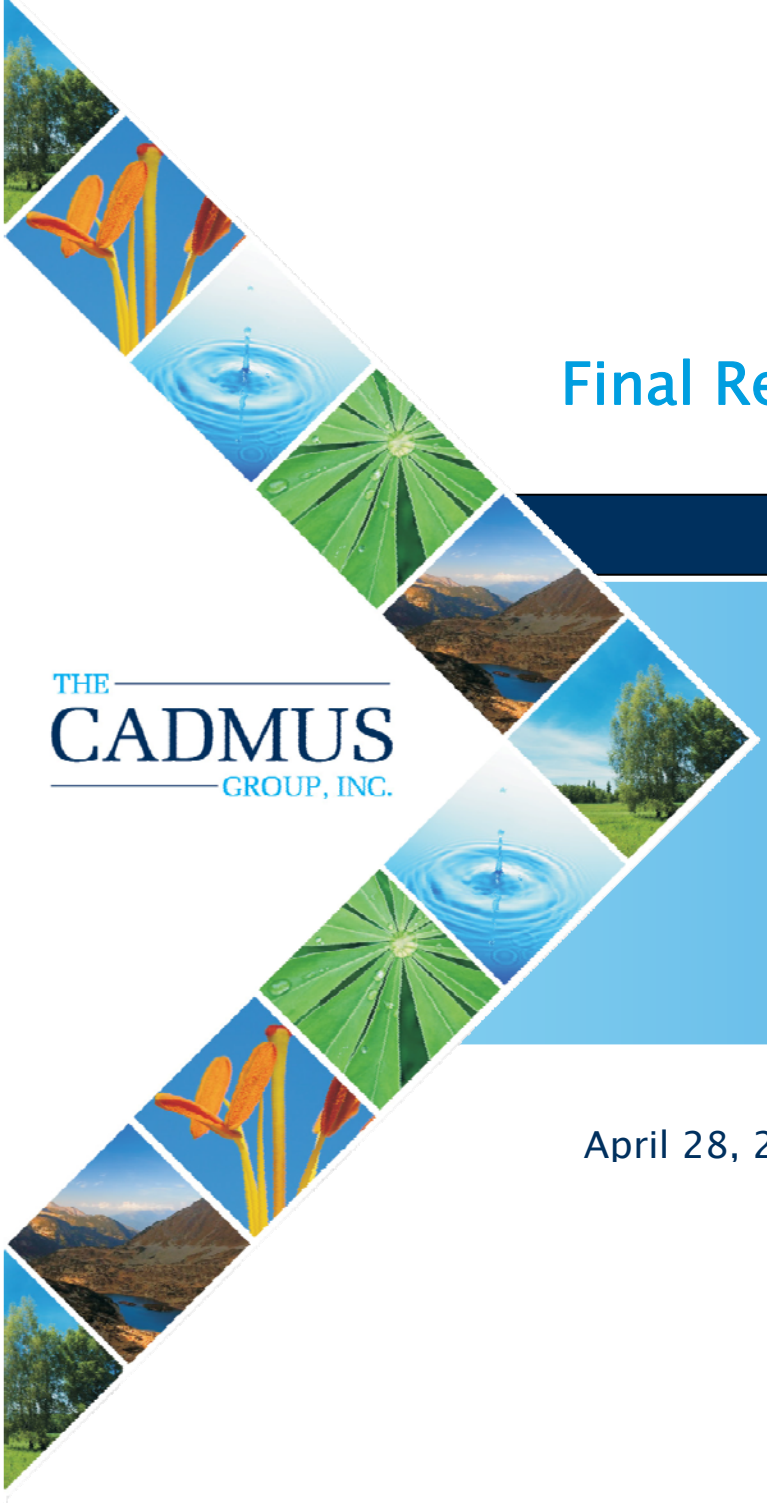

THE CADMUS GROUP, INC.

Final Report

Comprehensive Assessment of Demand-Side Resource Potentials (2012-2031)

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Executive Summary

Overview

This report summarizes the results of an independent study of the potentials for electric and natural gas demand-side resources (DSR) in Puget Sound Energy's (PSE's) service territory from 2012 to 2031. The study was commissioned by PSE as part of its biennial integrated resource planning (IRP) process.

The study, which builds upon previous efforts, incorporates updated baseline and DSR data informed by primary and secondary data collection. The study is also informed by the efforts of other entities in the region such as the Northwest Power and Conservation Council (the Council). The methods used to evaluate the technical potential and achievable technical potential draw upon the best practices in the utility industry and are consistent with the methodology used by the Council in its assessment of regional conservation potentials in the Northwest.

Summary of Results

The potentials identified in this study are summarized in Table 1. As shown, electric demand-side resources account for 667 aMW and 1,208 winter peak MW of achievable technical potential by 2031. These potentials represent 19% of retail energy sales and 21% of winter peak demand[1]. Similarly, achievable technical natural gas potential accounts for 20% of forecasted 2031 retail sales. High-level potentials by resource are presented below, with more detailed results in the sections of this report that follow.

Table 1. Summary of Energy and Capacity Saving Potentials, Cumulative in 2031

Resource	Energy (aMW / million therms)		Winter Coincident Peak Capacity (MW)	
	Technical Potential	Achievable Technical Potential	Technical Potential	Achievable Technical Potential
Electric Resources				
Energy Efficiency	961	645	1,497	985
Fuel Conversion	55	22	75	30
Demand Response	N/A	N/A	1,995	193
Electric Resources Total	1,016	667	3,567	1,208
Natural Gas Resources				
Energy Efficiency	427	268	N/A	N/A

Energy Efficiency

Table 2 shows 2031 forecasted baseline electric sales and potential by sector. As shown, the results of this study indicate 961 aMW of technically feasible electric energy-efficiency potential will be available by 2031, the end of the 20-year planning horizon. Once market constraints are

[1] Demand response potentials do not account for program interactions, and thus, this potential would likely be reduced if multiple programs were competing for participants.

taken into account, this translates to an achievable technical potential of 645 aMW. Were all of this potential cost-effective and realizable, it would amount to an 18 percent reduction in 2031 forecasted retail sales and a reduction in forecasted load growth of roughly 50 percent. This study, consistent with the Council, assumes that 85 percent of electric resources will be achievable over time. However, due timing of lost opportunity resource acquisition, the achievable technical potential amounts to less than 85 percent of the technical potential, as described in greater detail in Section 1.

Table 2. Electric Energy-Efficiency Potential by Sector, Cumulative in 2031

		Technical Potential		Achievable Technical Potential	
Sector	Baseline Sales	aMW	Percent of Baseline Sales	aMW	Percent of Baseline Sales
Residential	1,620	566	35%	336	21%
Commercial	1,823	373	20%	291	16%
Industrial	111	22	20%	18	17%
Total	3,554	961	27%	645	18%

Table 3 shows 2031 forecasted baseline natural gas sales and potential by sector. As shown, the results of this study indicate roughly 427 million therms of technically feasible natural gas energy-efficiency potential by 2031. This translates to an achievable technical potential of 268 million therms. If all of this potential was cost-effective and realizable, it would amount to a 20 percent reduction in 2031 forecasted retail sales and a 68% reduction in forecasted load growth from 2012 to 2031.

Table 3. Natural Gas Energy-Efficiency Potential by Sector, Cumulative in 2031

		Technical Potential		Achievable Technical Potential	
Sector	Baseline Sales	Million Therms	Percent of Baseline Sales	Million Therms	Percent of Baseline Sales
Residential	846	303	36%	183	22%
Commercial	445	117	26%	80	18%
Industrial	31	7	21%	5	16%
Total	1,322	427	32%	268	20%

Comparison to 2009 IRP

The assessment of energy efficiency potential is largely an update of the analysis conducted for PSE's 2009 IRP. However, there are a number of differences between the two studies that have led to differences in technical, and thus, achievable technical potential, namely:

- Updated commercial baseline data from the Northwest Energy Efficiency Alliance's (NEEA's) Commercial Building Stock Assessment (CBSA)
- Utilization of PSE's most recent energy and sales forecasts
- Incorporation of assumptions, data, and new measures from the Council's 6th Northwest Power Plan
- Adjustments to remaining potential based on PSE's actual 2008-2009 and projected 2010-2011 energy efficiency program accomplishments
- Updated data on measure costs, savings, lifetime, and applicability
- Incorporation of new codes and standards, as described in Section 1 of this report.

A comparison of electric and natural gas technical potentials from the two studies, by sector, is presented in Table 4. As shown, the results of the two studies are similar, with the exception of electric potential in the residential sector, where potential has increased by approximately 65 percent, as compared to the 2009 IRP. This increase is driven largely by increased savings from measures included in the Council's 6th Plan, such as heat pump water heaters and consumer electronics. Additionally, the impact of upcoming residential lighting standards is being treated differently in this study, as described in Section 1, which has increased the remaining lighting potential.

Table 4. Comparison of Energy Efficiency Technical Potential, 2009 IRP to 2011 IRP

	Electric (aMW)		Natural Gas (million therms)	
Sector	2009 IRP	2011 IRP	2009 IRP	2011 IRP
Residential	343	566	263	303
Commercial	378	373	132	117
Industrial	17	22	12	7
Total	739	961	407	427

Fuel Conversion

The fuel conversion analysis estimates available potential from converting electric equipment to natural gas for two main customer types: customers in PSE's natural gas service territory who do not currently have natural gas service, and those who do, but still have electric equipment (i.e. water heaters or appliances) that could be converted to natural gas. Table 5 shows the available technical and achievable technical potential in 2031 for each type of customer.

Table 5. Summary of Fuel Conversion Potentials, Cumulative in 2031

	Technical Potential		Achievable Technical Potential	
Customer Type	Electric Savings (aMW)	Additional Gas Usage (million therms)	Electric Savings (aMW)	Additional Gas Usage (million therms)
Electric-Only	23.5	16.0	10.6	7.3
Existing Gas Customer	31.4	18.6	11.5	7.5
Total	54.9	34.6	22.1	14.8

Comparison to 2009 IRP

As for energy efficiency, this analysis is largely an update to the 2009 IRP. The analysis builds upon the same updated data mentioned above, including baseline data, PSE's sales and customer forecasts, and measure assumptions. Table 6 presents a comparison of the estimated technical and achievable technical potential, as compared to the 2009 IRP. Whereas the 2009 IRP included customers in Cascade Natural Gas service territory, this study addresses conversion only for customers in PSE's natural gas service territory. Additionally, this study incorporated expected participation rates based on PSE pilot program experience, leading to substantially lower potential for electric customers.

Table 6. Comparison of Fuel Conversion Potential, 2009 IRP to 2011 IRP

	Technical Potential (aMW)		Achievable Technical Potential (aMW)	
Customer Type	2009 IRP	2011 IRP	2009 IRP	2011 IRP
Electric-Only	136	24	50	11
Existing Gas Customer	38	31	15	12
Total	174	55	65	22

Demand Response

Table 7 presents estimated winter and summer resource potentials for all demand response resources for the residential, commercial, and industrial sectors. As shown, demand response achievable technical potential represents reductions of approximately 3 percent of forecasted 2031 winter and summer peaks.

Table 7. Demand Response Technical and Achievable Technical Potential, MW in 2031

	Winter			Summer		
Sector	Technical Potential	Achievable Technical Potential	Achievable Technical As Percent of System Peak	Technical Potential	Achievable Technical Potential	Achievable Technical As Percent of System Peak
Residential	1,184	110	1.95%	402	32	0.72%
Commercial	767	79	1.40%	783	82	1.85%
Industrial	44	4	0.08%	54	5	0.12%
Total	1,995	193	3.43%	1,239	119	2.68%
*System peak is based on PSE's average load in the top 20 hours for each season.						

Comparison to 2009 IRP

This study relies on the same methodologies used in the 2009 IRP analysis; however, the program strategies included differed. The 2011 IRP assessed one incentive-based and one pricing-based program strategy in each sector, whereas the 2009 IRP included multiple options. This decision reflected the structure of PSE's current demand response pilot programs, and to minimize the interactive effects between similar program options. A comparison of estimated achievable technical potential during peak periods, by sector, is presented in Table 8.

Table 8. Comparison of Demand Response Achievable Technical Potential, 2009 IRP to 2011 IRP

	Winter MW		Summer MW	
Sector	2009 IRP	2011 IRP	2009 IRP	2011 IRP
Residential	170	110	48	32
Commercial	14	79	14	82
Industrial	5	4	5	5
Total	189	193	68	119
*System peak is based on PSE's average load in the top 20 hours for each season.				

The largest difference in results between the two studies is in the commercial sector, where potentials have increased considerably. The results of the 2011 IRP are based on the structure of PSE's nonresidential pilot program and informed by its success. Residential potential has decreased due to removal of multifamily customers from the program concept.

Distributed Generation

Distributed generation potentials were not estimated as part of this study. PSE incorporated the results of the 2009 IRP analysis into its 2011 IRP. For detailed potentials from the 2009 IRP analysis, see the 2008 Cadmus' report.[2]

Comparison to the Council's 6th Plan

This study employs methodologies consistent with the Council's 6th Plan to estimate available energy-efficiency potential (See Appendix A for a detailed comparison of methodologies). Additionally, Cadmus conducted a thorough review of baseline and measure assumptions used by the Council, including costs, savings, applicability, and current saturation. Although this study relies on data specific to PSE's service territory whenever possible, Council assumptions were incorporated where appropriate.

By applying PSE's share of regional sales, by sector, to the Council's regional potential, one can estimate the 6th Plan's share of potential in PSE's service territory. However, there are a number of factors that must be considered in comparing that allocated potential to the results of this study:

- The Council, by necessity, relies on average regional data; whereas this study utilizes primary data from PSE's service territory. Therefore, an allocation of regional potential based on sales may not account for PSE's unique service territory characteristics, such as customer mix, use per customer, end use saturations, fuel shares, and current measure saturation. Similarly, some industries included in the 6th Plan may not exist in PSE's service territory.
- PSE and the Council rely on unique baseline energy forecasts, each of which is a major driver in the respective estimates of potential.
- Both studies assess potential over a 20-year period; however, the 6th Plan begins in 2010, while estimation of potential in this study begins in 2012.
- Due to the timing of the release of the 6th Plan, not all upcoming codes and standards were removed from the potential (most notably, new standards relating to commercial lighting and residential water heating, as described in Section 1 of this report).

These caveats aside, Table 9 provides a comparison of the 2-, 10-, and 20-year achievable technical potentials estimated in this study, as compared to the 6th Plan. The 6th Plan numbers are derived by applying PSE's share of regional sales, by sector, to the 6th Plan estimates[3] of regional potential.[4]

- In the residential sector, while the 6th Plan allocation of 10- and 20-year potentials are substantially higher, the two-year 2011 IRP savings is higher due to accelerated ramping.
- In the commercial sector, short- and long-term potentials from the 2011 IRP are substantially higher.

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2 http://www.pse.com/SiteCollectionDocuments/2009IRP/AppL1_IRP09.pdf

3 Bus bar savings from the 6th Plan have been adjusted to savings at the customer meter using the Council's line loss factors.

4 Report 6th Plan potentials by sector and end use are based on summarization of measure-specific Council workbooks available here: http://www.nwcouncil.org/energy/powerplan/6/supplycurves/default.htm

- In the industrial sector, 2- and 10-year potentials are very close, although the 6th Plan's 20-year potential is substantially higher.

Details on sector-level differences are provided below.

Table 9. Comparison of 2011 IRP and 6th Plan Achievable Technical Potential (aMW)

Sector	2-Year Achievable Technical Potential		10-Year Achievable Technical Potential		20-Year Achievable Technical Potential	
	2011 IRP	PSE Share of Regional Potential	2011 IRP	PSE Share of Regional Potential	2011 IRP	PSE Share of Regional Potential
Residential*	47	40	229	263	336	584
Commercial	43	14	230	115	284	227
Industrial	4	2	18	17	18	35
Total	93	56	478	394	638	845
* Solar photovoltaic potential has been removed from 6th Plan potential to allow for direct comparison between studies						

Residential Sector

As shown in Table 9, the residential sector accounts for the largest differences in estimates of long-term achievable technical potential. Because of differences in end-use definitions, it is difficult to compare the two studies at a detailed end-use level; however, Table 10 shows the distribution of 20-year potential by major end-use group for each study. Differences in assumptions by end use are described below:

- ***Appliances and water heating*** are combined for this comparison because a large portion of appliance potential is water heating savings from clothes washers and dishwashers. A key difference in the modeling approaches is the incorporation of new residential water heating standards in the 2011 IRP, as described in Section 1 of this report. It is assumed that new equipment installed after 2014 would need to meet the new minimum efficiency requirements, reducing the potential for high-efficiency water heating equipment. Additionally, there is a substantial difference in the assumed percentage of water heaters using electricity (42 percent in PSE's service territory versus 64 percent for the region).
- The category of ***consumer electronics and other plug loads*** contains a variety of end uses, including televisions, computers, and other household electronics. While the base-year saturations of the various types of equipment are similar between the two studies, the assumptions differ regarding how saturations may change over time, leading to a difference in long-term potential.[5] Additionally, the 6th Plan includes commercial computers and monitors as part of the residential potential, while the study performed by Cadmus includes only units in residences.
- ***HVAC*** encompasses heating, cooling, and ventilation savings, which are combined due to differences in model structures. The main drivers of this difference are assumed saturation of central cooling (15 percent in PSE's service territory versus 53 percent for the region) and the share of electric heating (15 percent for PSE's service territory versus 35 percent for the region).

[5] The 2011 IRP assumes annual increases in saturations by technology ranging from 0.3% to 1.0% based on the EIA's 2010 Annual Energy Outlook. Council escalation assumptions vary by technology with an average annual increase of around two percent.

- ***Lighting*** savings in the 2011 IRP assumes a technology that meets the minimum requirements of the Energy Independence and Security Act of 2007 (EISA) will be available and that savings from CFL installations will still be available.

Table 10. Comparison of 20-Year Residential Achievable Technical Potential by End Use

End Use Group	20-Year Achievable Technical Potential	
	2011 IRP	PSE Share of Regional Forecast
Appliances and Water Heating	89	213
Consumer Electronics and Other Plug Loads	61	125
HVAC	125	202
Lighting	56	43
Total	366	584

Commercial Sector

Although in the commercial sector, this study estimates higher 2-, 10-, and 20-year achievable technical potential than does the 6th Plan, this difference is largely a function of differing load forecasts. Both studies estimate that approximately 16 percent of year-20 commercial sales could be saved; however, PSE forecasts its load to be approximately 20 percent higher than its allocation of the regional commercial sales forecast. Higher potential in the early years of this study is due to the 10-year acceleration of all discretionary potential.

Industrial Sector

Because the two assessments rely on the same measure assumptions, differences in potential are driven by the mix of industries present. For example, in the Northwest region on the whole, pulp and paper industries account for the largest portion of both baseline sales and achievable technical potential (roughly 30 percent and 40 percent, respectively). However, in PSE's service territory, these facilities account for less than 1 percent of baseline consumption. Additionally, PSE's forecasted industrial sales are approximately 30-percent lower than its allocated share of the regional forecast.

Incorporation of Demand Side Resources into PSE's IRP

The achievable technical potential shows above were grouped by levelized cost of conserved energy for inclusion in PSE's IRP model. Note, levelized costs are calculated over a measure's life, even if that life extends past the end of the planning horizon. Bundling resources into a number of distinct cost groups allows the model to select the optimal amount of DSR annually based on expected load growth, energy prices, and other factors.

Figure 1 shows the annual cumulative combined potential for energy efficiency, fuel conversion, and distributed generation by each of the cost bundles considered in PSE's 2011 IRP. Figure 2 shows the annual DSR bundles for natural gas energy efficiency.

