0	-6%	-202.0	-0.062	20.0	$429.57	$130.00	0.00	Installation of radiant barrier

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9100	HVAC Shell	Cool Roof - Heat pump	MF	N/A	Retrofit	3,171.0	-22%	-698.2	-0.120	20.0	$3,996.00	$1,000.00	0.00	Installation of cool roof
9101	HVAC Shell	Wall Sheathing - Heat pump	MF	N/A	Retrofit	3,171.0	10%	311.5	0.091	25.0	$1,242.00	$625.00	0.50	R12 polyiso
9102	HVAC Shell	ENERGY STAR Windows - Heat pump	MF	N/A	Retrofit	3,171.0	8%	266.8	0.162	25.0	$6,743.25	$1,000.00	0.35	U=0.30; SHGC=0.40
9103	HVAC Shell	Basement Sidewall Insulation - Heat pump	MF	N/A	Retrofit	3,477.9	9%	306.9	0.064	25.0	$2,815.20	$1,000.00	0.28	R0 to R13 sidewall insulation
9104	HVAC Shell	Floor Insulation Above Crawlspace - Heat pump	MF	N/A	Retrofit	3,277.2	3%	106.2	0.201	25.0	$849.15	$425.00	0.23	R13 floor insulation
9105	HVAC Shell	Smart Window Coverings - Shade/Blind/Controller/Sensor - Heat pump_ET	MF	N/A	Retrofit	3,171.0	16%	491.5	0.211	7.0	$8,500.00	$1,000.00	0.22	Smart shades
9106	HVAC Shell	Smart Window Coverings - Film/Transformer - Heat pump_ET	MF	N/A	Retrofit	3,171.0	16%	491.5	0.211	7.0	$4,045.95	$1,000.00	0.22	Smart films
9107	HVAC Shell	Radiant Barrier - Electric furnace	MF	N/A	Retrofit	4,973.1	-6%	-281.8	-0.073	20.0	$429.57	$130.00	0.00	Installation of radiant barrier
9108	HVAC Shell	Cool Roof - Electric furnace	MF	N/A	Retrofit	4,973.1	-33%	-1,661.4	-0.092	20.0	$3,996.00	$1,000.00	0.00	Installation of cool roof
9109	HVAC Shell	Wall Sheathing - Electric furnace	MF	N/A	Retrofit	4,973.1	13%	662.3	0.414	25.0	$1,242.00	$625.00	1.44	R12 polyiso
9110	HVAC Shell	ENERGY STAR Windows - Electric furnace	MF	N/A	Retrofit	4,973.1	8%	415.9	0.184	25.0	$6,743.25	$1,000.00	0.48	U=0.30; SHGC=0.40
9111	HVAC Shell	Basement Sidewall Insulation - Electric furnace	MF	N/A	Retrofit	5,634.1	12%	661.0	0.069	25.0	$2,815.20	$1,000.00	0.54	R0 to R13 sidewall insulation
9112	HVAC Shell	Floor Insulation Above Crawlspace - Electric furnace	MF	N/A	Retrofit	7,848.5	37%	2,875.4	-0.304	25.0	$849.15	$425.00	3.86	R13 floor insulation
9113	HVAC Shell	Smart Window Coverings - Shade/Blind/Controller/Sensor - Electric furnace_ET	MF	N/A	Retrofit	4,973.1	16%	770.8	0.238	7.0	$8,500.00	$1,000.00	0.30	Smart shades
9114	HVAC Shell	Smart Window Coverings - Film/Transformer - Electric furnace_ET	MF	N/A	Retrofit	4,973.1	16%	770.8	0.238	7.0	$4,045.95	$1,000.00	0.30	Smart films
9115	HVAC Shell	Duct Sealing - Average Sealing - Gas Heating	SF	NLI	Retrofit	3,380.5	5%	161.5	0.131	20.0	$200.00	$175.00	1.61	15% to 10% leakage
9116	HVAC Shell	Duct Sealing - Inadequate Sealing - Gas Heating	SF	NLI	Retrofit	3,442.6	7%	229.5	0.115	20.0	$350.00	$300.00	1.25	20% to 15% leakage
9117	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Gas Heating	SF	NLI	Retrofit	3,501.7	15%	526.8	0.297	20.0	$1,442.50	$1,000.00	0.91	25% to 15% leakage
9118	HVAC Shell	Wall Insulation - Gas Heating	SF	NLI	Retrofit	3,509.2	16%	569.6	0.541	25.0	$2,746.80	$450.00	6.29	R0 to R11 wall insulation
9119	HVAC Shell	Air Sealing - Average Sealing - Gas Heating	SF	NLI	Retrofit	2,939.6	7%	206.9	0.353	15.0	$624.65	$100.00	7.18	10 ACH 50 to 7 ACH 50
9120	HVAC Shell	Air Sealing - Inadequate Sealing - Gas Heating	SF	NLI	Retrofit	3,363.5	13%	423.9	0.392	15.0	$967.20	$100.00	10.02	14 ACH 50 to 10 ACH 50
9121	HVAC Shell	Air Sealing - Poor Sealing - Gas Heating	SF	NLI	Retrofit	4,030.0	17%	666.6	0.558	15.0	$967.20	$100.00	15.38	20 ACH 50 to 14 ACH 50
9122	HVAC Shell	Attic Insulation - Average Insulation - Gas Heating	SF	NLI	Retrofit	2,939.6	2%	62.9	0.076	25.0	$1,259.70	$450.00	0.48	R30 to R60
9123	HVAC Shell	Attic Insulation - Inadequate Insulation - Gas Heating	SF	NLI	Retrofit	2,997.7	4%	120.9	0.143	25.0	$1,744.20	$450.00	1.00	R19 to R60
9124	HVAC Shell	Attic Insulation - Poor Insulation - Gas Heating	SF	NLI	Retrofit	3,135.8	8%	241.1	0.225	25.0	$1,550.40	$450.00	1.81	R11 to R49
9125	HVAC Shell	Duct Sealing - Average Sealing - Gas Heating	SF	LI	DI	3,380.5	5%	161.5	0.131	20.0	$200.00	$200.00	1.41	15% to 10% leakage