Figure 1. Annual Electric DSR Bundles by Cost Group

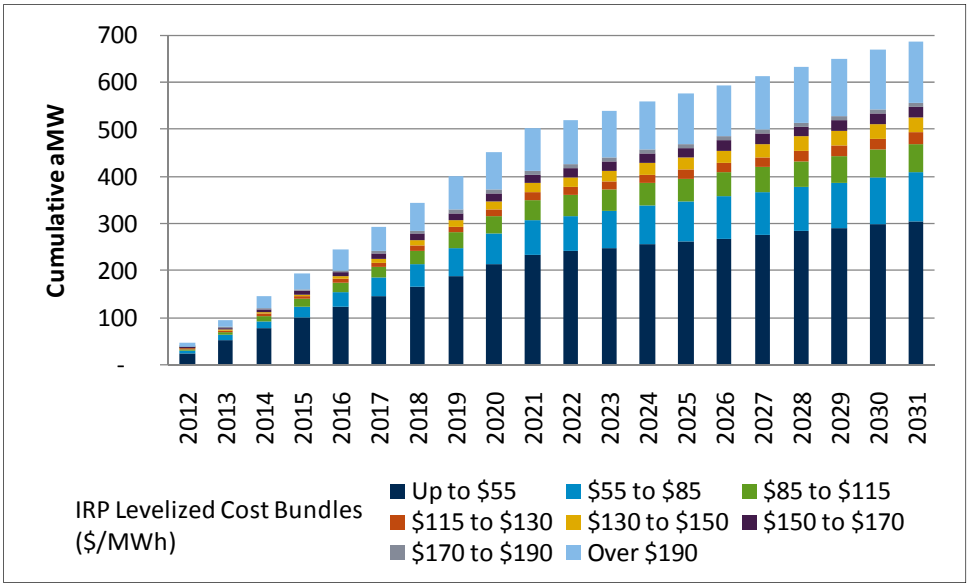
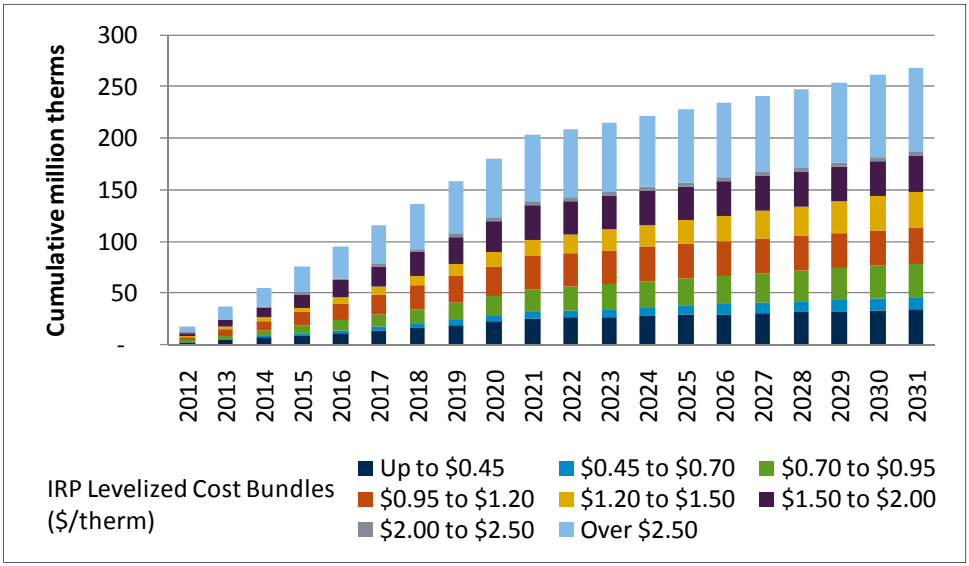


Figure 2. Annual Natural Gas DSR Bundles by Cost Group



In addition to the energy efficiency, fuel conversion, and distributed generation bundles displayed above, PSE included three other resource bundles in its IRP:

1. The expected effects on residential lighting due to EISA (shows graphically in Figure 3),
2. Capacity-only impacts of demand response, and
3. Savings associated with distribution efficiency improvements (outside the scope of this study).

Organization of the Report

The remainder of this report is organized in four sections. The first outlines the general methodology for assessment of potential for each resource type, while the remaining three sections present the key assumptions and results for each resource. Additional technical information and descriptions of data and their sources are presented in the appendices to this document.

1. General Approach and Methodology

This report describes the technologies, data inputs, data sources, data collection processes, and all assumptions used in the calculation of technical and achievable technical long-term potentials.

General Approach

The demand-side resources (DSR) analyzed in this study differ with respect to technology, availability, type of load impact, and target consumer markets. Analysis of their potentials, therefore, requires customized methods that can address the unique characteristics of each resource. These methods, however, spring from the same conceptual framework and aim to arrive at estimates of two distinct types of potential: technical and achievable technical.

Technical potential assumes that all technically feasible resource opportunities may be captured, regardless of their costs or other market barriers. It is important to note that the notion of technical potentials is less relevant to resources (such as demand response) since nearly all end-use loads may be subject to interruption or displacement by on-site generation from a strictly technical point of view.

Achievable technical potential is defined as that portion of technical potential that might be assumed to be achievable in the course of the planning horizon, regardless of the acquisition mechanism. (For example, savings may be acquired through utility programs, improved codes and standards, or market transformation.) The identified potential is then grouped by levelized cost, allowing PSE's IRP model to pick the optimal amount of DSR, given various assumptions around future resource requirements and costs. In addition to the up-front capital cost and annual energy savings, the levelized cost calculation incorporates several other factors, consistent with the Council's methodology:

- ***Incremental operations and maintenance (O&M) costs or benefits*** are considered annually over the life of the measure. The present value is used to adjust the levelized cost- upward for measures with costs above baseline technologies and downward for measures that decrease O&M costs.
- ***Non-energy benefits*** are treated as a reduction in levelized costs for measures that save resources in addition to the primary fuel being considered. This includes secondary fuel benefits (e.g. natural gas savings for electric measures) as well as reductions in consumption of water, detergent, or other applicable resources.
- ***The regional ten percent conservation credit, capacity benefits during PSE's system peak, and transmission and distribution (T&D) deferrals*** are similarly treated as reductions in levelized cost for electric measures**.**

In addition to the quantity of available potential, the timing of resource availability is a key consideration. For this analysis, resources are split into two distinct categories:

- ***Discretionary resources*** are retrofit opportunities in existing facilities that, theoretically, are available at any point over the course of the study period.
- ***Lost opportunity resources*** are those with pre-determined availability, such as replacement after equipment failure and opportunities in new construction.

Data Sources

The full assessment of resource potential required the compilation of a large set of measure-specific technical, economic, and market data obtained from secondary sources and through primary research. The main sources of data used in this study included:

- ***PSE Internal Data.*** This encompasses historical and forecasted sales and customers, hourly load profiles, and historic DSR accomplishments
- ***Primary Data.*** This study relies on several sources of data specific to PSE's service territory and customers. These sources include the 2008 Residential End Use Survey, 2008 Fuel Conversion Survey, 2007 CFL Saturation Study, and NEEA's 2009 Commercial Building Stock Assessment (CBSA).
- ***Secondary Pacific Northwest Sources.*** Several Northwest entities provided data critical to this study, including the Council, the Regional Technical Forum (RTF), and the Northwest Energy Efficiency Alliance (NEEA). This included technical information on measure savings, costs, and lives, hourly end-use load shapes (to supplement building simulations described above), and commercial building and energy characteristics.
- ***Additional Secondary Sources.*** The study relied on a number of secondary sources to characterize measures, assess baseline conditions, and benchmark results against other utilities' experiences. These sources include the California Energy Commission's Database of Energy Efficiency Resources (DEER), ENERGY STAR, the Energy Information Administration, and various utilities' annual and evaluation reports on energy efficiency and demand response programs.

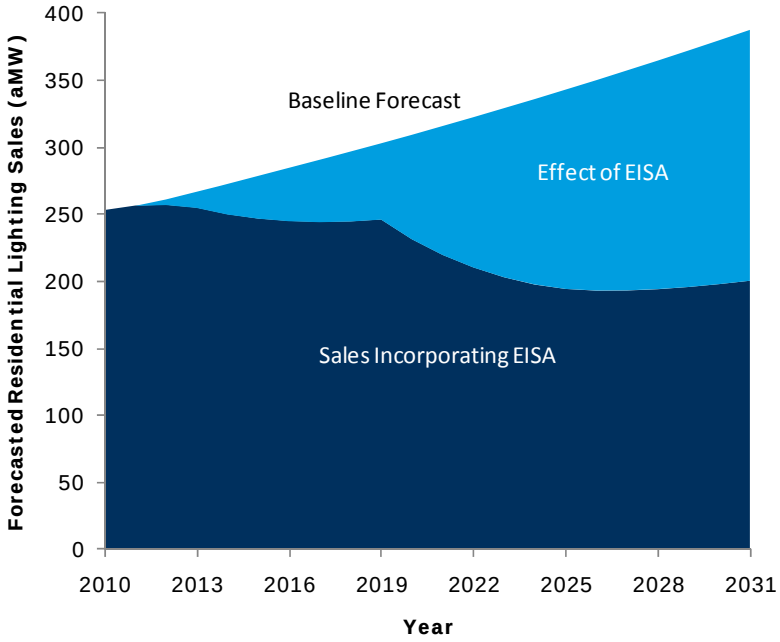
Incorporation of Upcoming Codes and Standards

While Cadmus' analysis does not attempt to predict how energy codes and standards may change, it does capture legislation that has been enacted, even if it will not go into effect for several years. The most notable, recent efficiency regulation is the Energy Independence and Security Act of 2007 (EISA), which set new standards for general service lighting, motors, and other end use equipment. It is particularly important to capture the effects of this legislation because residential lighting has played a large role in PSE's energy efficiency programs over the past several years.

EISA requires that general service lighting becomes roughly 30 percent more efficient than current incandescent technology, with standards phased in by wattage from 2012 to 2014. In addition to the 2012 phase-in, EISA contains a backstop provision that requires still higher efficacy beginning in 2020.

To ensure an accurate assessment of remaining lighting potential, Cadmus created a new forecast netting out EISA's effect on residential lighting (Figure 3). This was based on a strict interpretation of the legislation, assuming that affected bulbs would be replaced with technologies meeting EISA minimum standards, meaning savings from CFL and LED technologies would still exist. Note that PSE's 2009 IRP assumed CFLs would become the *de facto* baseline after the codes took effect, thus eliminating the potential for CFLs.

Figure 3: Residential Lighting Forecasts Before and After EISA Adjustment



While the new residential lighting standards have the largest effect on potential, several other codes and standards were explicitly accounted for in this study. Specifically, these:

- Current Washington state energy code (as of 2010)
- Residential water heating standards established on April 16, 2010, and taking effect in 2015, setting new requirement for Efficiency Factor (EF)[6]: The analysis assumes that, beginning in 2015, all new equipment installed will meet these minimum efficiency requirements.

Table 11. 2015 Residential Water Heater EF Requirements

Equipment Type	55 Gallons and Below	56 Gallons and Above
Electric Storage	EF = 0.960 - (0.0003 × Rated Storage Volume in gallons)	EF = 2.057 - (0.00113 × Rated Storage Volume in gallons)
Gas-fired Storage	EF = 0.675 - (0.0015 × Rated Storage Volume in gallons)	EF = 0.8012 - (0.00078 × Rated Storage Volume in gallons
Gas-fired Instantaneous	EF = 0.82	

- Two commercial lighting standards are phased in over the study horizon. First, as of July 2010, Department of Energy standards mandate that magnetic ballasts be phased out and replaced with electronic ballasts. In addition, standards require that all T-12 lamps be phased-out beginning in July 2012.[7] These standards are modeled as a percentage reduction to the lighting end use intensity (EUI), phased in upon ballast replacement. The EUI reduction is based on two factors:

6 http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/htgp_finalrule_fedreg.pdf

7 http://www1.eere.energy.gov/buildings/appliance_standards/residential/fluorescent_lamp_ballasts.html

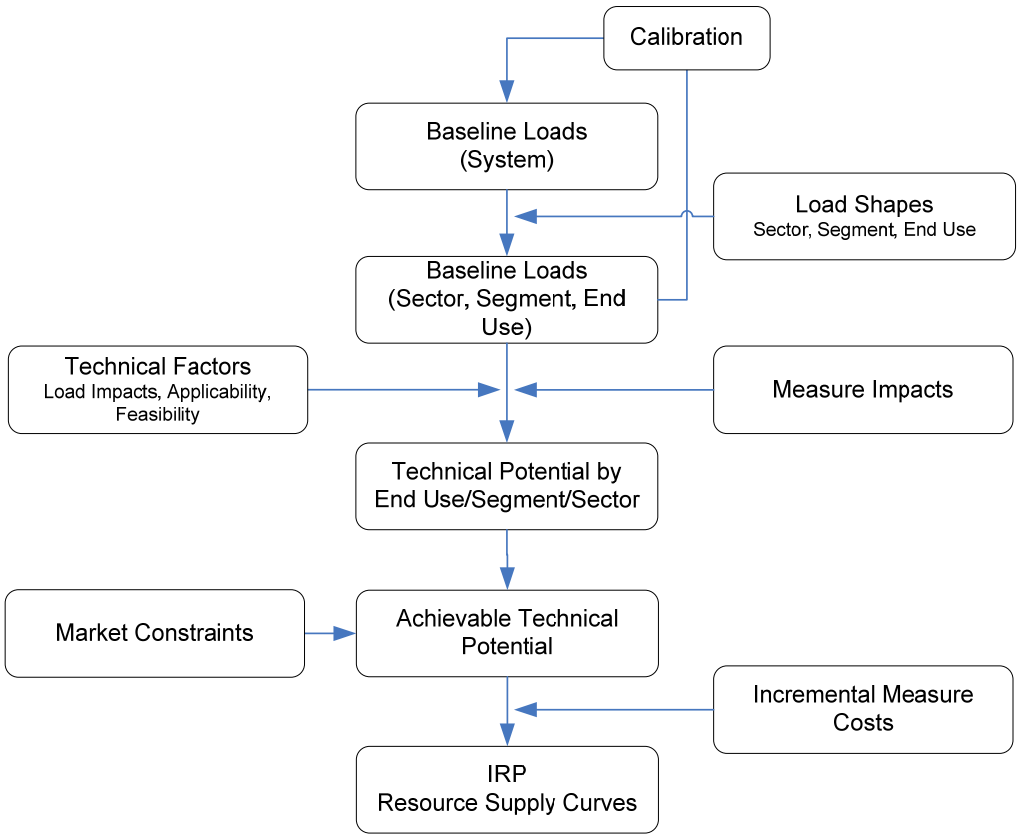
1. The difference in wattage between a T-12 lamp with a magnetic ballast and a T-8 lamp with an electronic ballast, and,
2. The percentage of floor space lit by T-12 lamps, as estimated by the 2009 CBSA.

The remainder of this section outlines the specific methodologies used for each resource.

Energy Efficiency

The methodology used for estimating the technical and achievable technical energy-efficiency potential is based on standard industry practices. This methodology is consistent with that of the Council in its assessments of conservation potentials for the 6th Northwest Regional Power Plan (6th Plan). The general approach, shown in Figure 4, illustrates how baseline and efficiency data are combined to develop estimates of potential for use in PSE's IRP process.

Figure 4. General Methodology for Assessment of Energy Efficiency Potentials



Developing Baseline Forecasts

As shown, the first step entails creating a baseline (no-DSR) forecast. In the residential and commercial sectors, the analysis relies on a bottom-up forecasting approach, beginning with annual consumption estimates by segment, end use, and efficiency level of equipment. Average base-year use per customer is then calculated from the saturations of equipment, fuel, and efficient equipment. These estimates are validated by comparison to PSE's historical use per

customer, and a forecast of future energy sales is then created based on expected new construction and equipment turnover rate.

In the industrial sector, as is standard practice, PSE's industrial forecast is disaggregated to end uses based on data available from the EIA's Manufacturing Energy Consumption Survey.

To bundle potential by cost, data on measure costs, savings, and market size were collected at the most granular level possible. Within each fuel and sector, the study distinguished between customer segments or facility types and their respective applicable end uses. Cadmus conducted the analyses for the following customer segments:

- Six residential segments (existing and new construction for single-family, multifamily, and manufactured homes),
- 20 commercial segments (10 building types within the existing and new construction vintages),
- 17 industrial segments (17 facility types, treated only as an existing construction vintage)

Estimating Technical Potential

To estimate technical potential, a comprehensive list of measures was developed for all sectors, segments, and end uses. For the residential and commercial sectors, the study begins with a review of a broad range of energy-efficiency measures. These measures are then screened to include only those measures that are: (1) commonly available, (2) based on well-understood technology, and (3) applicable to PSE's buildings and end uses.

The industrial sector measures were based on the Council's 6th Plan and other general categories of process improvements.[8]

The study encompasses 309 *unique* electric energy-efficiency measures and 106 unique gas energy-efficiency measures (Table 12). When expanded across segment, end use, and construction vintage, this amounts to over 6,000 measures. (A comprehensive list of measures included in the analysis is provided in Appendix B.2, with inputs and outputs provided in Appendix B.3.)

Table 12. Energy-Efficiency Measure Counts by Fuel

Sector	Electric Measure Counts	Gas Measure Counts
Residential	89 unique, 922 permutations across segments	48 unique, 409 permutations across segments
Commercial	138 unique, 2,503 permutations across segments	50 unique, 908 permutations across segments
Industrial	82 unique, 1,145 permutations across segments	8 unique process improvements, 124 permutations across segments

For every measure permutation contained in the study, a number of key inputs—varying by segment and end use—were compiled, specifically, these:

[8] Industrial improvements are derived from a variety of practices and specific measures defined in DOE's Industrial Assessment Centers Database, http://www.iac.rutgers.edu/database/.

- ***Measure savings.*** The energy savings associated with a measure as a percentage of the total end-use consumption. Sources include engineering calculations, energy simulation modeling, the Regional Technical Forum (RTF), the Council's 6th Plan, and secondary sources such as Energy Star and DEER.
- ***Measure costs.*** The per-unit cost (either full or incremental, depending on the application) associated with installation of the measure. Sources include the Council's 6th Plan, DEER, RS Means, and merchant Websites.
- ***Measure life.*** The expected useful life (EUL) of the measure. Sources include the Council's 6th Plan, DEER, and demand-side management (DSM) program evaluations.
- ***Measure applicability.*** A general term encompassing a number of factors, such as the technical feasibility of installation, the current saturation of the measure, measure interaction, and competition. Where possible, applicability factors are based on PSE survey data.

An alternate sales forecasts was created, incorporating the effects of all technically feasible measures, and the difference between this forecast and the baseline forecast represents the technical potential. This method allows for long-term estimates of technical potential by measure, while accounting for changes in baseline conditions inherent in the baseline forecast.

Achievable Technical Potential

"Achievable technical potential" is defined as that portion of technical potential expected to be reasonably achievable over the course of the planning horizon. This estimate accounts for likely rates of acquisition and market barriers to customer adoption, but it does not address cost-effectiveness or acquisition mechanism (utility programs, codes and standards, market transformation, etc.). Thus, the amount of savings a utility can expect to acquire cost-effectively may be substantially lower than this estimate.

This study, consistent with the Council's 6th Plan, assumes an achievability factor for electric energy efficiency of 85 percent. For lost opportunity measures, this number (which is applied directly to the total technical potential for discretionary measures) is ramped in at a rate determined by the technology. Because of this ramp-up, less than 85 percent of the lost opportunity potential will be acquired over the planning horizon, consistent with the Council's methodology[9].

Due to higher up-front cost of equipment for gas resources, it is assumed that 75 percent of the technical potential could be achieved over the planning horizon.

As discussed previously, lost opportunity measures have an inherent technical ramping based on new construction and equipment turnover rates. In contrast, discretionary opportunities can be acquired at any point. For this study, it is assumed that all achievable electric and gas discretionary measures can be acquired in 10 years. This 10-year accelerated ramp-in for discretionary measures is considered by PSE to be a reasonable representation of the overall rate

[9] This is consistent with the Council's assumption that 65 percent of lost opportunity resources can be acquired, as discussed in: *A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions,* April 2007 - http://www.nwcouncil.org/library/2007/2007-13.htm

of energy savings acquisition for resource planning analyses. It should be noted that actual market ramp rates will vary for specific measures.

Fuel Conversion

In the context of this study, "fuel conversion" refers to electric savings opportunities involving substitution of natural gas for electricity through replacement of space heating systems, water heating equipment, and appliances. Fuel conversion is only considered for existing single-family homes, new multifamily buildings, and both existing and new commercial facilities. These segments are considered the most likely and able to convert.

Cadmus' analysis is an extension of the energy-efficiency analysis described above, identifying applicable equipment and customers based on the following criteria:

- Customers must be within PSE's combined service territory. That is, areas where PSE provides both electricity and natural gas.
- Customers must be either existing gas customers or on a gas main.
- For existing construction, customers must have a ducted system for space heating conversion.
- New natural gas equipment must meet energy-efficiency program criteria (90 percent AFUE furnace, ENERGY STAR water heater, etc.).