9126	HVAC Shell	Duct Sealing - Inadequate Sealing - Gas Heating	SF	LI	DI	3,442.6	7%	229.5	0.115	20.0	$350.00	$350.00	1.08	20% to 15% leakage

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9127	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Gas Heating	SF	LI	DI	3,501.7	15%	526.8	0.297	20.0	$1,442.50	$1,442.50	0.63	25% to 15% leakage
9128	HVAC Shell	Wall Insulation - Gas Heating	SF	LI	DI	3,509.2	16%	569.6	0.541	25.0	$2,746.80	$2,746.80	1.03	R0 to R11 wall insulation
9129	HVAC Shell	Air Sealing - Average Sealing - Gas Heating	SF	LI	DI	2,939.6	7%	206.9	0.353	15.0	$624.65	$624.65	1.15	10 ACH 50 to 7 ACH 50
9130	HVAC Shell	Air Sealing - Inadequate Sealing - Gas Heating	SF	LI	DI	3,363.5	13%	423.9	0.392	15.0	$967.20	$967.20	1.04	14 ACH 50 to 10 ACH 50
9131	HVAC Shell	Air Sealing - Poor Sealing - Gas Heating	SF	LI	DI	4,030.0	17%	666.6	0.558	15.0	$967.20	$967.20	1.59	20 ACH 50 to 14 ACH 50
9132	HVAC Shell	Attic Insulation - Average Insulation - Gas Heating	SF	LI	DI	2,939.6	2%	62.9	0.076	25.0	$1,259.70	$1,259.70	0.17	R30 to R60
9133	HVAC Shell	Attic Insulation - Inadequate Insulation - Gas Heating	SF	LI	DI	2,997.7	4%	120.9	0.143	25.0	$1,744.20	$1,744.20	0.26	R19 to R60
9134	HVAC Shell	Attic Insulation - Poor Insulation - Gas Heating	SF	LI	DI	3,135.8	8%	241.1	0.225	25.0	$1,550.40	$1,550.40	0.52	R11 to R49
9135	HVAC Shell	Wall Sheathing - Gas Heating	SF	N/A	Retrofit	2,939.6	4%	125.1	0.192	25.0	$2,943.00	$1,000.00	0.92	R12 polyiso
9136	HVAC Shell	ENERGY STAR Windows - Gas Heating	SF	N/A	Retrofit	2,939.6	8%	249.6	0.535	25.0	$13,601.25	$1,000.00	0.76	U=0.30; SHGC=0.40
9137	HVAC Shell	Basement Sidewall Insulation - Gas Heating	SF	N/A	Retrofit	2,976.4	1%	36.8	0.036	25.0	$2,720.00	$1,000.00	0.48	R0 to R13 sidewall insulation
9138	HVAC Shell	Floor Insulation Above Crawlspace - Gas Heating	SF	N/A	Retrofit	2,908.9	-1%	-30.7	-0.036	25.0	$316.20	$90.00	0.73	R13 floor insulation
9139	HVAC Shell	ENERGY STAR Door - Gas Heating	SF	N/A	Retrofit	2,939.6	1%	34.6	0.052	25.0	$388.00	$120.00	1.25	Fiberglasss
9140	HVAC Shell	Smart Window Coverings - Shade/Blind/Controller/Sensor - Gas Heating_ET	SF	N/A	Retrofit	2,939.6	16%	455.6	0.531	7.0	$14,875.00	$1,000.00	0.53	Smart shades
9141	HVAC Shell	Smart Window Coverings - Film/Transformer - Gas Heating_ET	SF	N/A	Retrofit	2,939.6	16%	455.6	0.531	7.0	$8,160.75	$1,000.00	0.53	Smart films
9142	HVAC Shell	Duct Sealing - Average Sealing - Gas Heating	MF	NLI	Retrofit	2,487.5	26%	638.5	0.484	20.0	$200.00	$175.00	6.06	15% to 10% leakage
9143	HVAC Shell	Duct Sealing - Inadequate Sealing - Gas Heating	MF	NLI	Retrofit	2,631.4	20%	532.0	0.309	20.0	$350.00	$300.00	2.41	20% to 15% leakage
9144	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Gas Heating	MF	NLI	Retrofit	2,796.3	48%	1,342.7	0.788	20.0	$981.00	$500.00	3.67	25% to 15% leakage
9145	HVAC Shell	Wall Insulation - Gas Heating	MF	NLI	Retrofit	2,385.4	9%	222.4	0.221	25.0	$1,159.20	$450.00	2.12	R0 to R11 wall insulation
9146	HVAC Shell	Air Sealing - Average Sealing - Gas Heating	MF	NLI	Retrofit	2,163.0	9%	200.4	0.183	15.0	$309.69	$100.00	4.26	10 ACH 50 to 7 ACH 50
9147	HVAC Shell	Air Sealing - Inadequate Sealing - Gas Heating	MF	NLI	Retrofit	2,390.9	10%	227.9	0.162	15.0	$479.52	$100.00	5.01	14 ACH 50 to 10 ACH 50
9148	HVAC Shell	Air Sealing - Poor Sealing - Gas Heating	MF	NLI	Retrofit	2,758.6	13%	367.7	0.187	15.0	$479.52	$100.00	7.43	20 ACH 50 to 14 ACH 50
9149	HVAC Shell	Attic Insulation - Average Insulation - Gas Heating	MF	NLI	Retrofit	2,163.0	8%	172.1	0.145	25.0	$1,298.70	$450.00	0.86	R30 to R60
9150	HVAC Shell	Attic Insulation - Inadequate Insulation - Gas Heating	MF	NLI	Retrofit	2,203.0	10%	212.1	0.181	25.0	$1,798.20	$450.00	1.10	R19 to R60
9151	HVAC Shell	Attic Insulation - Poor Insulation - Gas Heating	MF	NLI	Retrofit	2,290.4	13%	291.6	0.245	25.0	$1,598.40	$450.00	1.51	R11 to R49
9152	HVAC Shell	Duct Sealing - Average Sealing - Gas Heating	MF	LI	DI	2,487.5	26%	638.5	0.484	20.0	$200.00	$200.00	5.30	15% to 10% leakage
9153	HVAC Shell	Duct Sealing - Inadequate Sealing - Gas Heating	MF	LI	DI	2,631.4	20%	532.0	0.309	20.0	$350.00	$350.00	2.06	20% to 15% leakage

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9154	HVAC Shell	Duct Sealing/Insulation - Poor Sealing - Gas Heating	MF	LI	DI	2,796.3	48%	1,342.7	0.788	20.0	$981.00	$981.00	1.87	25% to 15% leakage
9155	HVAC Shell	Wall Insulation - Gas Heating	MF	LI	DI	2,385.4	9%	222.4	0.221	25.0	$1,159.20	$1,159.20	0.82	R0 to R11 wall insulation
9156	HVAC Shell	Air Sealing - Average Sealing - Gas Heating	MF	LI	DI	2,163.0	9%	200.4	0.183	15.0	$309.69	$309.69	1.38	10 ACH 50 to 7 ACH 50
9157	HVAC Shell	Air Sealing - Inadequate Sealing - Gas Heating	MF	LI	DI	2,390.9	10%	227.9	0.162	15.0	$479.52	$479.52	1.04	14 ACH 50 to 10 ACH 50
9158	HVAC Shell	Air Sealing - Poor Sealing - Gas Heating	MF	LI	DI	2,758.6	13%	367.7	0.187	15.0	$479.52	$479.52	1.55	20 ACH 50 to 14 ACH 50
9159	HVAC Shell	Attic Insulation - Average Insulation - Gas Heating	MF	LI	DI	2,163.0	8%	172.1	0.145	25.0	$1,298.70	$1,298.70	0.30	R30 to R60
9160	HVAC Shell	Attic Insulation - Inadequate Insulation - Gas Heating	MF	LI	DI	2,203.0	10%	212.1	0.181	25.0	$1,798.20	$1,798.20	0.28	R19 to R60
9161	HVAC Shell	Attic Insulation - Poor Insulation - Gas Heating	MF	LI	DI	2,290.4	13%	291.6	0.245	25.0	$1,598.40	$1,598.40	0.43	R11 to R49
9162	HVAC Shell	Wall Sheathing - Gas Heating	MF	N/A	Retrofit	2,163.0	9%	203.7	0.190	25.0	$1,242.00	$625.00	0.96	R12 polyiso
9163	HVAC Shell	ENERGY STAR Windows - Gas Heating	MF	N/A	Retrofit	2,163.0	13%	286.7	0.281	25.0	$6,743.25	$1,000.00	0.64	U=0.30; SHGC=0.40
9164	HVAC Shell	Basement Sidewall Insulation - Gas Heating	MF	N/A	Retrofit	2,293.7	2%	43.4	-0.002	25.0	$2,815.20	$1,000.00	0.26	R0 to R13 sidewall insulation
9165	HVAC Shell	Floor Insulation Above Crawlspace - Gas Heating	MF	N/A	Retrofit	2,157.6	-1%	-27.1	-0.019	25.0	$849.15	$425.00	0.02	R13 floor insulation
9166	HVAC Shell	Smart Window Coverings - Shade/Blind/Controller/Sensor - Gas Heating_ET	MF	N/A	Retrofit	2,163.0	16%	335.3	0.258	7.0	$8,500.00	$1,000.00	0.28	Smart shades
9167	HVAC Shell	Smart Window Coverings - Film/Transformer - Gas Heating_ET	MF	N/A	Retrofit	2,163.0	16%	335.3	0.258	7.0	$4,045.95	$1,000.00	0.28	Smart films
10001	Water Heating	Water Heater Wrap	SF	N/A	Retrofit	3,536.2	2%	80.4	0.009	5.0	$20.00	$20.00	0.98	Add WH Wrap to reduce standby losses (Electric Only)
10002	Water Heating	Water Heater Temperature Setback	SF	NLI	Retrofit	733.6	11%	81.5	0.009	15.0	$6.50	$6.50	8.11	WH Temp Setback from 135 to 120
10003	Water Heating	Water Heater Timer	SF	NLI	Retrofit	3,536.2	9%	318.0	0.036	15.0	$60.00	$30.00	6.85	Install Timer to turn off at night or other periods (Electric Only)
10004	Water Heating	Pipe Wrap	SF	NLI	Retrofit	3,536.2	3%	106.1	0.012	15.0	$1.72	$1.72	39.87	Adding Pipe Wrap to Uninsulated Pipes
10005	Water Heating	Heat Pump Water Heater	SF	N/A	MO	3,536.2	67%	2,368.0	0.935	10.0	$1,000.00	$300.00	3.59	Heat Pump Water Heater
10006	Water Heating	Solar Water Heater with Electric Backup	SF	N/A	MO	3,536.2	50%	1,777.0	0.702	10.0	$9,506.00	$2,850.00	0.26	Solar WH (EF=1.8)
10007	Water Heating	Smart Water Heater - Tank Controls and Sensors_ET	SF	N/A	Retrofit	3,536.2	15%	530.0	0.209	10.0	$120.00	$60.00	4.26	Smart WH Controls
10008	Water Heating	Bathroom Aerator 1.0 gpm	SF	NLI	Retrofit	49.8	47%	23.6	2.153	10.0	$0.52	$0.52	20.53	1.0 GPM Bathroom FA
10009	Water Heating	Kitchen Flip Aerator 1.5 gpm	SF	NLI	Retrofit	396.6	39%	152.8	2.114	10.0	$1.34	$1.34	43.53	1.5 GPM Kitchen FA
10010	Water Heating	Low Flow Showerhead 1.5 gpm	SF	NLI	Retrofit	611.2	43%	262.6	6.429	10.0	$3.32	$3.32	31.13	1.5 GPM Low Flow Showerhead
10011	Water Heating	Thermostatic Restrictor Shower Valve	SF	N/A	Retrofit	611.2	11%	69.7	2.302	10.0	$30.00	$15.00	1.93	Thermostatic Restrictor Shower Valve (on base flow device)
10012	Water Heating	Shower Timer	SF	N/A	Retrofit	611.2	9%	53.6	0.321	2.0	$5.00	$5.00	1.28	Shower Timer limit time to 5 mins (per shower)