Once eligible populations for each equipment type are identified, measure costs and savings are compiled, consistent with the energy-efficiency analysis. Cadmus also accounts for additional up-front costs required due to the natural gas conversion (line extensions, piping, etc.). The cost of natural gas consumed over the life of the measure, calculated based on forecasted avoided costs, is treated as an O&M cost and is included in the calculation of the cost of conserved electricity.

As with energy efficiency, the technical potential assumes all eligible pieces of equipment are converted to natural gas. Achievability is based on the results of PSE's 2008 fuel conversion survey, which asked customers about their likelihood of participating at various incentive levels. Based on this survey, this analysis assumes 63 percent achievability, the value associated with PSE covering the entire incremental cost of conversion. Available potential is assumed to be acquired in equal amounts annually over the planning horizon.

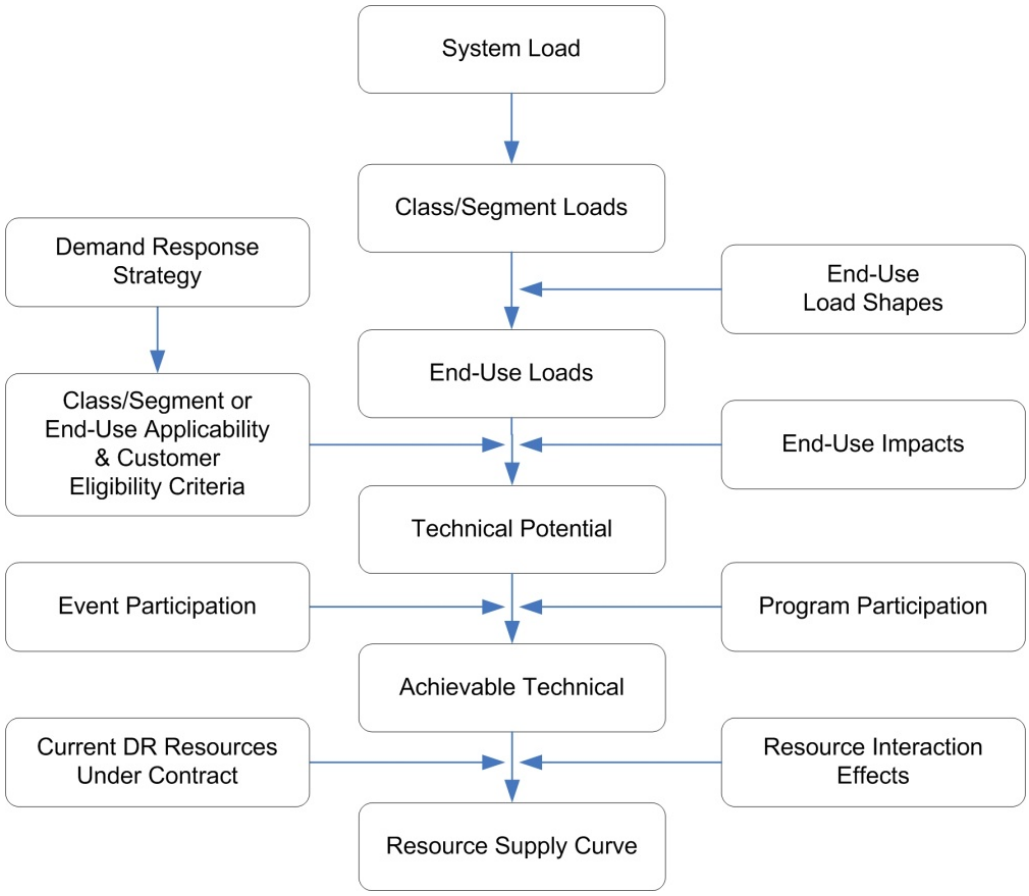
Demand Response

The methodology for estimating demand response potential is illustrated in Figure 5. The approach begins with utility system loads, which are disaggregated by sector, segment, and applicable end use. For each program strategy, technical potential impacts are calculated for all applicable end uses.

Note that technical potential for demand response resources is not particularly useful for planning, as it tends to be much higher than what can actually be attained. For example, nearly every central air conditioner could, in theory, be controlled. However, in practice, program and event participation rates are likely to be much lower than 100 percent, depending on the program

strategy. To estimate achievable technical potential, these expected rates are applied by program strategy to inform the IRP process.

Figure 5. Schematic Overview of Demand Response Assessment Methodology



Identify Eligible Loads

Estimation of both technical and achievable technical demand-response potential requires an understanding of available loads in peak periods by sector, segment, and end use. These loads are identified through the following steps:

1. ***Estimate the hourly demand by sector, segment, and end use.*** This task begins with the baseline forecast by sector, segment, and end use. Annual energy consumption for each combination is spread over hourly end-use loadshapes to estimate the demand in every hour of the year. To ensure the appropriateness of the loadshapes, hourly end-use demand is aggregated to the sector and system levels and compared to PSE's actual hourly loads.
2. ***Develop a list of program strategies for inclusion in analysis.*** The list of strategies was designed to include both price- and incentive-based options for all major customer segments and end uses in PSE's service territory. The list is informed by the 2009 IRP, PSE's demand response pilot program experience, and programs offered by other utilities.

3. ***Define the applicable sectors, segments and end uses for each program strategy.*** Not all loads analyzed in Step 1 will be candidates for any given demand response program strategy. Therefore, for each program strategy, applicable sectors, segments, and end uses are identified, establishing the peak demand that the given program can target.

Estimating Technical Potential

Technical potential (TP) for each demand response program is assumed to be a function of:

- customer eligibility in each class,
- affected end uses in that class, and
- the expected strategy impact on the targeted end uses.

Analytically, technical potential for each demand-response program strategy *(p)* is calculated as the sum of impacts at the end-use level (*e*) generated in customer segment (*s*) by the strategy:

$$TP_{pes} = LE_{ps} \times LI_{pes}$$

and

$$TP_{p} = \sum TP_{pes}$$

where,

LE_{ps} (load eligibility) represents the percent of customer segment (*s*) loads applicable for program strategy (*p*), referenced as "Eligible Load" in the program assumptions; and

LI_{pes} (load impact) is the percentage reduction in end-use load (*e*) for each segment (*s*) resulting from the program (*p*), referenced as "Technical Potential as a percent of Load Basis" in the program assumptions.

Estimating Achievable Technical Potential

Achievable technical potential is a subset of technical potential that accounts for the customers' ability and willingness to participate in capacity-focused programs subject to their unique business priorities, operating requirements, and economic (price) considerations.

For each program strategy, achievable technical potential is calculated by adjusting the technical potential by two factors:

- expected rates of program participation (percent of eligible load that would sign up for the program)
- event participation (percent of signed-up load that would participate in a given event)

Estimates of each factor were informed by PSE's program experience and/or secondary research. Assumptions for each program strategy are detailed in Section 4.

Demand-response programs vary significantly with respect to both the type and magnitude of costs. Applicable resource acquisition costs for demand-response strategies generally fall into two categories: (1) fixed direct expenses, such as infrastructure, administration, and data acquisition; and (2) variable costs, such as incentive payments to participants. Annual costs and impacts over the 20-year horizon are calculated based on available potential, assumed rate of

acquisition, and participant attrition, allowing for a calculation of the levelized cost ($/kW-year) of each program strategy and allowing for comparison to supply-side alternatives. Estimates of achievable technical potential are combined with per-unit resource costs to produce resource supply curves.

Distributed Generation

Distributed generation potentials were not estimated as part of this study. PSE incorporated the results of the 2009 IRP analysis into its 2011 IRP. For detailed potentials from the 2009 IRP analysis, see the 2008 Cadmus' report.[10]

[10] http://www.pse.com/SiteCollectionDocuments/2009IRP/AppL1_IRP09.pdf

2. Energy-Efficiency Potentials

Scope of Analysis

The primary objective for this assessment was to develop accurate estimates of available energy-efficiency potential, essential for PSE's IRP and program planning efforts. To support these efforts, Cadmus performed an in-depth assessment of technical potential and achievable technical potential for electric and gas resources in the residential, commercial, and industrial sectors. This potential was then bundled in terms of cost of conserved energy, allowing the IRP model to determine the optimal amount of energy-efficiency potential to select. The remainder of this section is divided into two parts: (1) a summary of resource potentials by fuel, and (2) detailed results by fuel and sector.

Summary of Resource Potentials – Electric

Table 13 shows 2031 forecasted baseline electric sales and potential by sector.[11] As shown, the results of this study indicate 961 aMW of technically feasible electric energy-efficiency potential will be available by 2031, the end of the 20-year planning horizon. This translates to an achievable technical potential of 645 aMW. Were all of this potential cost-effective and realizable, it would amount to an 18 percent reduction in 2031 forecasted retail sales and a reduction in projected load growth of roughly 50 percent.

Table 13. Electric Energy-Efficiency Potential by Sector, Cumulative in 2031

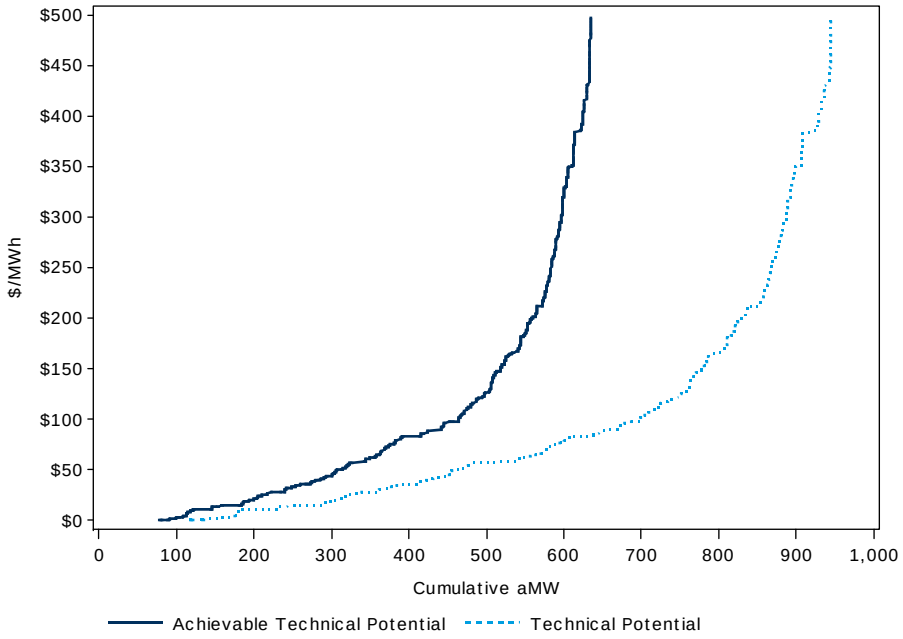
		Technical Potential		Achievable Technical Potential	
Sector	Baseline Sales	aMW	Percent of Baseline Sales	aMW	Percent of Baseline Sales
Residential	1,620	566	35%	336	21%
Commercial	1,823	373	20%	291	16%
Industrial	111	22	20%	18	17%
Total	3,554	961	27%	645	18%

Figure 6 illustrates the relationship between identified technical potential and achievable technical potential and the corresponding cost of conserved electricity.[12] As an example, there is approximately 500 aMW of achievable potential available at a cost of less than $120 per MWh.

[11] These savings are based on forecasts of future consumption absent any utility program activities. While consumption forecasts account for the past savings PSE has acquired, the estimated potential is inclusive of—not in addition to—current or forecasted program savings.

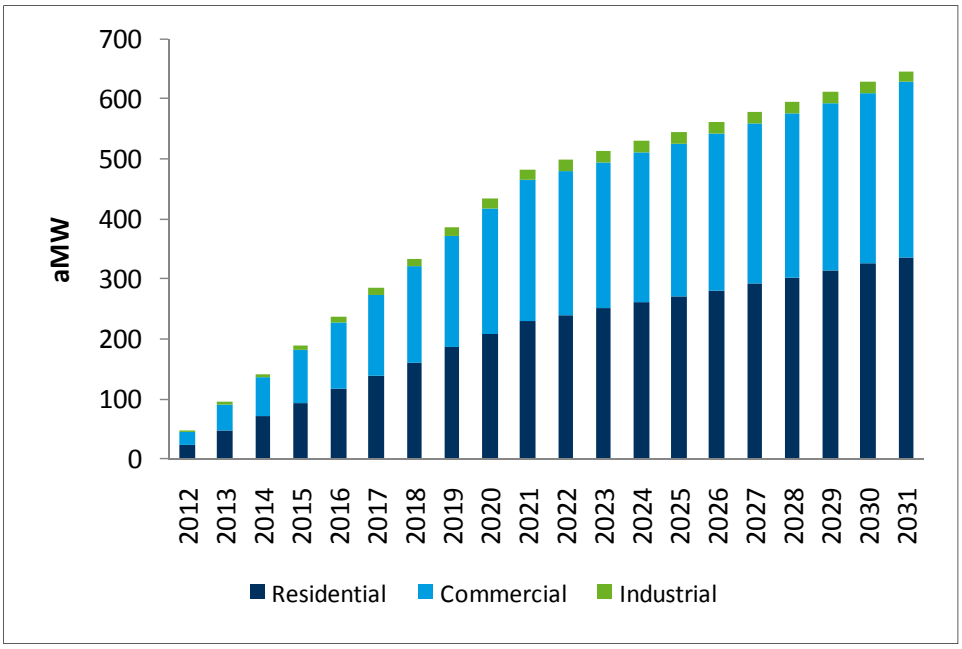
[12] In the calculation of levelized cost of conserved energy, non-energy benefits are treated as a negative cost. This leads to some measures having a negative cost of conserved energy, although there would be an incremental up-front cost.

Figure 6. Electric DSR Supply Curves – Cumulative in 2031



The cumulative potential available in each sector annually is presented in Figure 7. The 10-year acceleration of discretionary resources leads to the change in slope after 2021.

Figure 7. Electric Energy Efficiency Acquisition Schedule by Sector



Summary of Resource Potentials – Natural Gas

Table 14 illustrates the 2031 forecasted baseline natural gas sales and potential by sector. As shown, the results of this study indicate roughly 427 million therms of technically feasible energy-efficiency potential by 2031, the end of the 20-year planning horizon. This translates to

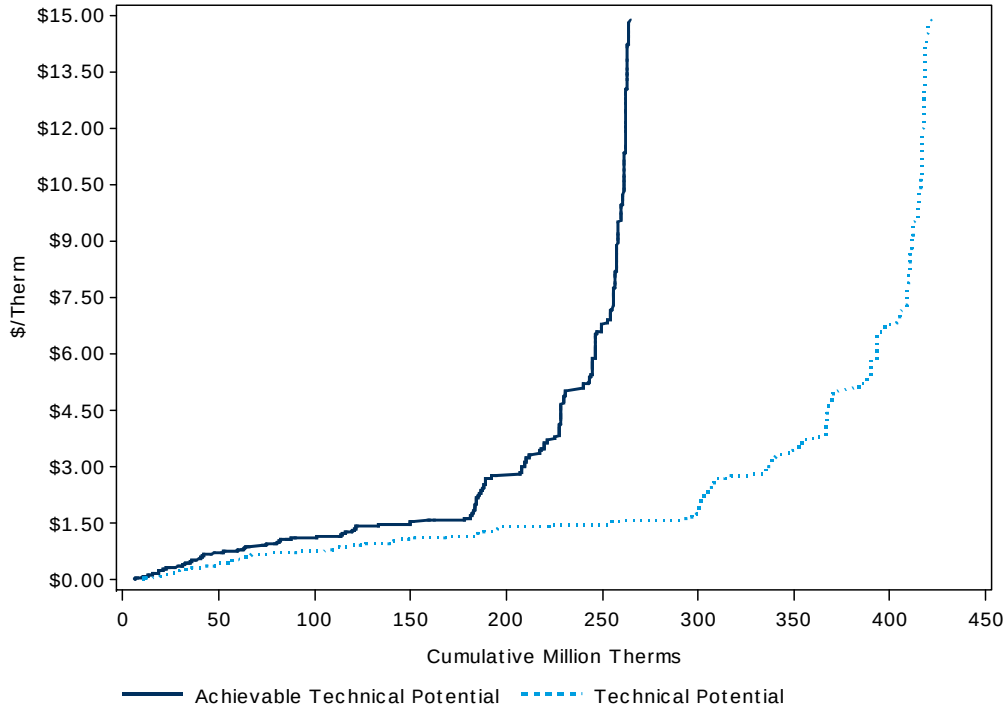
an achievable technical potential of 268 million therms. If all of this potential was cost-effective and realizable, it would amount to a 20-percent reduction in 2031 forecasted retail sales, offsetting approximately 68 percent of forecasted load growth from 2012 to 2031.

Table 14. Natural Gas Energy-Efficiency Potential by Sector, Cumulative in 2031

		Technical Potential		Achievable Technical Potential	
Sector	Baseline Sales	Million Therms	Percent of Baseline Sales	Million Therms	Percent of Baseline Sales
Residential	846	303	36%	183	22%
Commercial	445	117	26%	80	18%
Industrial	31	7	21%	5	16%
Total	1,322	427	32%	268	20%

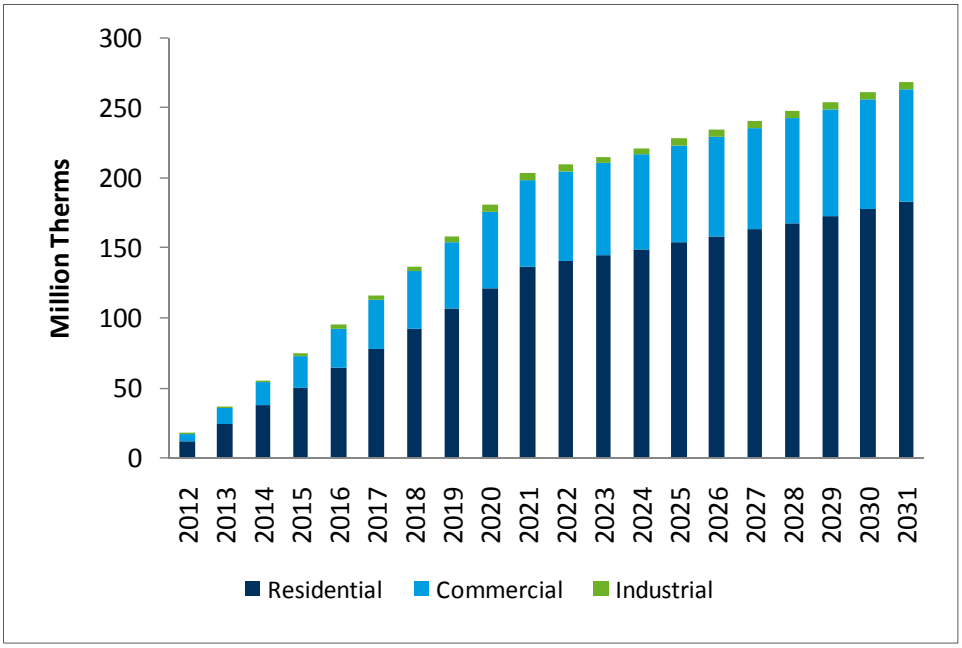
Figure 8 illustrates the relationship between identified technical potential and achievable technical potential and the corresponding cost of conserved energy. As an example, there are roughly 120 million therms of achievable potential available at a cost of less than $1 per therm.

Figure 8. Natural Gas DSR Potential Supply Curves, Cumulative in 2031



The cumulative potential available in each sector annually is presented in Figure 9. As with electric potential, the study assumes all achievable discretionary opportunities will be acquired over ten years.