10013	Water Heating	Drain water Heat Recovery	SF	N/A	Retrofit	3,536.2	25%	884.0	0.101	20.0	$742.00	$225.00	3.14	Drainpipe heat exchanger
10014	Water Heating	Desuperheater	SF	N/A	Retrofit	3,536.2	44%	1,556.0	0.178	25.0	$620.00	$185.00	7.69	Install Desuperheater (Paid with GSHP)
10015	Water Heating	Bathroom Aerator 1.0 gpm	SF	LI	DI	49.8	47%	23.6	2.153	10.0	$0.52	$0.52	20.53	1.0 GPM Bathroom FA
10016	Water Heating	Kitchen Flip Aerator 1.5 gpm	SF	LI	DI	396.6	39%	152.8	2.114	10.0	$1.34	$1.34	43.53	1.5 GPM Kitchen FA

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10017	Water Heating	Low Flow Showerhead 1.5 gpm	SF	LI	DI	611.2	43%	262.6	6.429	10.0	$3.32	$3.32	31.13	1.5 GPM Low Flow Showerhead
10018	Water Heating	Pipe Wrap	SF	LI	DI	3,536.2	3%	106.1	0.012	15.0	$1.72	$1.72	39.87	Adding Pipe Wrap to Uninsulated Pipes
10019	Water Heating	Water Heater Temperature Setback	SF	LI	DI	733.6	11%	81.5	0.009	15.0	$6.50	$6.50	8.11	WH Temp Setback from 135 to 120
10020	Water Heating	Water Heater Temperature Setback	SF	N/A	NC	733.6	11%	81.5	0.009	15.0	$6.50	$6.50	8.11	WH Temp Setback from 135 to 120
10021	Water Heating	Water Heater Timer	SF	N/A	NC	3,536.2	9%	318.0	0.036	15.0	$60.00	$30.00	6.85	Install Timer to turn off at night or other periods (Electric Only)
10022	Water Heating	Pipe Wrap	SF	N/A	NC	3,536.2	3%	106.1	0.012	15.0	$1.72	$1.72	39.87	Adding Pipe Wrap to Uninsulated Pipes
10023	Water Heating	Heat Pump Water Heater	SF	N/A	NC	3,536.2	67%	2,368.0	0.935	10.0	$1,000.00	$300.00	3.59	Heat Pump Water Heater
10024	Water Heating	Solar Water Heater with Electric Backup	SF	N/A	NC	3,536.2	50%	1,777.0	0.702	10.0	$9,506.00	$2,850.00	0.26	Solar WH (EF=1.8)
10025	Water Heating	Smart Water Heater - Tank Controls and Sensors_ET	SF	N/A	NC	3,536.2	15%	530.0	0.209	10.0	$120.00	$60.00	4.26	Smart WH Controls
10026	Water Heating	Bathroom Aerator 1.0 gpm	SF	N/A	NC	49.8	47%	23.6	2.153	10.0	$0.52	$0.52	20.53	1.0 GPM Bathroom FA
10027	Water Heating	Kitchen Flip Aerator 1.5 gpm	SF	N/A	NC	396.6	39%	152.8	2.114	10.0	$1.34	$1.34	43.53	1.5 GPM Kitchen FA
10028	Water Heating	Low Flow Showerhead 1.5 gpm	SF	N/A	NC	611.2	43%	262.6	6.429	10.0	$3.32	$3.32	31.13	1.5 GPM Low Flow Showerhead
10029	Water Heating	Thermostatic Restrictor Shower Valve	SF	N/A	NC	611.2	11%	69.7	2.302	10.0	$30.00	$15.00	1.93	Thermostatic Restrictor Shower Valve (on base flow device)
10030	Water Heating	Shower Timer	SF	N/A	NC	611.2	9%	53.6	0.321	2.0	$5.00	$5.00	1.28	Shower Timer limit time to 5 mins (per shower)
10031	Water Heating	Drain water Heat Recovery	SF	N/A	NC	3,536.2	25%	884.0	0.101	20.0	$742.00	$225.00	3.14	Drainpipe heat exchanger
10032	Water Heating	Desuperheater	SF	N/A	NC	3,536.2	44%	1,556.0	0.178	25.0	$620.00	$185.00	7.69	Install Desuperheater (Paid with GSHP)
10033	Water Heating	Water Heater Wrap	MF	N/A	Retrofit	2,662.9	2%	60.5	0.007	5.0	$20.00	$20.00	0.74	Add WH Wrap to reduce standby losses (Electric Only)
10034	Water Heating	Water Heater Temperature Setback	MF	NLI	Retrofit	733.6	11%	81.5	0.009	15.0	$6.50	$6.50	8.11	WH Temp Setback from 135 to 120
10035	Water Heating	Water Heater Timer	MF	NLI	Retrofit	2,662.9	9%	240.0	0.027	15.0	$60.00	$30.00	5.17	Install Timer to turn off at night or other periods (Electric Only)
10036	Water Heating	Pipe Wrap	MF	NLI	Retrofit	2,662.9	3%	79.9	0.009	15.0	$1.72	$1.72	30.03	Adding Pipe Wrap to Uninsulated Pipes
10037	Water Heating	Heat Pump Water Heater	MF	N/A	MO	2,662.9	58%	1,544.0	0.610	10.0	$1,000.00	$300.00	2.27	Heat Pump Water Heater
10038	Water Heating	Smart Water Heater - Tank Controls and Sensors_ET	MF	N/A	Retrofit	2,662.9	15%	399.0	0.158	10.0	$120.00	$60.00	3.21	Smart WH Controls
10039	Water Heating	Bathroom Aerator 1.0 gpm	MF	NLI	Retrofit	57.2	47%	27.1	2.153	10.0	$0.52	$0.52	22.77	1.0 GPM Bathroom FA
10040	Water Heating	Kitchen Flip Aerator 1.5 gpm	MF	NLI	Retrofit	274.9	39%	105.9	2.114	10.0	$1.34	$1.34	31.94	1.5 GPM Kitchen FA
10041	Water Heating	Low Flow Showerhead 1.5 gpm	MF	NLI	Retrofit	649.6	43%	279.1	6.429	10.0	$1.34	$1.34	81.22	1.5 GPM Low Flow Showerhead
10042	Water Heating	Thermostatic Restrictor Shower Valve	MF	N/A	Retrofit	649.6	11%	74.1	2.446	10.0	$30.00	$15.00	2.05	Thermostatic Restrictor Shower Valve (on base flow device)
10043	Water Heating	Shower Timer	MF	N/A	Retrofit	649.6	9%	56.9	0.321	2.0	$5.00	$5.00	1.33	Shower Timer limit time to 5 mins (per shower)
10044	Water Heating	Drain water Heat Recovery	MF	N/A	Retrofit	2,662.9	25%	666.0	0.076	20.0	$742.00	$225.00	2.36	Drainpipe heat exchanger
10045	Water Heating	Desuperheater	MF	N/A	Retrofit	2,662.9	44%	1,172.0	0.134	25.0	$620.00	$185.00	5.80	Install Desuperheater (Paid with GSHP)
10046	Water Heating	Bathroom Aerator 1.0 gpm	MF	LI	DI	57.2	47%	27.1	2.153	10.0	$0.52	$0.52	22.77	1.0 GPM Bathroom FA
10047	Water Heating	Kitchen Flip Aerator 1.5 gpm	MF	LI	DI	274.9	39%	105.9	2.114	10.0	$1.34	$1.34	31.94	1.5 GPM Kitchen FA
10048	Water Heating	Low Flow Showerhead 1.5 gpm	MF	LI	DI	649.6	43%	279.1	6.429	10.0	$1.34	$1.34	81.22	1.5 GPM Low Flow Showerhead
10049	Water Heating	Pipe Wrap	MF	LI	DI	2,662.9	3%	79.9	0.009	15.0	$1.72	$1.72	30.03	Adding Pipe Wrap to Uninsulated Pipes
10050	Water Heating	Water Heater Temperature Setback	MF	LI	DI	733.6	11%	81.5	0.009	15.0	$6.50	$6.50	8.11	WH Temp Setback from 135 to 120

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10051	Water Heating	Water Heater Temperature Setback	MF	N/A	NC	733.6	11%	81.5	0.009	15.0	$6.50	$6.50	8.11	WH Temp Setback from 135 to 120
10052	Water Heating	Water Heater Timer	MF	N/A	NC	2,662.9	9%	240.0	0.027	15.0	$60.00	$30.00	5.17	Install Timer to turn off at night or other periods (Electric Only)
10053	Water Heating	Pipe Wrap	MF	N/A	NC	2,662.9	3%	79.9	0.009	15.0	$1.72	$1.72	30.03	Adding Pipe Wrap to Uninsulated Pipes
10054	Water Heating	Heat Pump Water Heater	MF	N/A	NC	2,662.9	58%	1,544.0	0.610	10.0	$1,000.00	$300.00	2.27	Heat Pump Water Heater
10055	Water Heating	Smart Water Heater - Tank Controls and Sensors_ET	MF	N/A	NC	2,662.9	15%	399.0	0.158	10.0	$120.00	$60.00	3.21	Smart WH Controls
10056	Water Heating	Bathroom Aerator 1.0 gpm	MF	N/A	NC	57.2	47%	27.1	2.153	10.0	$0.52	$0.52	22.77	1.0 GPM Bathroom FA
10057	Water Heating	Kitchen Flip Aerator 1.5 gpm	MF	N/A	NC	274.9	39%	105.9	2.114	10.0	$1.34	$1.34	31.94	1.5 GPM Kitchen FA
10058	Water Heating	Low Flow Showerhead 1.5 gpm	MF	N/A	NC	649.6	43%	279.1	6.429	10.0	$1.34	$1.34	81.22	1.5 GPM Low Flow Showerhead
10059	Water Heating	Thermostatic Restrictor Shower Valve	MF	N/A	NC	649.6	11%	74.1	2.446	10.0	$30.00	$15.00	2.05	Thermostatic Restrictor Shower Valve (on base flow device)
10060	Water Heating	Shower Timer	MF	N/A	NC	649.6	9%	56.9	0.321	2.0	$5.00	$5.00	1.33	Shower Timer limit time to 5 mins (per shower)
10061	Water Heating	Drain water Heat Recovery	MF	N/A	NC	2,662.9	25%	666.0	0.076	20.0	$742.00	$225.00	2.36	Drainpipe heat exchanger
10062	Water Heating	Desuperheater	MF	N/A	NC	2,662.9	44%	1,172.0	0.134	25.0	$620.00	$185.00	5.80	Install Desuperheater (Paid with GSHP)

DI: Direct-install
LI: Low-income
MF: Multifamily
MO: Market opportunity
NC: New Construction
NLI: Non-low-income
SF: Single-family

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1	Interior Lighting	Compact Fluorescent - 2019	67.8%	198.8	0.039	3.0	$1.20	64.96
2	Interior Lighting	LED Exit Sign	91.3%	206.8	0.021	16.0	$30.00	10.52
3	Interior Lighting	High Performance T8 (vs RWT8) 4ft	19%	50	0.011	15	$18.00	4.98
4	Interior Lighting	Wall Mounted Occupancy Sensor	24.0%	335.3	0.000	8.0	$51.00	4.41
5	Interior Lighting	Fixture Mounted Occupancy Sensor	24%	198	0.000	8	$91.83	1.45
6	Interior Lighting	Remote Mounted Occupancy Sensor	24%	568	0.000	8	$101.00	3.78
7	Interior Lighting	High Bay LED vs (Metal Halide 250W)	35%	476	0.104	15	$200.00	5.65
8	Interior Lighting	High Bay LED vs (Metal Halide 400W)	53%	1,492	0.326	15	$250.00	14.15
9	Interior Lighting	High performance T5 (replacing T8)	44%	461	0.101	15	$100.00	8.20
10	Interior Lighting	CFL Hard Wired Fixture - 2019	69%	199	0.044	12	$37.50	7.94
11	Interior Lighting	CFL High Wattage 31-115 - 2019	55%	383	0.084	3	$21.00	7.46