Figure 9. Natural Gas Energy Efficiency Acquisition Schedule by Sector



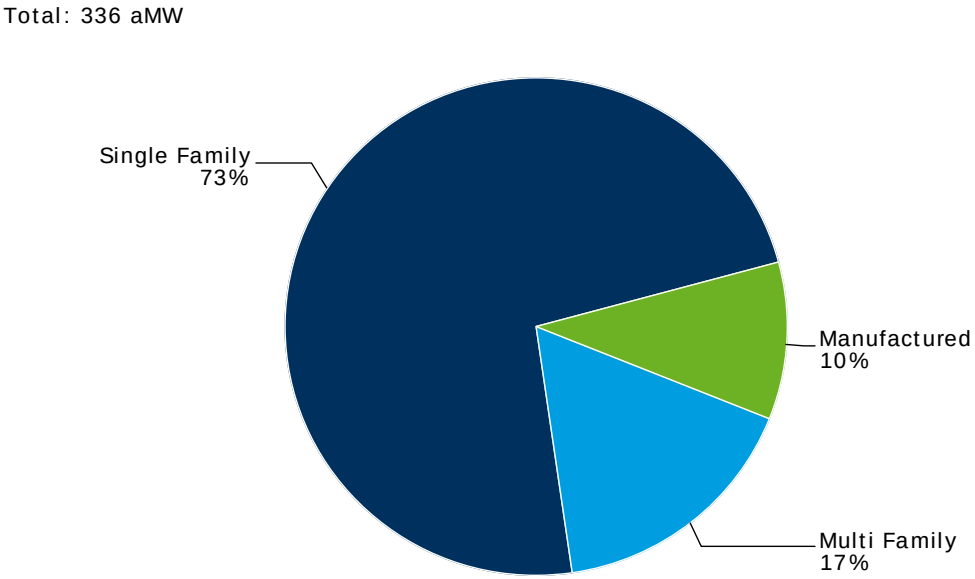
Detailed Resource Potentials

Residential Sector – Electric

Residential customers in PSE's service territory are expected to account for almost one-half of baseline electric retail sales by 2031. The single-family, manufactured, and multifamily dwellings that comprise this sector present a variety of potential savings sources, including equipment efficiency upgrades (e.g., air conditioning, refrigerators), improvements to building shells (e.g., insulation, windows, air sealing), and increases in lighting efficiency (e.g., compact fluorescent and LED light bulbs). As described in Section 1, the expected impacts of new lighting standards established through EISA have been removed from the potential presented in this section.

As shown in Figure 10, single-family homes represent 73 percent of the total achievable technical residential electric potential, followed by multifamily (16 percent) and manufactured homes (9 percent). The main driver of these results is each home type's proportion of baseline sales, but other factors play an important role in determining potential, such as heating fuel sources,. For example, a higher percentage of manufactured homes are heated electrically than other home types, which increases their relative share of the potential. However, manufactured homes are typically smaller than detached single-family homes, ***and*** per-customer energy use is lower, so the same measure may save less in a manufactured home than in a single-family home. Volume II, Appendix B.3 provides a comprehensive list of the factors that impact segment-level energy-efficiency potential.

Figure 10. Residential Electric Achievable Technical Potential by Segment, Cumulative in 2031



Heating end uses represent the largest portion (27 percent) of achievable technical potential. Water heating, lighting, and consumer electronics also represent over 10 percent of the total identified potential. Because the analysis assumes an EISA-minimum lighting baseline, a considerable amount of energy-efficiency potential remains in the lighting end use, even after EISA effects have been removed from the baseline forecast. Figure 11 shows the total achievable technical potential by end-use group. Detailed potentials by end use are presented in Table 15.

Figure 11. Residential Electric Achievable Technical Potential by End Use, Cumulative in 2031

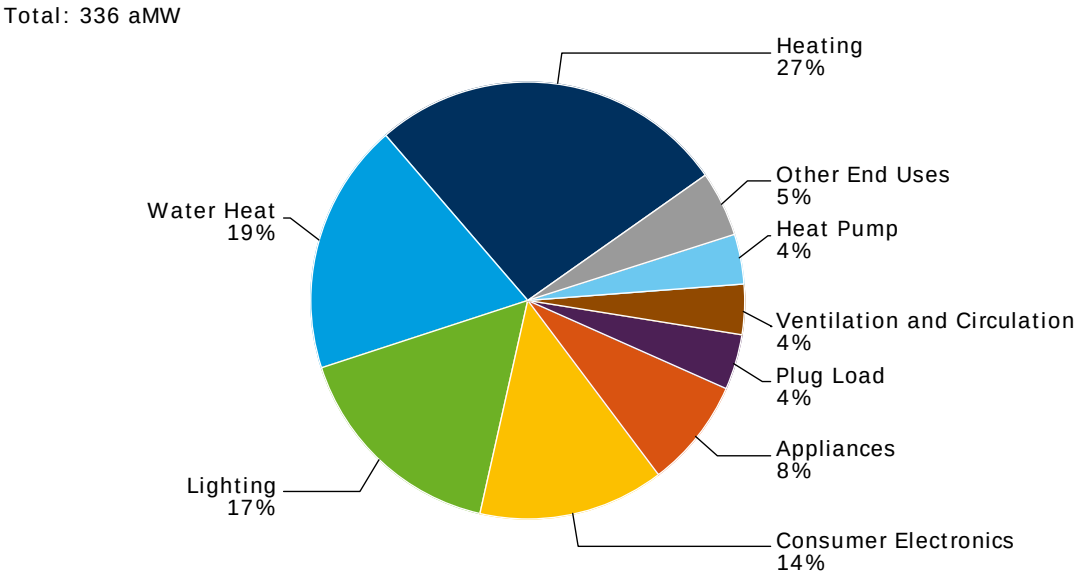


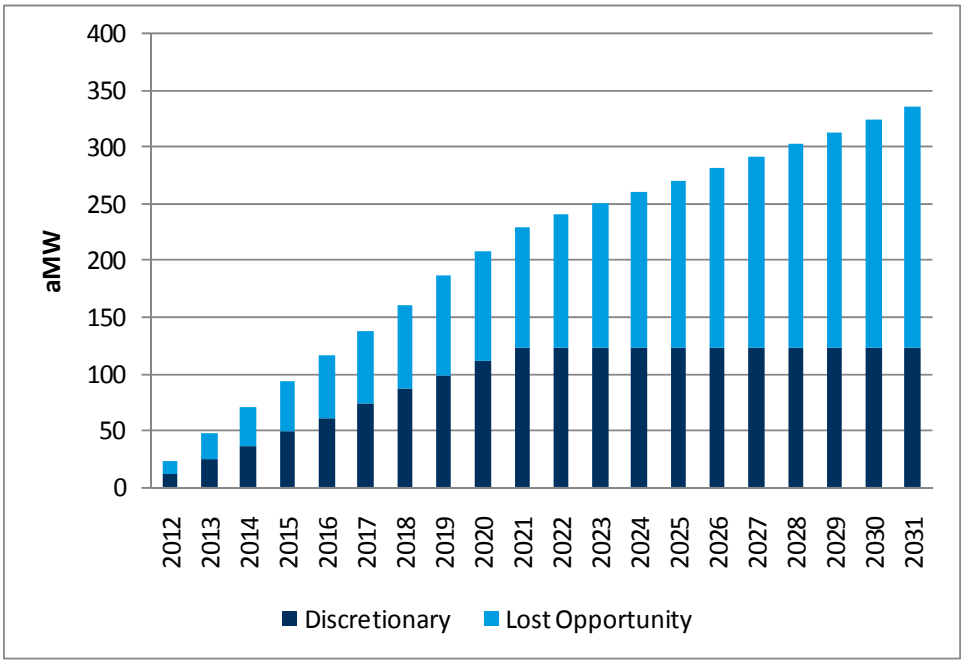
Table 15. Residential Electric Potential by End Use, Cumulative in 2031

End Use	Baseline Sales (aMW)	Technical Potential		Achievable Technical Potential	
		aMW	Percent of Baseline Sales	aMW	Percent of Baseline Sales
Appliances	288	42	14%	27	9%
Computer	37	10	27%	5	13%
Consumer Electronics	222	86	39%	46	21%
Cooling	27	14	52%	10	38%
Heat Pump	43	17	40%	12	29%
Heating	298	143	48%	90	30%
Lighting	198	121	61%	56	28%
Other Plug Loads	163	18	11%	14	9%
Pool Pump	6	2	42%	1	23%
Ventilation and Circulation	81	29	35%	13	15%
Water Heat	257	84	33%	62	24%
Total	1,620	566	35%	336	21%

Additional details regarding the savings associated with specific measures assessed within each end use are provided in Volume II, Appendix B.3.

Figure 12 shows annual cumulative achievable technical potential by resource type for the sector. Discretionary measures are acquired in equal increments over a ten-year period and account for 37 percent of cumulative achievable technical potential in 2031.

Figure 12. Residential Electric Annual Cumulative Achievable Technical Potential by Resource Type

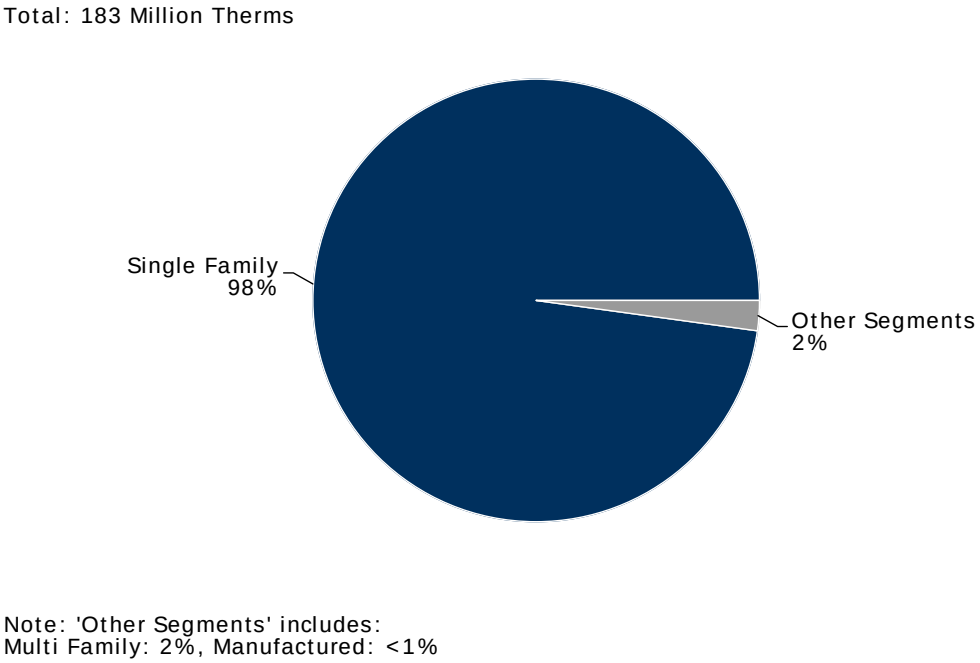


Residential Sector – Natural Gas

By 2031, residential customers are expected to account for over 55 percent of PSE's natural gas sales. Unlike residential electricity consumption, relatively few natural gas-fired end uses exist (primarily, space heating, water heating, and appliances); however, significant energy savings opportunities remain available. Based on resources used in this assessment, the achievable technical potential in the residential sector is expected to be about 183 million therms over 20 years, corresponding to a 19-percent reduction of forecasted 2031 sales.

Single-family homes account for 98 percent of the identified achievable technical potential, as shown in Figure 13. Due to lack of gas connections, only two percent of total achievable technical potential is in multifamily and manufactured residences.

Figure 13. Residential Natural Gas Achievable Technical Potential by Segment, Cumulative in 2031



The space heating and water heating end uses account for over 99 percent of the identified achievable technical potential (Figure 14). This potential is a combination of high-efficiency equipment (such as condensing furnaces and water heaters) and retrofits (such as shell measures, duct and pipe insulation, and low-flow showerheads). Detailed potentials by end use are presented in Table 16.

Figure 14. Residential Natural Gas Achievable Technical Potential by End Use, Cumulative in 2031

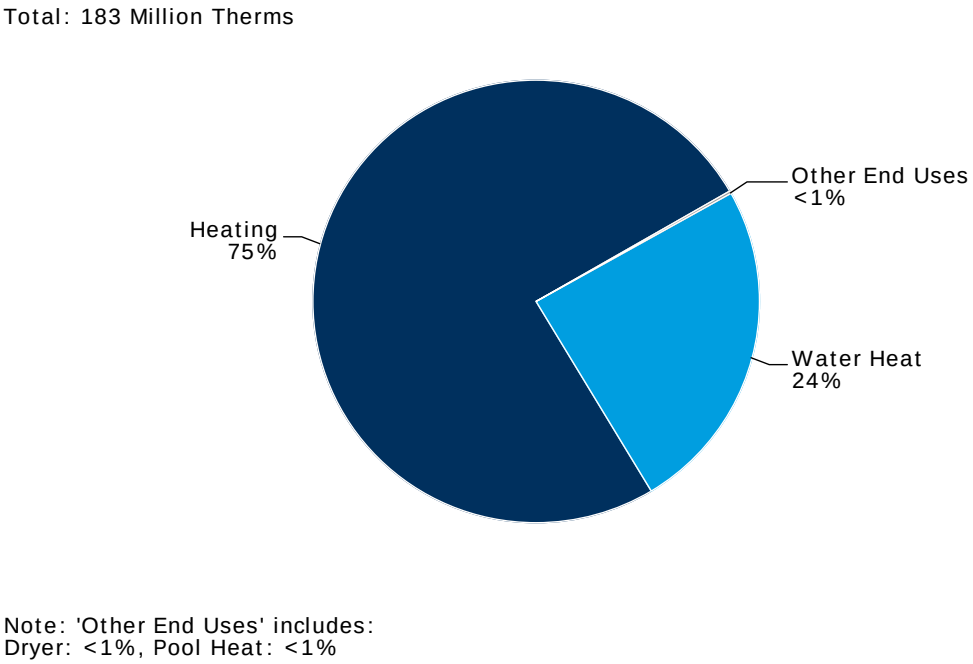
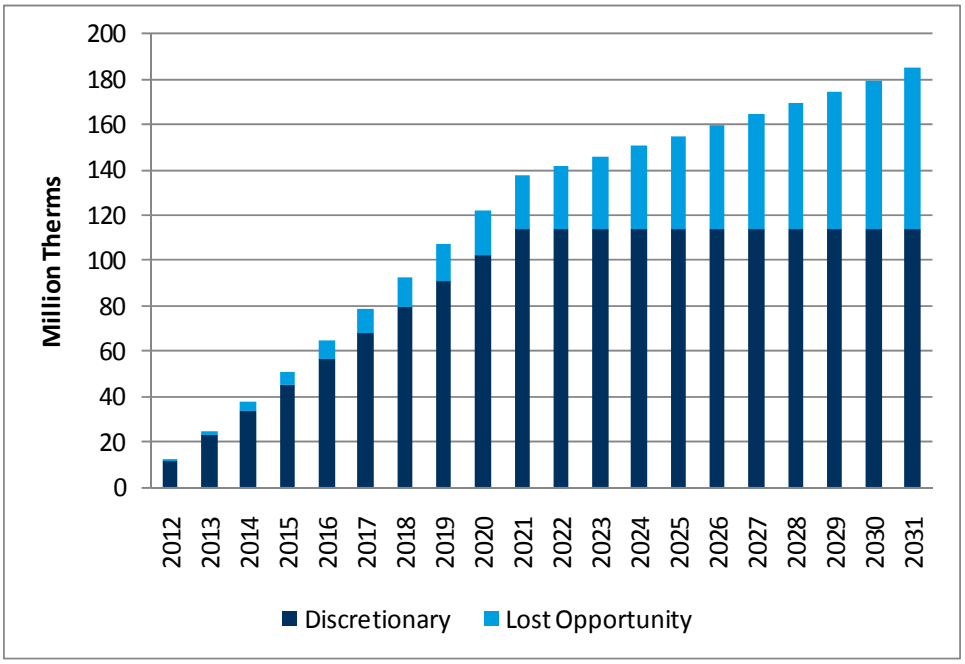


Table 16. Residential Natural Gas Potential by End Use, Cumulative in 2031

End Use	Baseline Sales (Million Therms)	Technical Potential		Achievable Technical Potential	
		Million Therms	Percent of Baseline Sales	Million Therms	Percent of Baseline Sales
Cooking	16	0	0%	0	0%
Dryer	8	1	7%	0	3%
Heating	554	219	40%	138	25%
Miscellaneous End Uses	23	0	0%	0	0%
Pool Heat	5	0	5%	0	3%
Water Heat	240	83	35%	45	19%
Total	830	303	37%	183	22%

Figure 15 shows residential natural gas annual cumulative achievable technical potential by resource type. Discretionary measures are acquired in equal increments over a ten-year period and account for 61 percent of cumulative achievable technical potential in 2031.

Figure 15. Residential Natural Gas Annual Cumulative Achievable Technical Potential by Resource Type

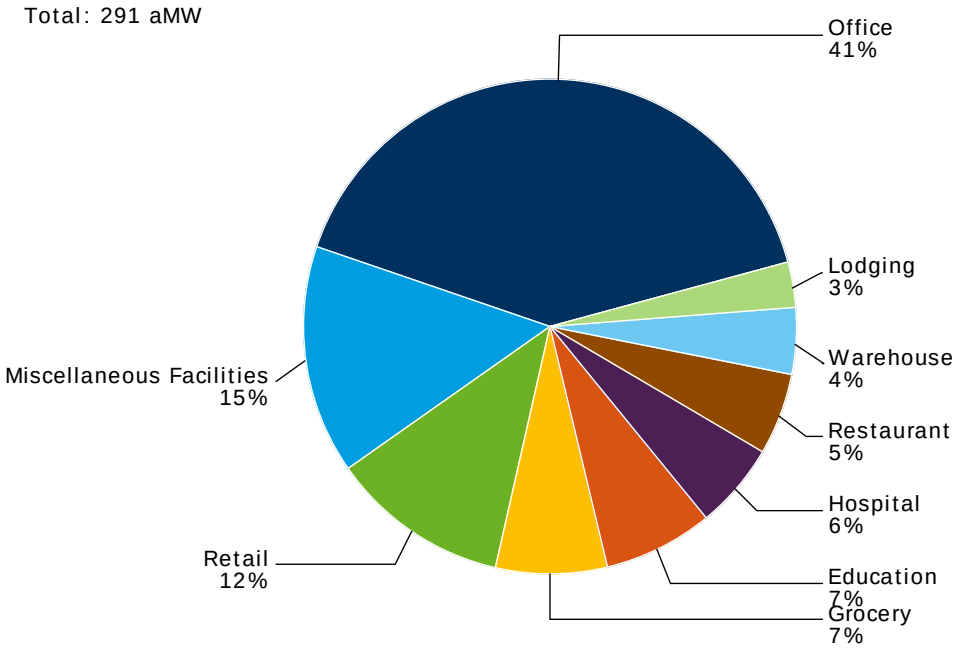


Commercial Sector – Electric

Based on resources included in this assessment, electric achievable technical potential in the commercial sector is expected to be 291 aMW over 20 years, a 17 percent reduction in forecasted 2031 commercial sales.

As shown in Figure 16, offices represent almost half of the available potential (41 percent). Miscellaneous facilities (15 percent) also represent a large portion of available potential. The miscellaneous segment consists of customers who do not fit into any of the other categories and customers for whom there is not enough information to be classified.

Figure 16. Commercial Electric Achievable Technical Potential by Segment, Cumulative in 2031



Lighting efficiency improvements represent by far the largest portion of achievable technical potential in the commercial sector (37 percent), followed by cooling (13 percent), space heating (10 percent), and HVAC auxiliary (10 percent), as shown in Figure 17. The large lighting potential entails bringing existing buildings to code and exceeding code in new and existing structures. Table 17 shows how baseline sales and savings are distributed across end uses.