12	Interior Lighting	CFL High Wattage 150-199 -2019	58%	1,088	0.238	3	$57.00	7.80
13	Interior Lighting	Low Bay LED (vs T8HO)	42%	306	0.067	15	$331.00	1.64
14	Interior Lighting	High Bay LED (vs T8HO)	35%	472	0.103	15	$482.00	1.74
15	Interior Lighting	LED Screw-In Bulb	51%	149	0.027	15	$1.20	207.76
16	Interior Lighting	LED Downlight Fixtures	68%	168	0.037	15	$27.00	11.07
17	Interior Lighting	LED Linear Replacement Lamps	37%	99	0.022	15	$25.00	7.04
18	Interior Lighting	LED Troffer	38%	106	0.023	15	$62.00	3.03
19	Interior Lighting	Light Tube	10%	250	0.104	10	$500.00	0.95
20	Interior Lighting	Central Lighting Controls	10%	4,077	1.000	8	$103.00	43.51
21	Interior Lighting	Lighting Power Density Reduction (NC)	10%	4,077	1.000	15	$220.00	45.78
22	Interior Lighting	Switching Controls for Multi-Level Lighting	30%	12,232	3.000	8	$274.00	49.07
23	Interior Lighting	Smart Advanced Lighting Controls	47%	2	0.001	10	$1.51	2.63
24	Interior Lighting	Smart Web-based lighting Mgmt System	35%	3	0.001	10	$1.15	5.41
25	Exterior Lighting	Outdoor LED (< 250W MH)	65%	495	0.101	15	$238.50	3.01
26	Exterior Lighting	Outdoor LED (> 250W MH)	54%	983	0.201	15	$592.00	2.41
27	Space Cooling - Unitary / Split	Split System, <65,000 Btu/hr (CEE Tier 1)	13%	143	0.123	15	$63.00	8.91
28	Space Cooling - Unitary / Split	Split System, <65,000 Btu/hr (CEE Tier 2)	19%	201	0.173	15	$127.00	6.22
29	Space Cooling - Unitary / Split	Single Package System <65,000 Btu/hr (CEE Tier 1)	7%	66	0.057	15	$63.00	4.14
30	Space Cooling - Unitary / Split	Single Package System <65,000 Btu/hr (CEE Tier2)	13%	124	0.107	15	$127.00	3.85
31	Space Cooling - Unitary / Split	<135,000 Btu/hr (CEE Tier 1) (2019- 2022)	8%	86	0.074	15	$63.00	5.37
32	Space Cooling - Unitary / Split	<135,000 Btu/hr (CEE Tier 2) (2019-2022)	13%	140	0.121	15	$127.00	4.35
33	Space Cooling - Unitary / Split	<135,000 Btu/hr (CEE Advanced Tier) (2023+)	18%	169	0.146	15	$127.00	5.24
34	Space Cooling - Unitary / Split	<240,000 Btu/hr (CEE Tier 1) (2019 - 2022)	6%	69	0.060	15	$63.00	4.31
35	Space Cooling - Unitary / Split	<240,000 Btu/hr (CEE Tier 2) (2019 - 2022)	13%	144	0.125	15	$127.00	4.47
36	Space Cooling - Unitary / Split	<240,000 Btu/hr (CEE Advanced Tier) (2023+)	17%	163	0.141	15	$127.00	5.06
37	Space Cooling - Unitary / Split	<760,000 Btu/hr (CEE Tier 1) (2019 -2022)	6%	69	0.060	15	$19.00	14.37
38	Space Cooling - Unitary / Split	<760,000 Btu/hr (CEE Tier 2) (2019 -2022)	12%	148	0.127	15	$38.00	15.30
39	Space Cooling - Unitary / Split	<760,000 Btu/hr (CEE Advanced Tier) (2023+)	9%	96	0.083	15	$38.00	9.93

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40	Space Cooling - Unitary / Split	Tier 1) (2019 -2022)	3%	44	0.038	15	$19.00	9.03
41	Space Cooling - Unitary / Split	Tier 2) (2019 -2022)	9%	113	0.097	15	$38.00	11.70
42	Space Cooling - Unitary / Split	PTAC, <7,000 Btu/hr	8%	106	0.078	15	$84.00	4.51
43	Space Cooling - Unitary / Split	PTAC ≥7,000 Btu/h and ≤15,000 Btu/hr	11%	162	0.124	15	$84.00	7.05
44	Space Cooling - Unitary / Split	PTHP, ≥7,000 Btu/hr and ≤15,000 Btu/hr	11%	177	0.130	15	$84.00	7.52
45	Space Cooling - Unitary / Split	HVAC Tune-up (2019-2022)	15%	164	0.000	3	$35.00	1.98
46	Space Cooling - Unitary / Split	HVAC Tune-up (2023+)	15%	150	0.000	3	$35.00	1.80
47	Space Cooling - Unitary / Split	Air Source Heat Pump <65,000 BtuH (CEE Tier 1)	7%	66	0.057	15	$50.00	1.14
48	Space Cooling - Unitary / Split	Air Source Heat Pump <65,000 BtuH (CEE Tier 2)	13%	124	0.107	15	$50.00	2.38
49	Space Cooling - Unitary / Split	Btu/hr (CEE Tier 1) (2019-2022)	10%	117	0.101	15	$50.00	1.99
50	Space Cooling - Unitary / Split	Btu/hr (CEE Tier 1) (2023+)	10%	101	0.088	15	$50.00	2.08
51	Space Cooling - Unitary / Split	Btu/hr (CEE Tier 1) (2019 -2022)	9%	112	0.097	15	$50.00	1.94
52	Space Cooling - Unitary / Split	Btu/hr (CEE Tier 1) (2023+)	9%	97	0.083	15	$50.00	1.76
53	Space Cooling - Unitary / Split	(2019 -2022)	10%	133	0.115	15	$50.00	2.22
54	Space Cooling - Unitary / Split	(2023+)	10%	113	0.098	15	$50.00	2.00
55	Space Cooling - Unitary / Split	Ground Source Heat Pump <135,000 Btu/hr	10%	110	0.095	15	$75.00	1.57
56	Space Cooling - Unitary / Split	Water Source Heat Pump <17,000Btu/hr	13%	147	0.126	15	$75.00	1.90
57	Space Cooling - Unitary / Split	<135,000Btu/hr	7%	76	0.066	15	$75.00	1.05
58	Space Cooling - Unitary / Split	Advanced Rooftop Controls	45%	3,034	2.617	9	$187.50	57.49
59	Space Cooling - Unitary / Split	Commercial/Industrial CO2 Heat Pump	70%	351	0.000	10	$87.78	5.52
60	Space Cooling - Unitary / Split	Room A/C	4%	16	0.037	9	$40.00	2.23
61	Space Cooling - Unitary / Split	Cool roof	15%	89	0.045	20	$88.22	0.65
62	Space Cooling - Unitary / Split	Ceiling Insulation	8%	87	0.044	30	$58.59	2.34
63	Space Cooling - Unitary / Split	Wall insulation	2%	507	0.136	30	$8.32	71.55
64	Space Cooling - Unitary / Split	Roof Insulation	8%	24	0.019	30	$11.36	4.35
65	Space Cooling - Unitary / Split	Destratification Fan	50%	8	-0.007	15	$7.27	0.51
66	Space Cooling - Unitary / Split	EMS	10%	310	0.014	15	$0.86	194.09
67	Space Cooling - Unitary / Split	Duct sealing 15% leakage base	5%	19	0.013	18	$10.85	2.47
68	Space Cooling - Unitary / Split	Integrated Building Design	30%	2	0.000	20	$0.11	16.35
69	Space Cooling - Unitary / Split	Retrocommissioning	16%	1	0.000	7	$0.03	12.80
70	Space Cooling - Unitary / Split	Commissioning	13%	1	0.000	7	$0.12	2.69
71	Space Cooling - Unitary / Split	Commercial Window Film	5%	209	0.050	10	$35.50	1.94
72	Space Cooling - Unitary / Split	High Performance Glazing	6%	2	0.070	20	$6.82	8.95
73	Space Cooling - Unitary / Split	Programable Thermostats	10%	945	0.000	4	$22.44	5.36
74	Space Cooling - Unitary / Split	Cooling	25%	119	0.047	8	$18.89	3.19
75	Space Cooling - Unitary / Split	Smart Thermostats	8%	660	0.000	10	$29.75	6.50
76	Space Cooling - Unitary / Split	Smart Cloud-Based Enery Information System (EIS)	8%	89	0.000	10	$0.61	42.60
77	Space Cooling - Chillers	Air Cooled Chiller <150 tons	13%	318	0.116	20	$127.00	8.04
78	Space Cooling - Chillers	Air Cooled Chiller ≥150 tons	13%	305	0.112	20	$127.00	7.28

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79	Space Cooling - Chillers	Water Cooled Screw Chiller <150 ton	13%	191	0.070	20	$177.68	3.46
80	Space Cooling - Chillers	Water Cooled Screw Chiller ≥150 tons and < 300 tons	19%	273	0.100	20	$127.00	6.91
81	Space Cooling - Chillers	Water Cooled Screw Chiller ≥300 ton	21%	300	0.110	20	$87.00	11.09
82	Space Cooling - Chillers	Water Cooled Centrifugal Chiller <150 ton	20%	300	0.110	20	$166.10	5.81
83	Space Cooling - Chillers	tons	27%	410	0.150	20	$122.87	10.71
84	Space Cooling - Chillers	Water Cooled Centrifugal Chiller ≥300 ton	25%	355	0.130	20	$92.22	12.37
85	Space Cooling - Chillers	Air Cooled Chiller Tune-up/Diagnostics	8%	187	0.000	5	$5.66	20.10
86	Space Cooling - Chillers	WaterCooled Chiller/Tune-up/Diagnostics	8%	119	0.000	5	$5.66	12.78
87	Space Cooling - Chillers	Chilled Water Reset Controls	25%	173	0.030	10	$681.34	0.39
88	Space Cooling - Chillers	Cool roof	15%	89	0.045	20	$88.22	0.65
89	Space Cooling - Chillers	Ceiling Insulation	8%	87	0.044	30	$58.59	2.34
90	Space Cooling - Chillers	Wall insulation	2%	507	0.136	30	$8.32	71.55
91	Space Cooling - Chillers	Roof Insulation	8%	24	0.019	30	$11.36	4.35
92	Space Cooling - Chillers	Destratification Fan	50%	8	-0.007	15	$7.27	0.51
93	Space Cooling - Chillers	EMS	10%	310	0.014	15	$0.86	194.09
94	Space Cooling - Chillers	Duct sealing 15% leakage base	5%	19	0.013	18	$10.85	2.47
95	Space Cooling - Chillers	Integrated Building Design	30%	2	0.000	20	$0.11	16.35
96	Space Cooling - Chillers	Retrocommissioning	16%	1	0.000	7	$0.03	12.80
97	Space Cooling - Chillers	Commissioning	13%	1	0.000	7	$0.12	2.69
98	Space Cooling - Chillers	Commercial Window Film	5%	209	0.050	10	$35.50	1.94
99	Space Cooling - Chillers	High Performance Glazing	6%	2	0.070	20	$6.82	8.95
100	Space Cooling - Chillers	Programable Thermostats	10%	945	0.000	4	$22.44	5.36
101	Space Cooling - Chillers	Smart Thermostats	8%	660	0.000	10	$29.75	6.50