Figure 17. Commercial Electric Achievable Technical Potential by End Use, Cumulative in 2031

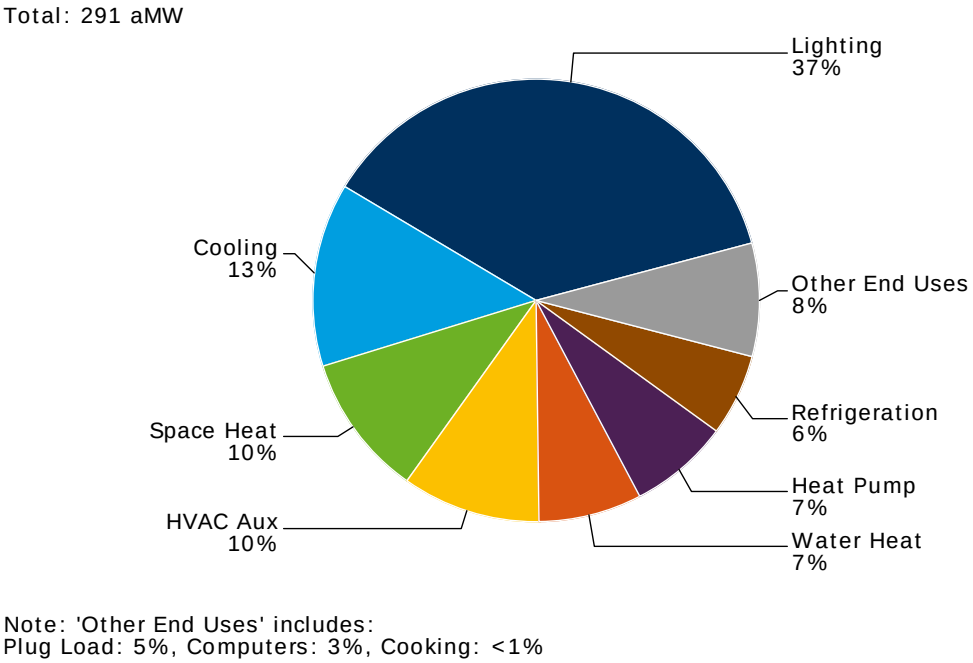
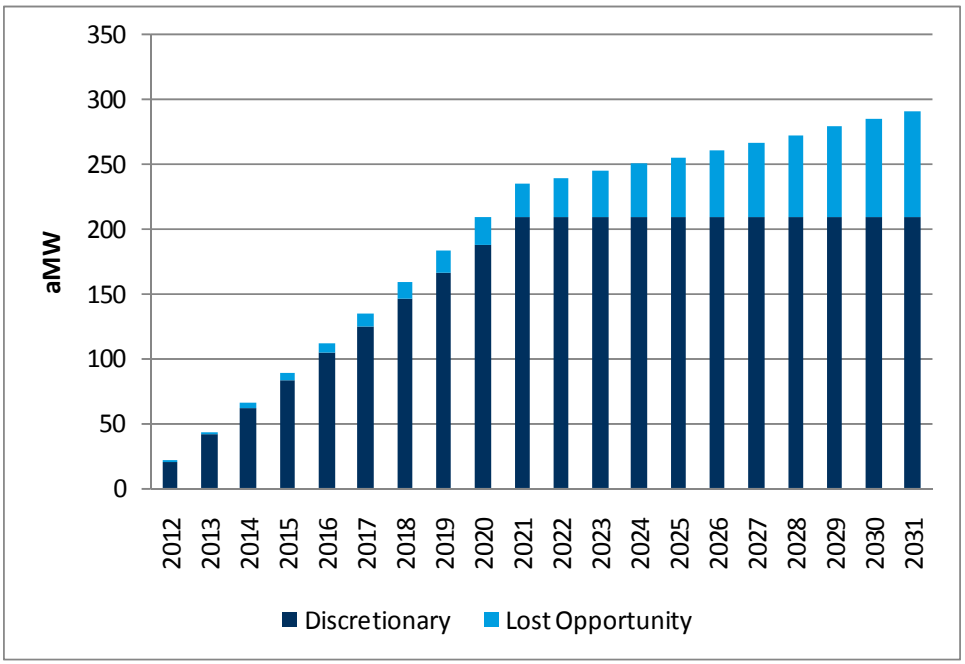


Table 17. Commercial Electric Potential by End Use, Cumulative in 2031

End Use	Baseline Sales (aMW)	Technical Potential		Achievable Technical Potential	
		aMW	Percent of Baseline Sales	aMW	Percent of Baseline Sales
Computers	64	18	28%	9	15%
Cooking	24	1	4%	1	3%
Cooling	111	49	44%	39	35%
HVAC Auxiliary	299	38	13%	29	10%
Heat Pump	78	28	36%	21	27%
Lighting	757	134	18%	108	14%
Other Plug Loads	208	17	8%	14	7%
Refrigeration	105	22	21%	17	16%
Space Heat	102	36	36%	30	30%
Water Heat	74	29	39%	22	29%
Total	1,823	373	20%	291	16%

Figure 18 shows commercial electric annual cumulative achievable technical potential by resource type. Discretionary measures are acquired in equal increments over a ten-year period and account for 72 percent of cumulative achievable technical potential in 2031.

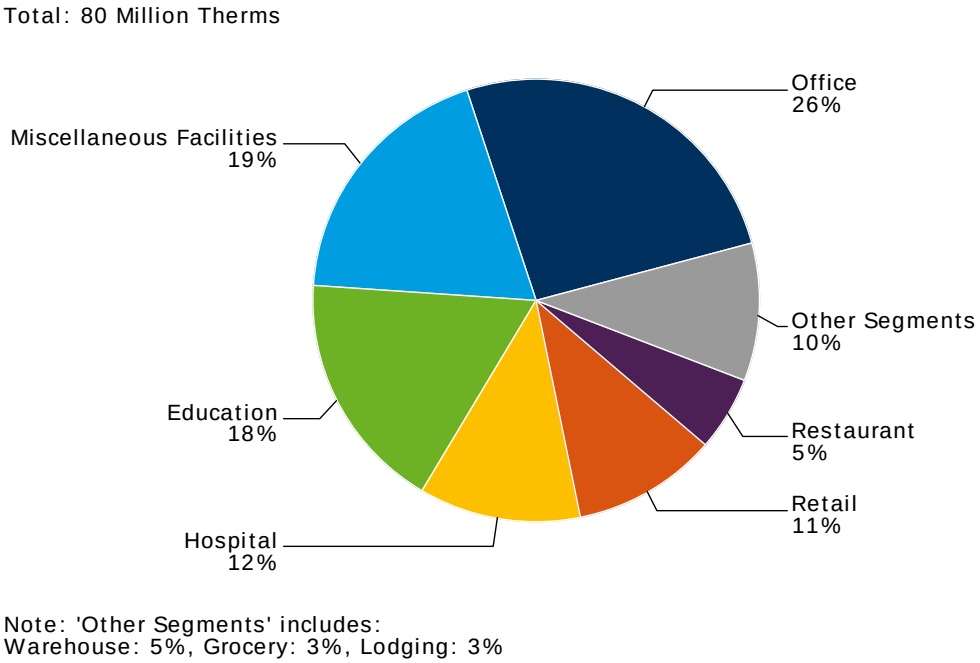
Figure 18. Commercial Electric Annual Cumulative Achievable Technical Potential by Resource Type



Commercial Sector – Natural Gas

Based on resources included in this assessment, natural gas achievable technical potential in the commercial sector is expected to be 80 million therms over 20 years, an 18 percent reduction in forecasted 2031 commercial sales. Achievable technical natural gas potential in the commercial sector represents about one-third of the total identified potential across all sectors. For electric customers, office buildings represent the largest portion of potential (26 percent, Figure 19). Significant amounts of achievable technical potential are also available in miscellaneous facilities (19 percent) and education buildings (18 percent).

Figure 19. Commercial Natural Gas Achievable Technical Potential by Segment, Cumulative in 2031



As in the residential sector, there are far fewer gas-fired end uses than electric end uses. Space heating accounts for 76 percent of the identified potential, and the remaining potential is mostly in water heating (21 percent), with small amounts in cooking and pool heating (Figure 20 and Table 18).

Figure 20. Commercial Natural Gas Achievable Technical Potential by End Use, Cumulative in 2031

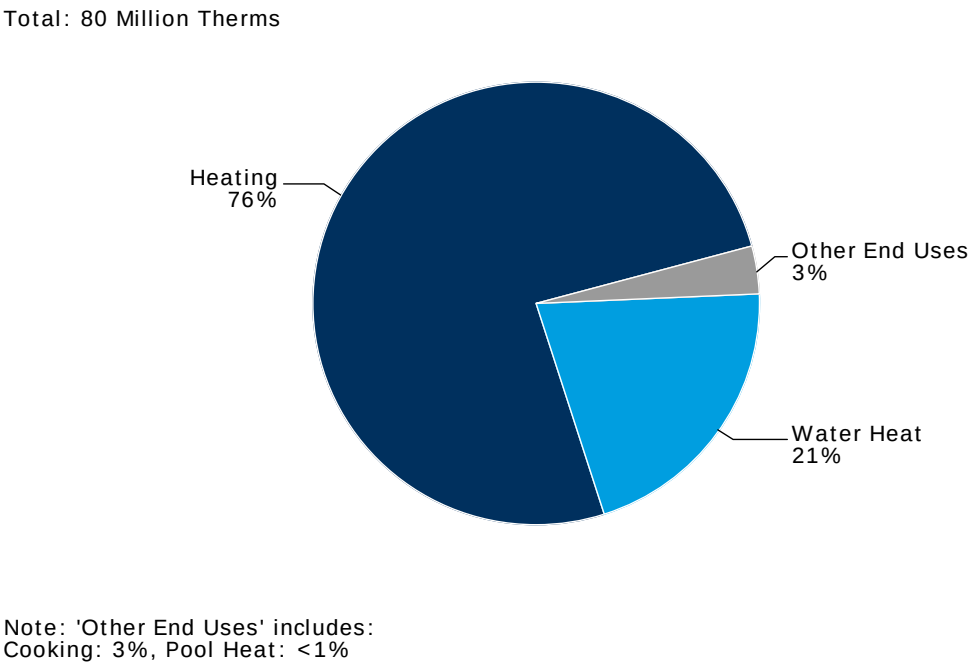
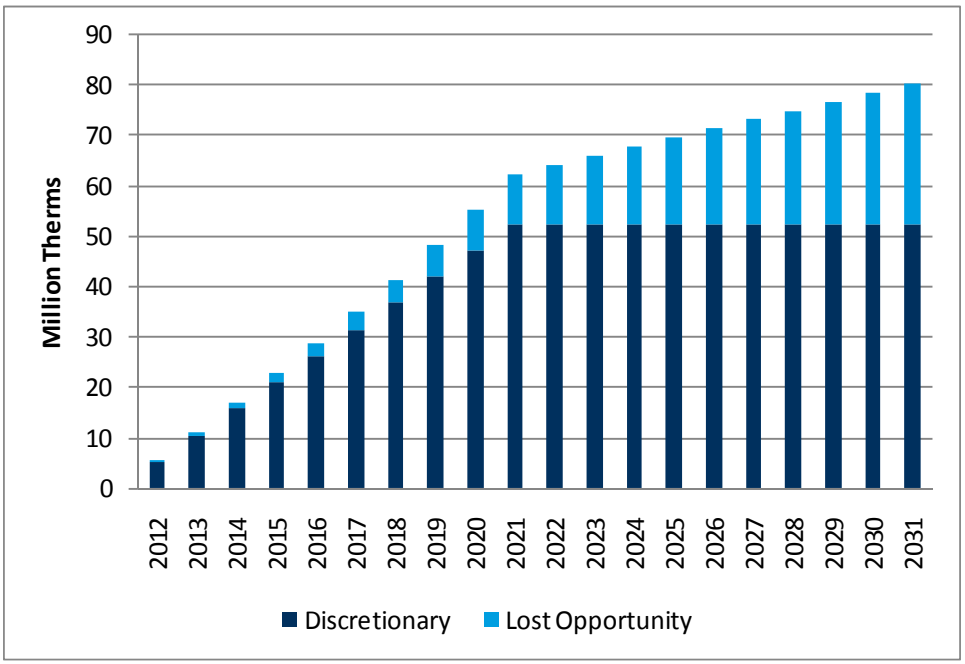


Table 18. Commercial Natural Gas Potential by End Use, Cumulative in 2031

End Use	Baseline Sales (Million Therms)	Technical Potential		Achievable Technical Potential	
		Million Therms	Percent of Baseline Sales	Million Therms	Percent of Baseline Sales
Cooking	62	3	5%	2	3%
Heating	293	88	30%	60	21%
Pool Heat	6	1	18%	1	13%
Water Heat	84	25	30%	17	20%
Total	445	117	26%	80	18%

Figure 21 shows commercial natural gas annual cumulative achievable technical potential by resource type. Discretionary measures are acquired in equal increments across a ten year period and account for 65 percent of cumulative achievable technical potential in 2031.

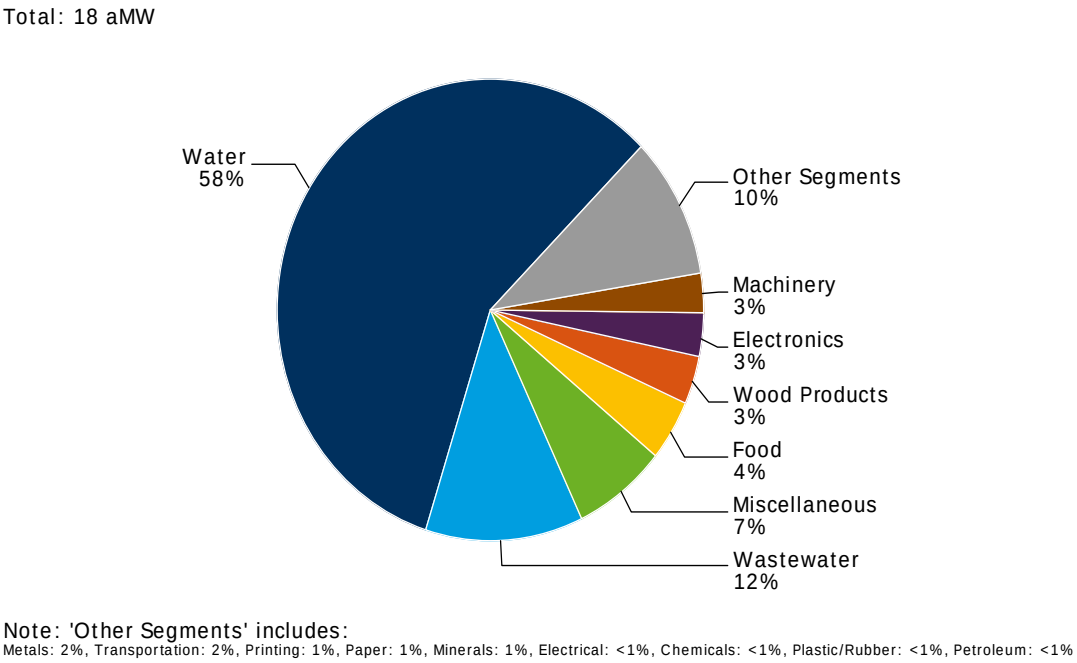
Figure 21. Commercial Natural Gas Annual Cumulative Achievable Technical Potential by Resource Type



Industrial Sector – Electric

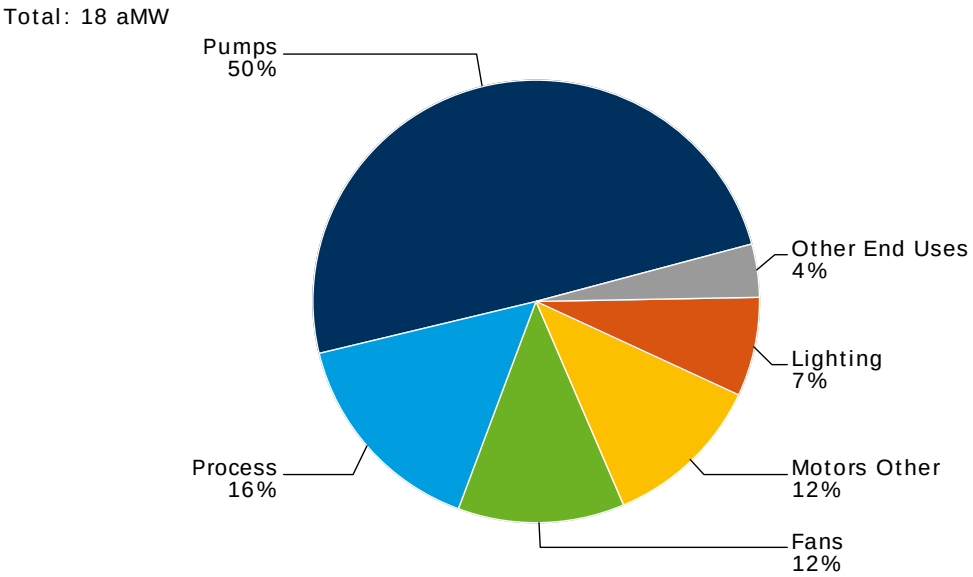
Technical and achievable technical energy-efficiency potential were estimated for major end uses within 17 major industrial sectors. (For a list of these industries, along with baseline information, see Volume II, Appendix B.1.) Across all industries, achievable technical potential totals approximately 18 aMW over the 20-year planning horizon, corresponding to an 18 percent reduction of forecasted 2031 industrial consumption.

Figure 22. Industrial Sector Electric Achievable Technical Potential by Segment



The majority of electric achievable technical potentials in the industrial sector (50 percent) are in pumps, shown in Figure 23. Process improvement measures (16 percent) and fans (12 percent) also comprise significant portions of available technical potential. A small amount of additional potential exists for lighting and other facility improvements. Detailed potentials by end use are presented in Table 19. All industrial measures are considered discretionary with savings acquired over a ten-year timeframe.

Figure 23. Industrial Electric Achievable Technical Potential by End Use, Cumulative in 2031



Note: 'Other End Uses' includes:
HVAC: 4%, Other: <1%

Table 19. Industrial Electric Potential by End Use, Cumulative in 2031

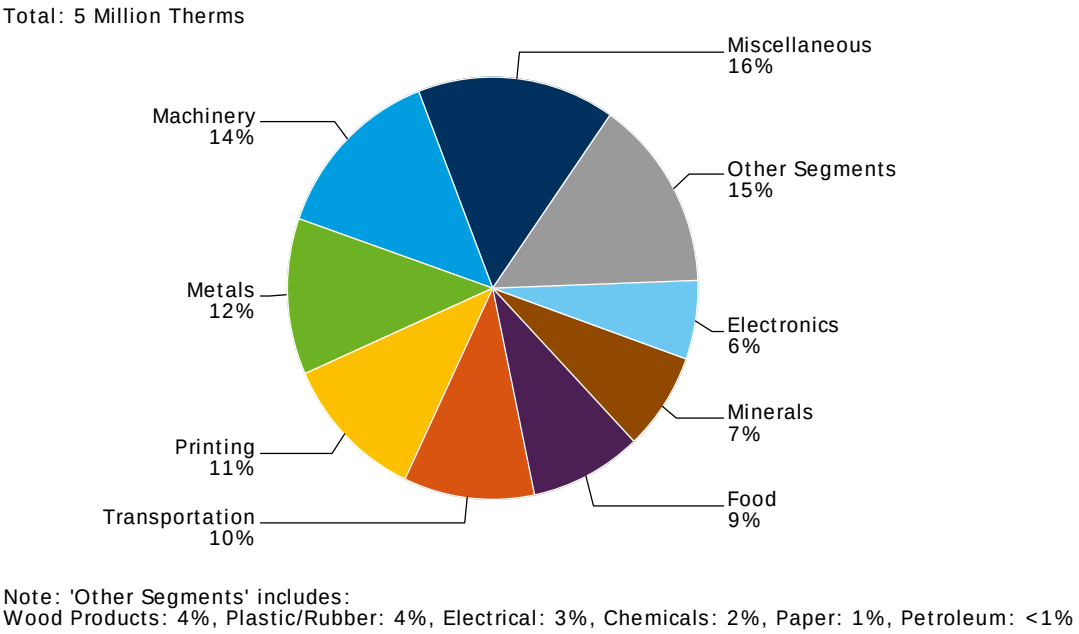
End Use	Baseline Sales (aMW)	Technical Potential		Achievable Technical Potential	
		aMW	Percent of Baseline Sales	aMW	Percent of Baseline Sales
Fans	8	3	33%	2	28%
HVAC	10	1	8%	1	7%
Indirect Boiler	1	0	0%	0	0%
Lighting	8	2	20%	1	17%
Motors Other	15	3	17%	2	14%
Other	10	0	0%	0	0%
Process	23	3	14%	3	12%
Pumps	36	11	30%	9	26%
Total	**111**	**22**	20%	**18**	17%

Industrial Sector – Natural Gas

Most industrial processes and end uses are powered by electricity and, thus, the industrial sector represents a small portion of natural gas baseline sales and potential.

Across all industries, achievable technical potential totals approximately 5 million therms over 20 years. Although this represents 16 percent of forecasted 2031 industrial sales, it accounts for only 2 percent of the achievable technical potential across the three sectors. As shown in Figure 24, substantial achievable technical potential lies in miscellaneous manufacturing (16 percent), machinery (14 percent), metals (12 percent), and paper (11 percent).

Figure 24. Industrial Natural Gas Achievable Technical Potential by Segment, Cumulative in 2031



Half of the achievable technical potential comes from process heating improvements. The remaining potentials are in HVAC and boiler improvements (Figure 25 and Table 20**).** All industrial measures are considered discretionary with savings acquired over a ten-year timeframe.

Figure 25. Industrial Natural Gas Achievable Technical Potential by End Use

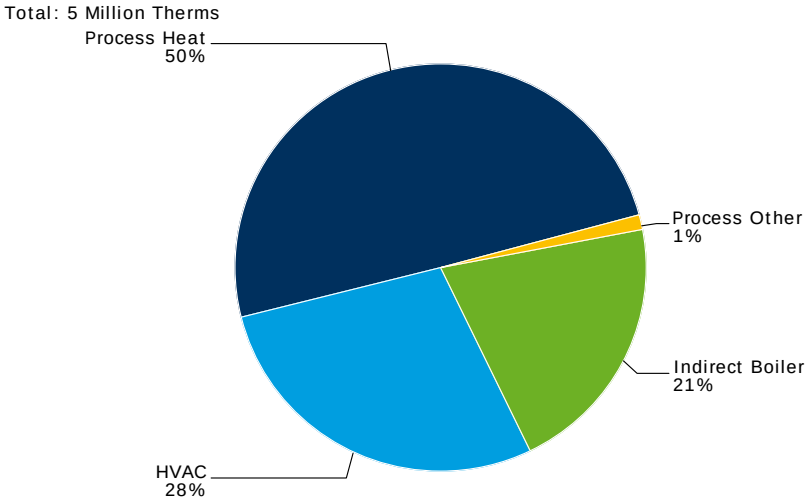


Table 20. Industrial Natural Gas Potential by End Use, Cumulative in 2031

End Use	Baseline Sales (Million Therms)	Technical Potential		Achievable Technical Potential	
		Million Therms	Percent of Baseline Sales	Million Therms	Percent of Baseline Sales
HVAC	9	2	21%	1	15%
Indirect Boiler	9	1	16%	1	12%
Other	0	0	0%	0	0%
Process Heat	12	3	27%	2	20%
Process Other	1	0	9%	0	6%
Total	31	7	21%	5	16%

3. Fuel Conversion Potentials

Scope of Analysis

In the context of this study, "fuel conversion" refers to electricity saving opportunities involving substitution of natural gas for electricity through replacement of space heating systems, water heating equipment, and appliances.

In the area where PSE provides both gas and electric service, fuel conversion potentials were examined for existing residential single-family homes, existing and new commercial buildings, and new multifamily structures. Three end uses were included in the analysis for single and multifamily homes: space heating, water heating, and appliances (clothes dryers and cooking ranges). For new multifamily homes, the potential from conversion of electric baseboard heating to natural gas furnaces was also included in Cadmus' analysis. For commercial buildings, only space and water heating end uses were analyzed.

Summary of Resource Potentials

Fuel conversion technical potentials were calculated by assuming all applicable customers and end uses would be converted. As part of the 2009 IRP, a survey of residential customers was conducted to help determine the willingness of customers to switch from an electric heating system to a gas heating system. Based on this survey, approximately 63 percent of respondents indicated they would either be likely or highly likely to convert from electric to gas space heating if the utility were to pay 100 percent of the cost. As such, the achievable technical potential is assumed to be 63 percent of the technical potential. In the absence of comparable primary data, the same percentage was used for the commercial sector.

Based on the results of the survey and previous PSE experience, it is assumed that of the new residential-sector gas customers who convert a space heater, 70 percent will also convert a water heater, and 5 percent will convert a range and/or dryer. For existing gas customers, all will convert a water heater, and 5 percent will convert a range and/or dryer. Similar percentages are assumed for the water heating conversions in the commercial sector.

The cumulative electric technical potential from fuel conversion by 2031 is estimated at 55 aMW. Acquisition of the indicated electricity savings would, however, result in increased gas consumption of about 35 million therms by 2031. After making the adjustments for achievability described above, the total achievable technical electric savings potential of fuel conversion in 2031 is estimated at just over 22 aMW. This achievable technical potential corresponds to increased gas consumption of about 15 million therms.

Technical and achievable technical potential by customer type and market segment are shown in Table 21 and Table 22, respectively

Table 21. Fuel Conversion Potentials by Customer Type, Cumulative in 2031

Customer Type	Technical Potential		Achievable Technical Potential	
	Electric Savings (aMW)	Additional Gas Usage (million therms)	Electric Savings (aMW)	Additional Gas Usage (million therms)
Electric-Only	23.5	16.0	10.6	7.3
Existing Gas Customer	31.4	18.6	11.5	7.5
Total	54.9	34.6	22.1	14.8

Table 22. Fuel Conversion Potentials by Market Segment, Cumulative in 2031

Market Segment	Technical Potential		Achievable Technical Potential	
	Electric Savings (aMW)	Additional Gas Usage (million therms)	Electric Savings (aMW)	Additional Gas Usage (million therms)
Single Family	30.6	15.8	9.4	5.0
Multifamily	1.6	1.3	0.5	0.4
Commercial	22.7	17.5	12.3	9.4
Total	54.9	34.6	22.1	14.8

Detailed Resource Potentials

Residential Sector

The fuel conversion potential for single-family homes targets existing customers, while the multifamily conversion targets new construction. The new construction market size is cumulative over 20 years. Note that the potential market size accounts for current measure saturation. For example, some existing single-family homes already have a gas water heater, so those customers are not considered for water heater conversion. In addition, the potential market size for new construction excludes the percentage of customers who have historically included gas systems.

Measures Considered

Cadmus' analysis of fuel conversion considered opportunities for three major end uses in residential dwellings: central heating, water heating, and appliances (clothes dryer and oven).

- For new multifamily buildings, conversion of room (or zonal) heating systems to natural gas furnaces was examined.
- For existing single-family buildings, the cost of converting an existing baseboard system to a central system was not considered, given the high cost of installing the necessary ductwork.

Clothes dryers and cooking ranges were the only appliances considered in the study. Although the range of efficiencies for dryers tends to be narrow, a moisture sensor can be installed that will automatically shut off the dryer once the moisture level drops below a certain level. This

measure can result in a 15-percent decrease in energy usage over a standard dryer due to reduced run-time.[13]

Similarly, there are minor differences in the efficiency level of ovens, and an energy savings of 20 percent can be achieved by using a convection oven.[14] Applicable measures and their assumed technical specifications are shown in Table 23. These measures are equivalent to those used for the energy-efficiency analysis, and detailed descriptions can be found in Volume II, Appendix B.

Table 23. End Uses and Measures Assessed

End Use	Gas Measure	Electric Baseline
Space heating	90-percent AFUE condensing furnace	Electric furnace Electric baseboard (new MF only)
Water heating	EF=0.67 storage water heater	Electric water heater
	EF=0.82 tankless water heater	
Appliances	Gas dryer w/ moisture sensor	Electric dryer w/ moisture sensor
	Convection gas range	Convection electric range

Gas Availability

Gas availability and its implications in terms of service extension costs is an important consideration in determining the potential for fuel conversion. A major factor in determining the cost of new gas service is whether an electric-only customer is on a gas main. For existing single-family customers, data from several sources (including PSE's 2008 REUS) were used to determine availability. In addition, consideration was given to the size range of single family homes, given that larger homes are likely to use more energy for space heating. Homes of 2,000 or fewer square feet were excluded as not meeting the programmatic requirements of sufficient electric usage..

PSE currently provides gas to approximately 49 percent of single-family homes in its electric service area. Customers who currently receive gas service from PSE are considered candidates only for *additional* gas-using equipment, without imposing additional line extension costs. The REUS was used to estimate the total number of gas-heated single-family homes with electric water heater and other appliances. This resulted in an estimate of nearly 24,000 existing gas homes eligible for conversion.

Of the electric customers without PSE gas service, approximately one-third reside in PSE's gas service territory. However, based on the latest data available from PSE, approximately 25 percent of these customers are on a gas main and would be candidates for conversion of all applicable end uses. Off-main customers were excluded from the analysis, as too economically and technically impractical.

For the multifamily segment, a previous residential survey (2004 Residential Energy Study) was used to determine the distribution of market share, as the REUS had only a small sample of multifamily homes. For new electric multifamily customers, approximately 14 percent are in

[13] http://www.consumerenergycenter.org/home/appliances/dryers.html

[14] http://www.aceee.org/consumerguide/cooking.htm A convection oven includes a fan within the oven cavity that results in air circulation around the food, increasing overall heat transfer to the food. This allows for lowered oven temperatures and shortened cooking times.

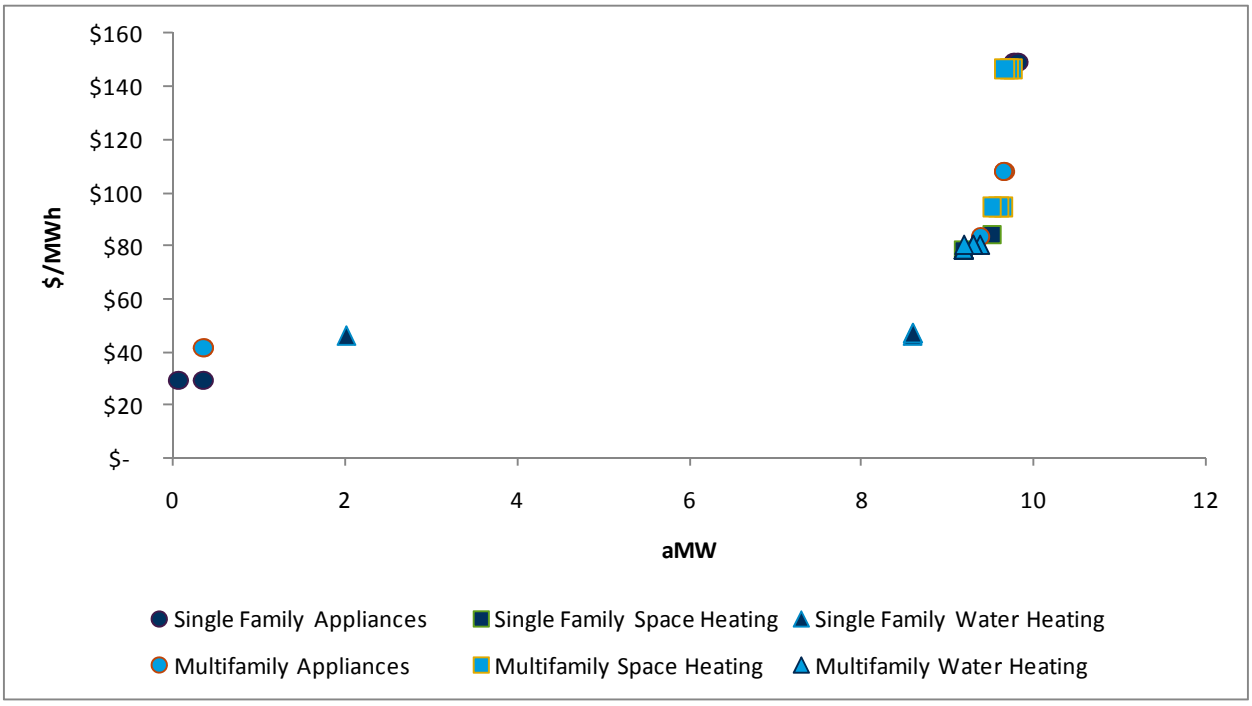
PSE combination territory, a quarter of which are on a main. Of those, approximately 1,200 customers are expected to install a furnace, and another 1,000 customers will install baseboard heating systems.

Conversion Costs and Savings

The total resource cost (TRC) perspective was used to assess conversion costs. This considers the assumed installed cost of the gas measure, less the cost of the equivalent electric measure, and includes gas line extension costs. For electric-only customers, connecting a house to the gas main is assumed to require a service line extension of $3,600. Since it is expected current electric customers would at least install a gas furnace, the cost to add the gas line to the house is only added to the furnace costs. Other end uses will have an additional cost only for interior piping (estimated at $200 per piece of equipment, as determined through interviews with local HVAC contractors on PSE's Contract Referral Service List).

Figure 26 shows how cumulative electric savings categorized by home type and end use are distributed by levelized cost. Conversion savings were estimated based on the same assumed levels of unit energy consumption (UEC) used in the energy-efficiency analysis described in Section 2. Increased gas usage was counted as an ongoing annual O&M cost, and is included in the calculation of levelized cost. For baseline values, electric UECs (kWh/yr) and gas UECs (therms/year) from the baseline forecast for existing single-family and new multifamily homes were used.

Figure 26. Residential Fuel Conversion Supply Curve, Cumulative in 2031



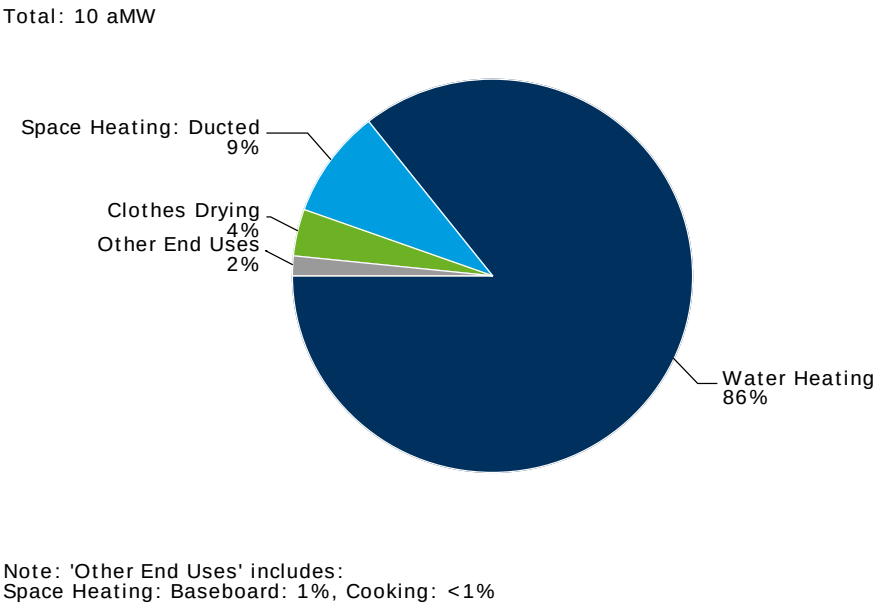
Potential

The technical and achievable technical conversion potential in 2031 for the residential sector by end use are given in Table 24 and Figure 27.

Table 24. Residential Fuel Conversion Potential by End Use, Cumulative aMW in 2031

End Use	Technical Potential	Achievable Technical Potential
Clothes Drying	11.9	0.4
Cooking	2.0	0.1
Space Heating: Baseboard	0.3	0.1
Space Heating: Ducted	2.8	0.9
Water Heating	15.3	8.4
Total	32.3	9.8

Figure 27. Residential Fuel Conversion Achievable Technical Potential by End Use, Cumulative in 2031



Commercial Sector

Conversion of equipment in existing buildings and new facilities was included in the fuel conversion potential for the commercial sector.

Measures Considered

For existing facilities in the commercial sector, the measures considered were 90 percent AFUE furnaces and high-efficiency water heaters (≥0.67 EF storage and tankless). For the new construction segment, the same measures are included, as well as conversion from electric to gas warm-up heaters. Note that it is only the smaller buildings (less than approximately 7,500 square feet) that are likely to utilize a furnace.

Gas Availability

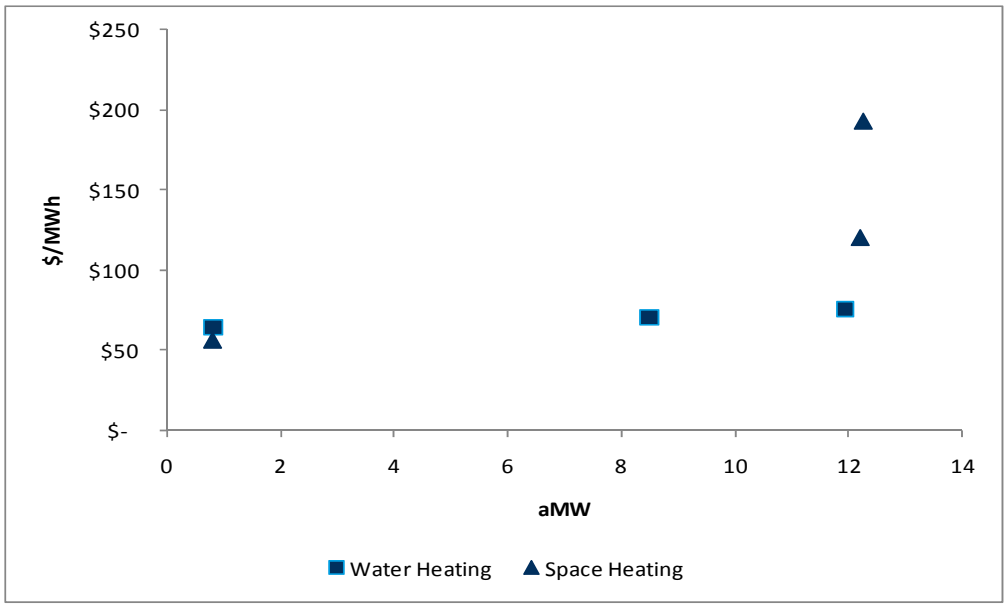
Data from the 2008 Commercial Building Stock Assessment (CBSA), coupled with PSE's nonresidential customer database, provided the market shares by territory and end use. Of existing electric-only customers, approximately 60 percent are in PSE gas territory, and a quarter of those are on a main line. For new customers, approximately 32 percent are expected to be in the combination service territory, a quarter of whom will be on a gas main. By applying this percentage to PSE's commercial new customer forecast and accounting for saturation of furnaces, Cadmus estimates about 400 customers would be eligible over the 20-year study to install a furnace. This number excludes customers who are expected to install a gas line anyway. Additional potential exists for current gas customers who do not already have gas water heaters (approximately 6,500 customers).

Conversion Costs and Benefits

Conversion savings were estimated based on the assumed levels of UEC, consistent with those used in the energy-efficiency analysis described in Section 2. Increased gas usage is counted as an ongoing annual O&M cost, and is counted in the calculation of levelized cost. For baseline values, electric UECs (kWh/yr) and gas UECs (therms/year) from the baseline forecast were used.

Figure 28 shows how cumulative electric savings by end use are distributed by levelized cost. Similar to the residential sector, service-line connection cost is added only to existing customers for the furnace cost. For simplicity, commercial buildings were modeled assuming an energy consumption that was the weighted average of all segments, based on likelihood of equipment being used in the given facility.

Figure 28. Commercial Fuel Conversion Supply Curve, Cumulative in 2031



Potential

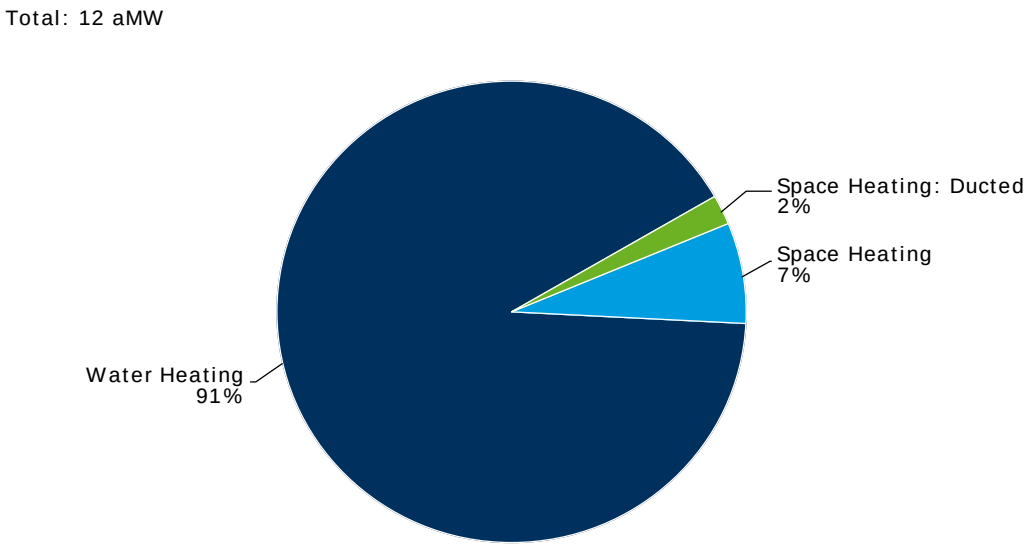
Table 25 and Figure 29 show the technical and achievable technical conversion potential in 2031 by end use. The end-use "Space Heating: Ducted" represents conversion for electric furnaces in

existing buildings, while the "Space Heating" end use represents both furnace and gas warm-up heat conversion in new construction.