102	Space Cooling - Chillers	Smart Cloud-Based Enery Information System (EIS)	8%	89	0.000	10	$0.61	42.60
103	Space Heating	PTHP, <7,000 Btu/hr	8%	65	0.100	15	$84.00	1.12
104	Space Heating	PTHP, ≥7,000 Btu/hr and ≤15,000 Btu/hr	11%	94	0.146	15	$84.00	1.63
105	Space Heating	Tier 1)	4%	33	0.052	15	$50.00	1.14
106	Space Heating	Tier 2)	9%	84	0.130	15	$50.00	2.38
107	Space Heating	System (CEE Tier 1)	6%	57	0.088	15	$50.00	4.14
108	Space Heating	System (CEE Tier 2)	6%	57	0.088	15	$50.00	3.85
109	Space Heating	Btu/hr (CEE Tier 1) (2019-2022)	8%	57	0.089	15	$50.00	1.99
110	Space Heating	Btu/hr (CEE Tier 1) (2023+)	6%	37	0.057	15	$50.00	2.08
111	Space Heating	Btu/hr (CEE Tier 1) (2019 -2022)	9%	61	0.094	15	$50.00	1.94
112	Space Heating	Btu/hr (CEE Tier 1) (2023+)	6%	39	0.061	15	$50.00	1.76
113	Space Heating	(2019 -2022)	9%	61	0.094	15	$50.00	2.22
114	Space Heating	(2023+)	9%	61	0.094	15	$50.00	2.00
115	Space Heating	Ground Source Heat Pump <135,000 Btu/hr	10%	61	0.008	15	$75.00	1.57
116	Space Heating	Water Source Heat Pump < 135,000Btu/hr	13%	68	0.009	15	$75.00	1.90
117	Space Heating	<135,000Btu/hr	7%	38	0.005	15	$75.00	1.05

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118	Space Heating	Commercial/Industrial CO2 Heat Pump	70%	189	0.000	10	$47.22	5.52
119	Space Heating	Cool roof	15%	41	0.021	20	$88.22	0.65
120	Space Heating	Ceiling Insulation	8%	40	0.020	30	$58.59	2.34
121	Space Heating	Wall insulation	2%	236	0.063	30	$8.32	71.55
122	Space Heating	Roof Insulation	8%	11	0.009	30	$11.36	4.35
123	Space Heating	Destratification Fan	50%	4	-0.003	15	$7.27	0.51
124	Space Heating	EMS	10%	144	0.007	15	$0.86	194.09
125	Space Heating	Duct sealing 15% leakage base	5%	9	0.006	18	$10.85	2.47
126	Space Heating	Integrated Building Design	30%	1	0.000	20	$0.11	16.35
127	Space Heating	Retrocommissioning	16%	0	0.000	7	$0.03	12.80
128	Space Heating	Commissioning	13%	0	0.000	7	$0.12	2.69
129	Space Heating	Commercial Window Film	5%	97	0.023	10	$35.50	1.94
130	Space Heating	High Performance Glazing	6%	1	0.032	20	$6.82	8.95
131	Space Heating	Programable Thermostats	10%	945	0.000	4	$22.44	5.36
132	Space Heating	Cooling	25%	119	0.047	8	$18.89	3.19
133	Space Heating	Smart Thermostats	8%	660	0.000	10	$29.75	6.50
134	Space Heating	Smart Cloud-Based Enery Information System (EIS)	8%	89	0.000	10	$0.61	42.60
135	Ventilation	VFD Supply and Return Fans, < 2 HP	30%	2,497	0.369	15	$1,330.00	2.73
136	Ventilation	VFD Supply and Return Fans, <3 to 10 HP	30%	6,242	0.922	15	$1,622.00	5.59
137	Ventilation	VFD Supply and Return Fans, 11 to 50 HP	30%	37,450	5.530	15	$3,059.00	17.79
138	Ventilation	Enthalpy Economizer	20%	117	0.000	10	$400.00	0.30
139	Ventilation	Improved Duct Sealing	23%	70	0.000	18	$107.91	1.43
140	Ventilation	Electronically-Commutated Permanent Magnet Motors	65%	1,635	0.000	15	$3,059.00	0.78
141	Ventilation	High Volume Low Speed Fans	50%	8,379	3.067	10	$4,185.00	4.03
142	Ventilation	VFD Tower Fan	30%	829	0.265	10	$155.96	5.50
143	Motors	VFD on Chilled Water Pump Motor, 5 HP	15%	28,580	0.000	15	$1,330.00	31.22
144	Motors	VFD on Chilled Water Pump Motor, 7.5 HP	15%	42,870	0.000	15	$1,622.00	38.40
145	Motors	VFD on Chilled Water Pump Motor, 20 HP	15%	171,480	0.000	15	$3,059.00	81.44
146	Motors	High Performance Elevators	80%	12,982	1.406	25	$54,690.00	0.64
147	Motors	Escalators Motor Efficiency Controllers	30%	5,414.000	0.620	20	$6,900.00	1.86
148	Other	NEMA Premium Transformer, single-phase	2%	0.163	0.000	30	$0.24	3.16
149	Other	NEMA Premium Transformer, three-phase	2%	0.244	0.000	30	$0.18	4.81
150	Other	High Efficiency Transformer, single-phase	2%	0.393	0.000	30	$0.46	3.56
151	Other	High Efficiency Transformer, three-phase	2%	0	0.000	30	$0.44	5.50
152	Water Heating	High Efficiency Storage (tank)	0%	9	0.000	15	$70.00	0.18
153	Water Heating	retrofit	20%	1,284	0.000	5	$92.90	7.30
154	Water Heating	On Demand (tankless)	7%	7,905	0.000	5	$1,050.00	3.97
155	Water Heating	dryer	38%	86	0.000	7	$19.35	3.32
156	Water Heating	Electric dryer	25%	542	0.000	7	$72.00	5.62