Table 25. Commercial Fuel Conversion Potential by End Use, Cumulative aMW in 2031

End Use	Technical Potential	Achievable Technical Potential
Space Heating	1.4	0.9
Space Heating: Ducted	0.4	0.3
Water Heating	21.0	11.1
Total	22.8	12.3

Figure 29. Commercial Fuel Conversion Achievable Technical Potential by End Use, Cumulative in 2031



4. Demand Response Potentials

Scope of Analysis

Focused on reducing a utility's capacity needs, demand-response programs rely on flexible loads, which may be curtailed or interrupted during system emergencies or when wholesale market prices exceed the utility's supply cost. These programs are designed to help reduce peak demand and promote improved system reliability. In some instances, these programs may defer investments in delivery and generation infrastructure.

Demand-response objectives may be met through a broad range of strategies, both price-based (such as time-varying rates or interruptible tariffs) and incentive-based (such as direct load control) strategies. The following demand response strategies are used in this assessment:

1. ***Direct Load Control*** (DLC) programs allow a utility to interrupt or cycle electrical equipment and appliances remotely at a customer's facility. In this study, the assessment of DLC program potential is analyzed for two programs in the residential sector:
   - a combination program of central electric heating (including heat pumps) and electric water heating
   - a combination program of room heating and electric water heating
2. ***Load Curtailment*** programs refer to contractual arrangements between the utility and a third-party aggregator that works with utility customers. The third-party aggregator typically guarantees a specific level of curtailment during an event period, achieving load reduction by working with utility customers who agree to curtail or interrupt their loads in whole or in part when requested. In most cases, participation is required once the customer enrolls in the program and incentives are paid per curtailed kW. Cadmus' analysis of these programs assumes they target nonresidential customers with average monthly loads greater than 100 kW. Customers may use backup generation to meet displaced loads.
3. ***Critical Peak Pricing*** (CPP) or extreme-day pricing refers to programs aiming to reduce system demand by encouraging customers to reduce their loads for a limited number of hours during the year. During such events, customers have the option of curtailing their usage or paying substantially higher-than-standard retail rates. CPP programs integrate a pricing structure similar to a time-of-use (TOU) program, with the distinction of more extreme pricing signals during critical events. CPP options are explored for both the residential and commercial sectors in this assessment.

As this study is an update to the 2009 IRP, the program options listed above are based largely on that assessment, with revisions based on input from PSE. After Cadmus completed a review of new demand response literature on the selected programs and on PSE's pilot programs, updates were made to each program. Design specifications and assumptions underlying the analysis for each program strategy are described in detail in this chapter.

Summary of Resource Potentials

Table 26 represents estimated resource potentials for all demand-response strategies for the residential, commercial, and industrial sectors during summer and winter. Achievable technical potential is highest in the residential sector due to the direct load control programs. Note that this analysis does not account for program interactions and overlap; thus, the total technical potential and achievable technical potential estimates may not be fully attainable if all program strategies are implemented.

Table 26. Demand Response Technical and Achievable Technical Potential, MW in 2031

	Winter			Summer		
Sector	Technical Potential	Achievable Technical Potential	Achievable Technical As Percent of System Peak	Technical Potential	Achievable Technical Potential	Achievable Technical As Percent of System Peak
Residential	1,184	110	1.95%	402	32	0.72%
Commercial	767	79	1.40%	783	82	1.85%
Industrial	44	4	0.08%	54	5	0.12%
Total	1,995	193	3.43%	1,239	119	2.68%
*System peak is based on PSE's average load in the top 20 hours for each season.						

Resource Costs and Supply Curves

Applicable resource acquisition costs generally fall into two categories: (1) fixed program expenses such as infrastructure, administration, maintenance, and data acquisition; and (2) variable costs. Variable costs have two categories: those that vary by the number of customers (e.g., hardware costs) and those that vary by kW reduction (primarily incentives).

Where possible, cost estimates were developed for each program option based on comparable programs offered by other utilities. In certain cases, costs at this level of detail were difficult to determine. Many utilities do not report specific program costs, and among those that do there are a wide range of costs.

Development of a new demand-response program can be a significant cost for a utility, requiring enrollment, call centers, program management, load research, development of evaluation protocols, changes to billing systems, and program marketing. Based on the experiences of utilities, this analysis assumed $400,000 as a typical first cost for program development for residential and nonresidential programs.

Marketing costs can vary greatly by utility and program, from about $25 per customer to more than $5,000 per customer, based on interviews with program managers. Cadmus' analysis assumed $25 for each new residential participant and $200 for each commercial or industrial participant.

To develop supply curves, Cadmus calculated streams of projected annual program costs and impacts. These annual figures account for program assumptions such as eligible loads, program participation, participant attrition, and ramp-up time. The levelized cost of each program was then calculated as the ratio of the present value of costs to winter demand savings for comparison with supply-side alternatives. Note that some programs would have additional summer demand savings potential, but these impacts have not been factored into these levelized cost calculations.

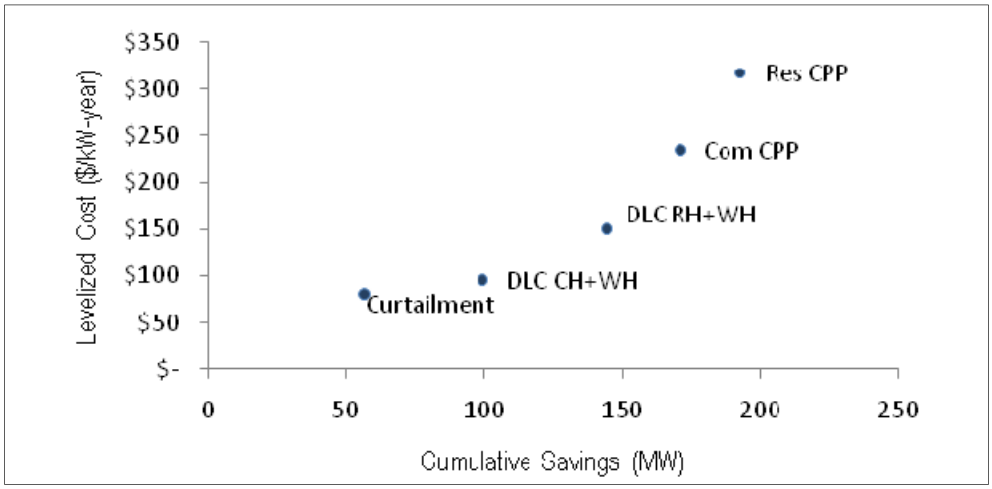
Table 27 displays the per-unit ($/kW per year) costs by program for the estimated achievable technical potential. It is important to note that all programs have higher $/kW costs in the early years due to program start-up costs. The curtailable load program for large nonresidential customers is estimated to be the least-expensive option, having a levelized cost of $81.25/kW per year, while residential CPP was the most costly with a levelized cost of $317/kW per year.

Table 27. Demand Response Achievable Technical Potential and Levelized Costs, Winter MW in 2031

Program Strategy	Achievable Potential	Levelized Cost ($ / Winter kW)
Residential Direct Load Control - Space and Water Heat	43	$95.31
Residential Direct Load Control - Room and Water Heat	45	$150.36
Residential Critical Peak Pricing	22	$316.90
Commercial Critical Peak Pricing	27	$234.48
Commercial Curtailment	56	$81.25

Supply curves were constructed from quantities of estimated achievable technical potential and per-unit costs of each program option. Figure 30 shows the quantity of achievable technical demand-response potential available during winter peak hours in 2031 as a function of levelized cost.

Figure 30. Demand Response Supply Curve, Winter MW in 2031



Resource Acquisition Schedule

Cadmus assumed each program will require an ample start-up period before achieving full participation. Therefore, each program option has an associated ramp rate, as described below:[15]

- The curtailment program is assumed to be the first to begin, achieving approximately 10 MW per year until reaching maximum participation in 2015.

[15] Once programs reach full participation, impacts continue to grow due to forecasted load growth.

- Residential DLC programs start in 2015 as three-year pilot program. In 2018, the programs will slowly begin to grow to full participation by 2022.
- The CPP programs are assumed to start as a three-year pilot 2015 to account for the time required to create a new tariff and put necessary infrastructure in place. In 2018, the programs will begin to ramp up, growing to full deployment by 2020.

Figure 31 and Figure 32 shows the acquisition schedule for achievable potential for winter and summer impacts, respectively.

Figure 31. Demand Response Annual Achievable Technical Potential by Strategy - Winter

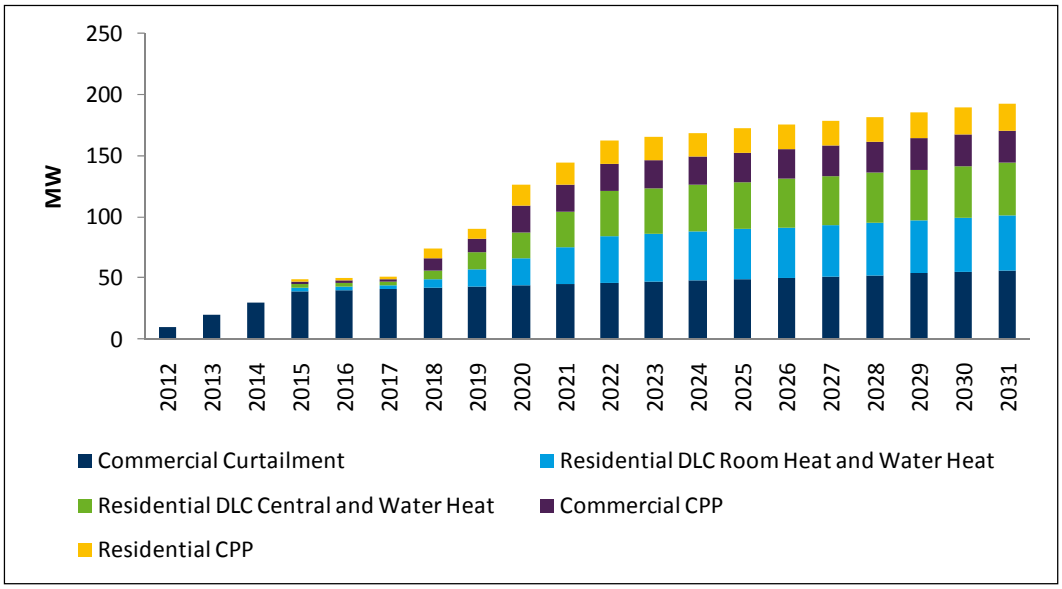
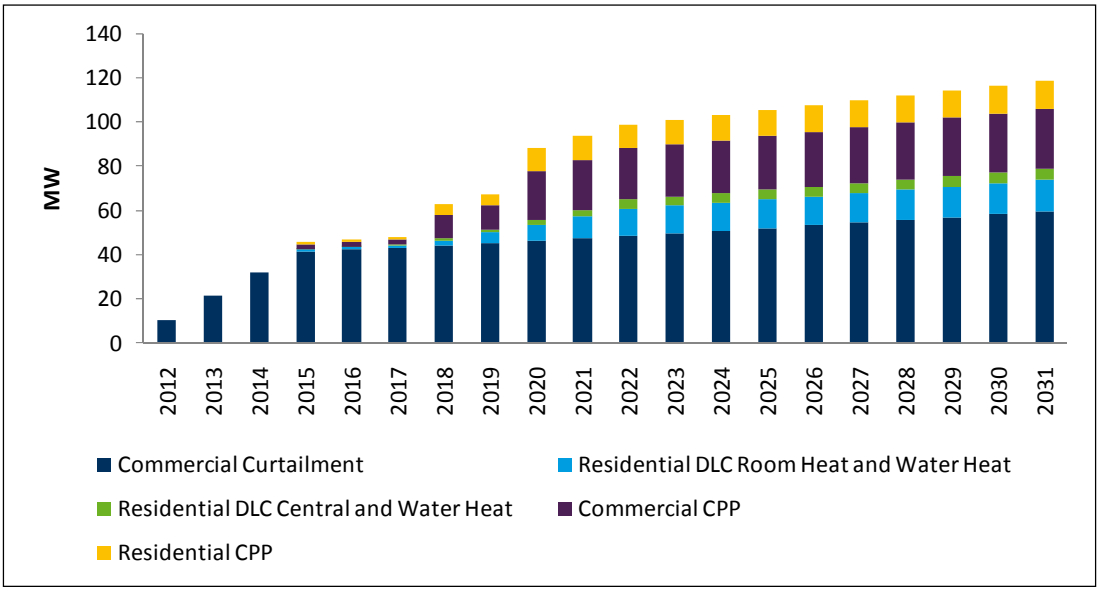


Figure 32. Demand Response Annual Achievable Technical Potential by Strategy – Summer



Detailed Resource Potentials by Program Strategy

Residential Direct Load Control (DLC)

DLC programs are designed to interrupt specific end-use loads at customer facilities through utility-directed control. When deemed necessary, the utility, through a third-party contractor, is authorized to cycle or shut off participating appliances or equipment for a limited number of hours on a limited number of occasions. Customers do not have to pay for the equipment or installation of control systems, and they typically receive incentives paid through monthly credits on their utility bills.

For this type of program, receiver systems are installed on customer equipment to enable communications from the utility and to execute controls. Historically, DLC programs have become mandatory once a customer elects to participate; however, voluntary participation is now an option for some programs with more intelligent control systems and override capabilities at the customer facility.[16]

Because PSE's system peak occurs in the winter, this assessment focuses on two DLC programs that focus on controlling heating loads. Although residential DLC for air conditioning has been one of the most well-established programs in the nation (utilized by PacifiCorp, MidAmerican Energy, Alliant Energy, Florida Power and Light, Xcel Energy, et al.), the central and room heating DLC programs are a relatively new idea with minimal data available through secondary research.

PSE is currently implementing a space-and-water-heating DLC pilot for 700 homes, with approximately one MW available to be curtailed during each event. Since minimal data are available for these types of programs, some summer DLC program assumptions have been adapted to supplement PSE's pilot data for this assessment.

Central Heating and Water Heating

Table 28 shows the technical and achievable technical potential results by end use by season. Although this is program is primarily focused on reducing the winter peak, water heaters would be available for control in the summer.

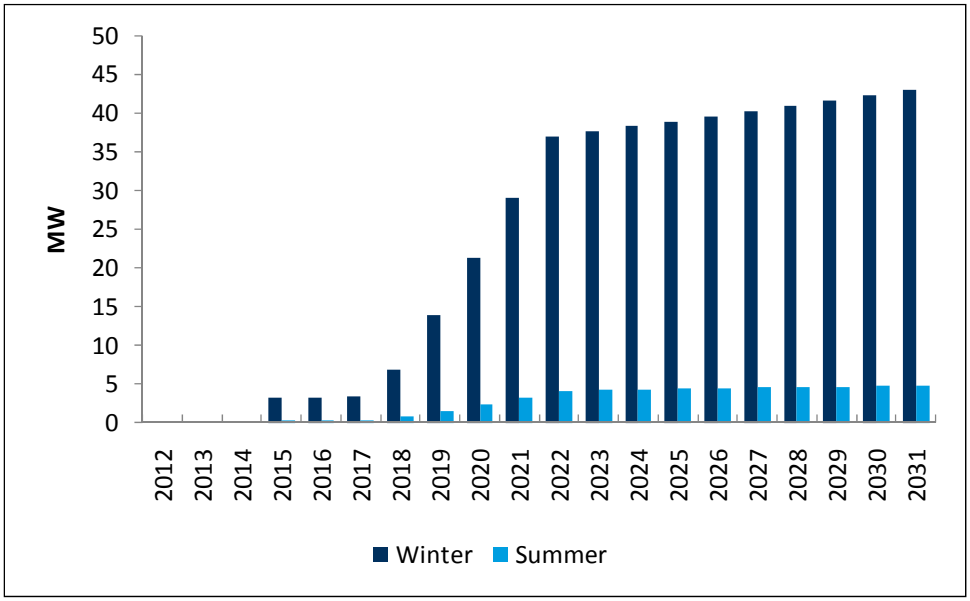
Table 28. Residential DLC Central Heat and Water Heat: Technical and Achievable Technical Potential, MW in 2031

	Winter			Summer		
End Use	Technical Potential	Achievable Technical Potential	Achievable Technical As percent of System Peak	Technical Potential	Achievable Technical Potential	Achievable Technical As percent of System Peak
Central Heat	251	38	0.67%	0	0	0.00%
Water Heat	46	5	0.10%	42	5	0.11%
Total	297	43	0.77%	42	5	0.11%
*System peak is based on PSE's average load in the top 20 hours for each season.						

[16] Typically, penalties are associated with non-compliance or opt-outs.

Figure 33 shows the achievable potential for the central heat DLC program, based on an acquisition schedule with a three-year pilot program starting in 2015 and ramping up to full participation in 2022.

Figure 33. Residential DLC Central Heat and Water Heat Acquisition Schedule



Utility incentives for residential DLC programs can vary greatly, from a free programmable thermostat, to a set incentive amount per month, to a 15 percent discount on customers' summer electricity bills (which may amount to from $50 to $60 annually for many participants). Incentives for this analysis are set at $32/year for central heat cycling, with an additional $8 for water heating control. Additional costs are assessed for this program, including the following:

- $25 of marketing; per new customer
- $7 for communications per existing customer
- a third-party vendor administrative cost

Detailed assumptions are provided in Table 29 and Table 30.

Table 29. Residential DLC Central Heat and Water Heat: Program Basics

Program Concept	Assumptions
Customer Sectors Eligible	Residential customers in single-family and manufactured homes
End Uses Eligible for Program	Electric central heating (including air-source heat pumps) and electric water heaters
Customer Size Requirements, if any	N/A
Winter Load Basis	Top 20 hours
Summer Load Basis	Top 20 hours

Table 30. Residential DLC Central Heat and Water Heat: Inputs and Sources

Inputs	Value	Sources or Assumptions
Annual Attrition (%)	5%	Studies found 7% (composed of 5% change-of-service and 2% removals) from utilities, including PacifiCorp, Xcel Energy, Eon US, Sacramento Municipal Utility District,, Florida Power and Light (removals range from 1% to 3%). Removals are accounted for in event participation.
Per Customer Impacts (kW)	1.0 Central Heating 0.6 Water Heating	Based on PSE's central and water heating pilot.
Annual Administrative Costs (percent of annual costs)	5%	An additional utility administrative cost is added to the vendor program cost.
Annual Vendor Administrative Costs (percent of annual costs)	15%	Based on research of vendor bids and informal communication with vendors. Includes maintenance, administrative labor, and dispatch software.
Technology Cost	$160 per switch plus $100 for installation labor	Based on PSE's experience. Assumes the water heater will be controlled by the same switch, consistent with PSE's central heating and water heating pilot program.
Marketing Cost	$25	Assumes 1/2 hour of staff time valued at $50/hour (fully loaded). Based on research of vendor bids and informal communication with vendors.
Incentive (annual costs)	Central Heating $32 Water Heating $8	Incentives range from $30 to $35 for most utilities for one piece of equipment and $8 for additional equipment. Currently PSE's pilot program offers $50 for both central and water heating.
Communication Costs (per Customer Per Year)	$7	This value accounts for annual per-customer communication of a one-way transmission system.
Eligible Load (%)	100%	Assumes all electric central heating customers and associated loads are eligible for the program.
Technical Potential (as percent of Gross)	Central Heating 50% Water Heating 100%	Assumes all central heating units and heat pumps can be retrofit and that the program employs a 50% cycling strategy. Due to the tank, water heaters can be shut off for the entire event (100% reduction).
Program Participation (%)	Single Family and Manufactured Central Heating 20% Multifamily Central Heating 0% Water Heating Single Family: 2%; Multifamily 0%; Manufactured: 5%	Assumes 20% of single-family and manufactured homes with electric central heating will participate. Minimal data for DLC heating programs exist; therefore, this assumption is based on the average participation rate for national programs for DLC cooling programs (between 15% and 20% of all residential customers, which translates to 20% to 30% of eligible customers). This is consistent with the 2009 FERC study[17] estimate of 25% program participation for DLC cooling programs. Due to difficulty in reaching the multifamily segment, these customers have been removed from the potential.. As customers with electric central heating will also include water heating, the water heating participation rates reflect the portion of electric water heaters in homes with electric central heating.
Event Participation (%)	Central Heating 94% Water Heating 94%	Based on utility experience with DLC cooling programs, accounting for homeowners removing units and operational breakdowns (from 2.5% to 5.8%). Because one switch controls both devices, the event participation is the same for both end-uses.

Room Heating and Water Heating

Similar to a central heating DLC program, a room heating DLC program is a relatively new idea with little or no data available through secondary research. Table 31 shows the technical and achievable technical potential results by end use for winter and summer. As with the central heating, there is greater potential in the winter since all the heating load occurs in the winter. The summer portion of the program would only target the water heating load.

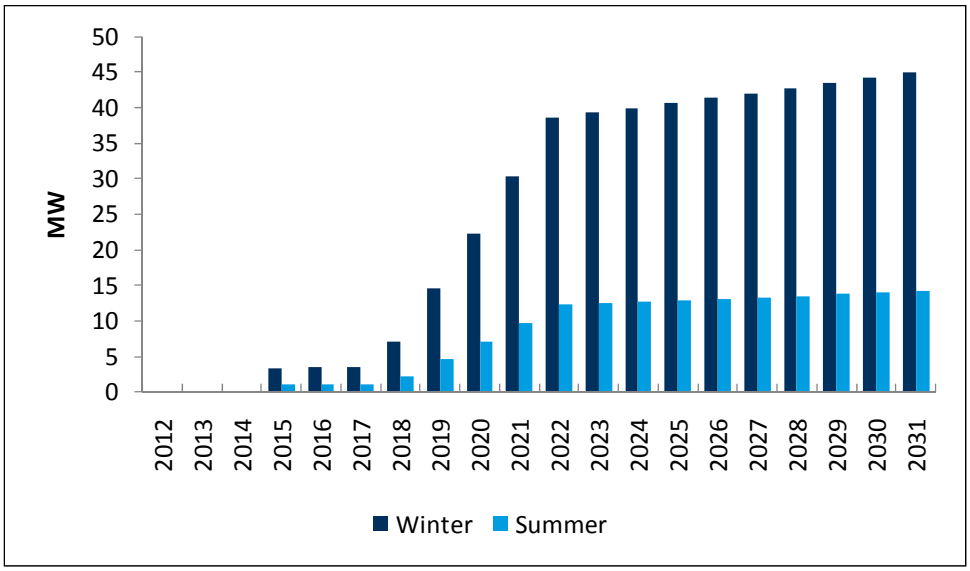
[17] Federal Energy Regulatory Commission. "A National Assessment of Demand Response Potential." June 2009.

Table 31. Residential DLC Room Heat and Water Heat: Technical and Achievable Technical Potential, MW in 2031

	Winter			Summer		
End Use	Technical Potential	Achievable Technical Potential	Achievable Technical As Percent of System Peak	Technical Potential	Achievable Technical Potential	Achievable Technical As Percent of System Peak
Room Heat	325	29	0.52%	0	0	0.00%
Water Heat	103	16	0.28%	93	14	0.32%
Total	428	45	0.80%	93	14	0.32%
*System peak is based on PSE's average load in the top 20 hours for each season.						

Figure 34 shows the achievable potential for the central heat DLC program based on an acquisition schedule starting in 2015, with a three-year pilot program, ramping up to full participation in 2022.

Figure 34. Residential DLC Room Heat and Water Heat Acquisition Schedule



All cost assumptions, except for technology costs, are consistent with the central heating program. Detailed assumptions are provided in Table 32 and Table 33.

Table 32. Residential DLC Room Heat and Water Heat: Program Basics

Program Concept	Assumptions
Customer Sectors Eligible	All residential
End Uses Eligible for Program	Electric room heating (baseboard)
Customer Size Requirements, if any	N/A
Winter Load Basis	Top 20 hours
Summer Load Basis	Top 20 hours

Table 33. Residential DLC Room Heat and Water Heat: Inputs and Sources

Inputs	Value	Sources or Assumptions
Annual Attrition (%)	5%	Studies have found 7% (composed of 5 % change-of-service and 2% removals) from utilities, including PacifiCorp, Xcel Energy, Eon US, Sacramento Municipal Utility District,, Florida Power and Light (removals range from 1 to 3%). Removals are accounted for in event participation.
Per Customer Impacts (kW)	0.75 Room Heating 0.6 Water Heating	Assumes approximately 25% lower demand savings than the central heating program, based on engineering estimate. Water heating savings are based on PSE's pilot program.
Annual Administrative Costs (percent of annual costs)	5%	An additional utility administrative cost is added to the vendor program cost.
Annual Vendor Administrative Costs (percent of annual costs)	15%	Based on research of vendor bids and informal communication with vendors. Includes maintenance, administrative labor, and dispatch software.
Technology Cost	$160 per switch plus $250 for installation labor	Assumes one switch will control all room heaters and the water heater. Switch costs are based on PSE's experience. Installation cost is $250 (assumes 25 percent labor cost savings per heater).
Marketing Cost	$25	Marketing costs are based on 1/2 hour of staff time valued at $50/hour (fully loaded).
Incentive (annual costs)	Room Heating $32 Water Heating $8	Incentives range from $30 to $35 for most utilities for one piece of equipment and $8 for additional equipment. Currently PSE's pilot program offers $50 for both space and water heating.
Technical Potential (as percent of Gross)	Room Heating 50% Water Heating 100%	Assumes all room units can be retrofit and that the program employs a 50 percent cycling strategy. Due to the tank, water heating can be shut off for the entire event (100 percent reduction).
Program Participation (%)	Single Family and Manufactured Room Heating 15% Multifamily Room Heating 0% Water Heating Single Family: 5%; Multifamily 11%; Manufactured: 3%	Assumes 15% of customers with electric room heating will participate. Minimal data for DLC heating programs exists; therefore, the assumption is based on the average participation rate for national programs for DLC AC programs (between 15% and 20% of all residential customers, which translates to 20% to 30% of eligible customers). Due to the difficulty of reaching the multifamily segment, it is assumed that multifamily customers will only participate in the water heating portion of this program. All customers with electric room heating will also include water heating in the program, so participation rates have been adjusted to account for the percent of electric heating customer with electric water heat.
Event Participation (%)	Room Heating 94% Water Heating 94%	Based on PacifiCorp's Cool Keeper historic event participation, which accounts for homeowners removing units and operational breakdowns (2.5% to 5.8%). Because one switch controls both devices, the event participation is the same for both end-uses.
Annual Attrition (%)	5%	Based on utility experience with DLC cooling programs, accounting for homeowners removing units and operational breakdowns (2.5% to 5.8%). Because one switch controls both devices, the event participation is the same for both end-uses.

Nonresidential Load Curtailment

Load curtailment programs utilize contractual arrangements between the utility, a third-party aggregator that implements the program, and utility nonresidential customers who agree to curtail or interrupt their operations (in whole or part) for a predetermined period when requested by the utility. In most cases, mandatory participation or liquidated damage agreements are required once the customer enrolls in the program; however, the number of curtailment requests—both in total and on a daily basis—is limited by the terms of each contract.

Customers are generally not paid for individual events, but are compensated in the form of a fixed monthly amount per kW of pledged curtailable load or in the form of a rate discount. Typically, contracts require customers to curtail their connected load by either a set percentage (typically, from 15 percent to 20 percent) or a predetermined level (e.g., 100 kW). These types of programs often involve long-term contracts and have penalties for non-compliance, which range from simply dropping the customer from the program to more punitive actions, such as requiring the customer to repay the utility for the committed (but not curtailed) energy at market rates.

For this study, Cadmus assumed nonresidential customers with a monthly demand of at least 100 kW would be eligible for such a program. One key aspect to the potential savings associated with the curtailment program is backup generation. Since these participants can turn on a backup generator during these critical peak times, the burden on a customer with a backup generator is minimal. In many utility programs (excluding those in California), customers are allowed to use backup generators to meet curtailment requirements, and these customers are included in this assessment.

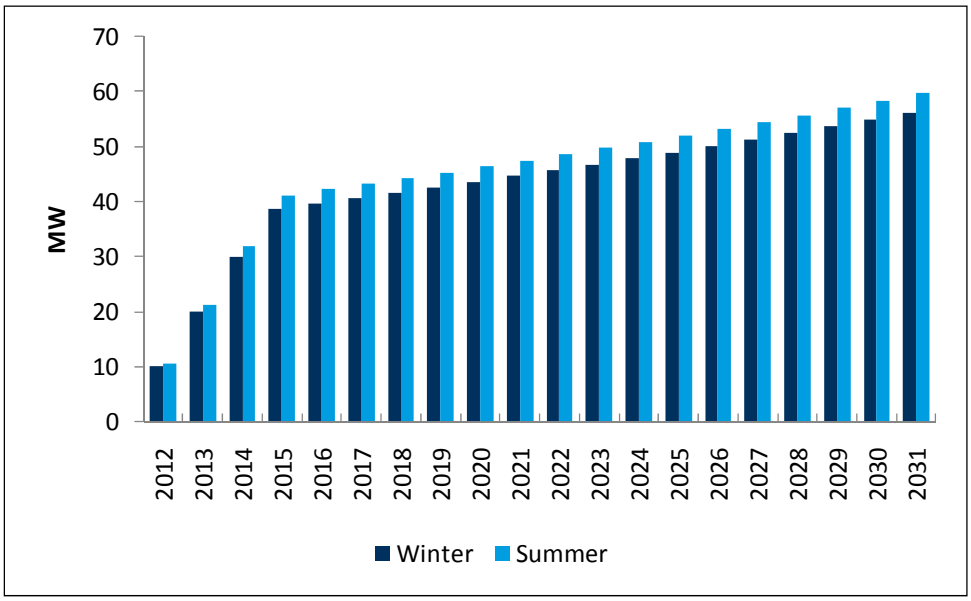
Table 34 shows the estimated technical and achievable technical potential by sector for winter and summer. These potentials are inclusive of the approximate five MW PSE has under control through its curtailment pilot program.

Table 34. Load Curtailment Technical and Achievable Technical Potential, MW in 2031

	Winter			Summer		
Sector	Technical Potential	Achievable Technical Potential	Achievable Technical As percent of System Peak	Technical Potential	Achievable Technical Potential	Achievable Technical As percent of System Peak
Commercial	383	55	0.98%	391	58	1.31%
Industrial	22	1	0.02%	27	2	0.03%
Total	406	56	1.00%	418	60	1.35%
*System peak is based on PSE's average load in the top 20 hours for each season.						

Figure 35 shows the achievable potential for the curtailment program based on an acquisition schedule that begins in 2012, achieving approximately 10 winter MW per year until full potential is reached in 2015.

Figure 35. Load Curtailment Acquisition Schedule



Curtailment programs are typically run through third-party aggregators that charge a set $/kW cost. For this assessment, the technology costs and marketing costs were excluded from the bid when calculating the total $/kW cost of the program. Detailed assumptions providing values and sources that derived potential and levelized costs are shown in Table 35 and Table 36.

Table 35. Load Curtailment Program Basics

Program Concept	Assumptions
Customer Sectors Eligible	All industrial and commercial market segments
End Uses Eligible for Program	Total load of all end uses
Customer Size Requirements, if any	Customers >100kW
Winter Load Basis	Top 20 hours
Summer Load Basis	Top 20 hours

Table 36. Load Curtailment Inputs Consistent Across Market Segments

Inputs	Value	Sources or Assumptions
Annual Administrative Costs (%)	5%	Administrative costs are rolled into the $/kW cost
Technology Cost (per new participant)	$1,400	Technology costs include communications, connectivity and meters, if necessary, based on California spending of $32m for 23,000 large C&I hardware after energy crisis
Marketing Cost (per new participant)	$200	Assumes 4 hours of utility labor at $50/hour (fully loaded)
Incentives (annual costs per participating kW)	N/A	Included in third-party aggregator bid
Overhead: First Costs	N/A	Included in third-party aggregator bid
Vendor Costs	$80	Based on third-party aggregator bid (exclusive of technology and marketing costs)
Technical Potential	Varies by Sector	Based on detailed engineering audits of demand response potential of commercial and industrial customers throughout California, with third-party verification of results. Findings are amalgamated by sector and end use category and supported by senior engineering analysis.
Program Participation (%)	Varies by Sector	Based on survey of PacifiCorp nonresidential customers. See Table 37 for details.
Event Participation (%)	95%	Based on informal conversations with a third-party aggregator.

Table 37. Load Curtailment Inputs and Sources Varying by Segment

Market Segment	End Use	Technical Potential as percent of Load Basis	Program Participation
Grocery	Segment Total	5%	13%
Hospital	Segment Total	12%	0%
Office	Segment Total	16%	21%
Dry Goods Retail	Segment Total	16%	8%
Hotel-Motel	Segment Total	17%	0%
Other	Segment Total	16%	13%
Restaurant	Segment Total	17%	25%
School	Segment Total	17%	23%
University	Segment Total	17%	23%
Warehouse	Segment Total	16%	13%
Industrial	Segment Total	17%	6%

Critical Peak Pricing (CPP)

Under a CPP program, customers receive a discount on their retail rates during non-critical peak periods in exchange for paying premium prices during critical peak events. However, the peak price is determined in advance, providing customers with some degree of certainty about the participation costs.

The basic rate structure is a TOU tariff, where the rate has fixed prices for usage during different blocks of time (typically on-, off-, and mid-peak prices by season). During CPP events, the normal peak price under a TOU rate structure is replaced with a much higher price, generally set to reflect the utility's avoided cost of supply during peak periods.

CPP rates only take effect a limited number of times during the year. In times of emergency or high market prices, the utility can invoke a critical peak event, where customers are notified and rates become much higher than normal, encouraging customers to shed or shift load. Most CPP

programs provide advanced notice in addition to event criteria (such as a threshold for forecasted weather temperatures) to help customers plan their operations. One attractive feature of the CPP program is the absence of a mandatory curtailment requirement.

The benefit of a CPP rate over a standard TOU rate is that an extreme price signal can be sent to customers for a limited number of events. Utilities have found that demand reductions during these events are typically greater than during TOU peak periods for several reasons:

- Customers under CPP rates are often equipped with automated controls triggered by a signal from the utility
- The higher CPP rate serves as an incentive for customers to shift load away during the CPP event period
- The relative rarity of CPP events may encourage short-term behavioral changes, resulting in reduced consumption during the events.

Since the CPP rate only applies on select days, this raises a number of questions about when a utility can call an event, for how long, and how often. The rules governing utility dispatch of CPP events vary widely by utility and by program, with some utilities reserving the right to call an event at any time while others must provide notice one day before the event. This analysis assumes that approximately 10 four-hour events will be called during the summer and winter for a total of 40 event hours.

Currently, peak pricing is offered through experimental pilots or full-scale programs by several organizations in the United States, notably Southern Company (Georgia Power), Gulf Power, Niagara Mohawk, California utilities (SCE, PG&E, SDG&E), PJM Interconnection, and New York ISO (NYISO). Adoption of CPP has not been as widespread in Western states as in Eastern states.

Table 38 shows the estimated technical and achievable technical potential by sector for winter and summer.

Table 38. CPP Technical and Achievable Technical Potential, MW in 2031

	Winter			Summer		
Sector	Technical Potential	Achievable Technical Potential	Achievable Technical As percent of System Peak	Technical Potential	Achievable Technical Potential	Achievable Technical As percent of System Peak
Residential	458	22	0.39%	267	13	0.29%
Commercial	383	24	0.42%	391	24	0.54%
Industrial	22	3	0.05%	27	4	0.08%
Total	863	48	0.86%	685	40	0.90%

*System peak is based on PSE's average load in the top 20 hours for each season.

Residential CPP

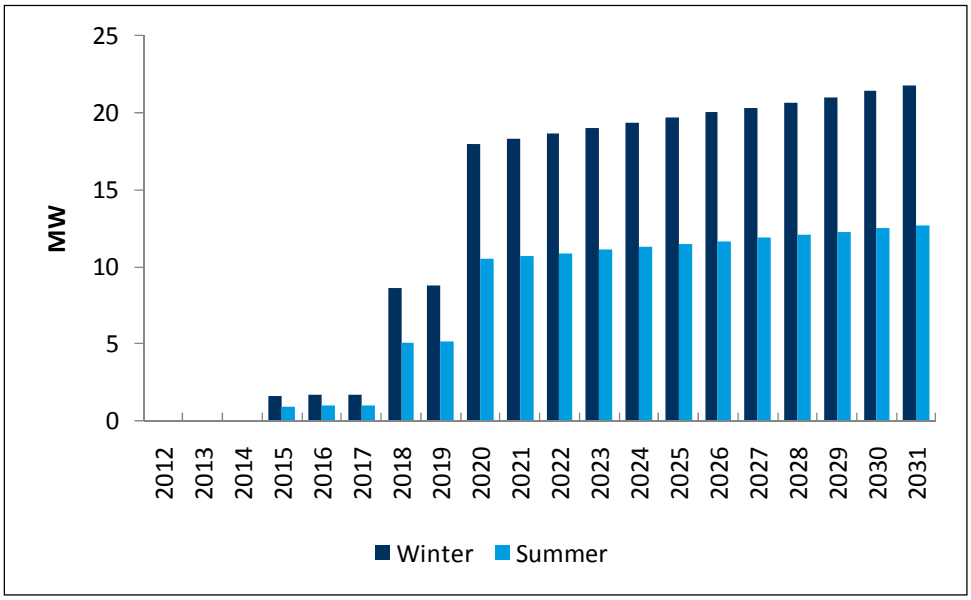
The most common national CPP programs are offered to the residential customer class. Recently, significant literature has shown the value of a technology-enabled CPP program, which essentially provides customers with smart thermostats. These can be programmed to change temperature settings and even control other end uses, such as lighting and water heating,

depending on the pricing period (such as critical peak, on-peak, or off-peak). This combination of pricing and technology has shown to be an effective means of improving per-customer load impacts.

Technically, national studies have shown that 13 percent to 40 percent[18] of peak demand can be reduced for participating customers. Cadmus' study assumes a 15-percent reduction based on the California pricing pilot and PSE's experience with the nonresidential curtailable load pilot. Five percent is consistent with the 2009 FERC study, and event participation is estimated to be 95 percent, based on almost all participants shifting consumption during a CPP event.

Figure 36 shows the achievable technical potential for the nonresidential CPP program, based on an acquisition schedule that begins with a three-year pilot program in 2015 to account for the time necessary to create a new tariff and put infrastructure in place. This is expected to be followed by two years of increased participation, reaching full participation in 2020.

Figure 36. Residential CPP Acquisition Schedule



The residential CPP program has a start-up cost of $400,000, since a new rate structure will be put in place. Additionally, the program will require the installation of a smart thermostat and meter and ongoing communication, priced at $515 and $7 per participant, respectively.

[18] Charles River Associates (CRA), Impact Evaluation of the California Statewide Pricing Pilot, March 16, 2005. California Energy Commission (CEC), Statewide Pricing Pilot load reduction data for Zone 4 (desert and inland climate), provided in MS Excel by Pat McAuliffe, CEC staff, via e-mail November 3, 2006. Demand Response Research Center (DRRC), Ameren Critical Peak Pricing Pilot, Presentation by Rick Voytas, Manager of Corporate Analysis at Ameren Services, at the Demand Response Town Hall Meeting, Berkeley, CA, June 26, 2006. International Energy Agency, Demand-Side Management Programme, Task XI: Time of Use Pricing and Energy Use for Demand Management Delivery, Subtask 2: Time of Use Pricing for Demand Management Delivery, April 2005. Rocky Mountain Institute, Automated Demand Response System Pilot, Final Report Volume 1: Introduction and Executive Summary, March 2006. Summit Blue Consulting, Interim Report for the myPower Pricing Segment Evaluation, prepared for PSEG, December 27, 2006. University of California Energy Institute (UCEI), Dynamic Pricing, Advanced Metering and Demand Response in Electricity Markets, S. Borenstein et al., October 2002.

Marketing costs are consistent with other program assumptions, and no incentives are given because the program is rate-based. Detailed assumptions of values and sources that derived the potential and levelized costs are shown in Tables 39 and 40.

Table 39. Residential CPP Program Basics

Program Concept	Assumptions
Customer Sectors Eligible	All residential customers
End Uses Eligible for Program	Total load of all end uses
Customer Size Requirements, if any	N/A
Winter Load Basis	Top 20 hours
Summer Load Basis	Top 20 hours

Table 40. Residential CPP Inputs and Sources

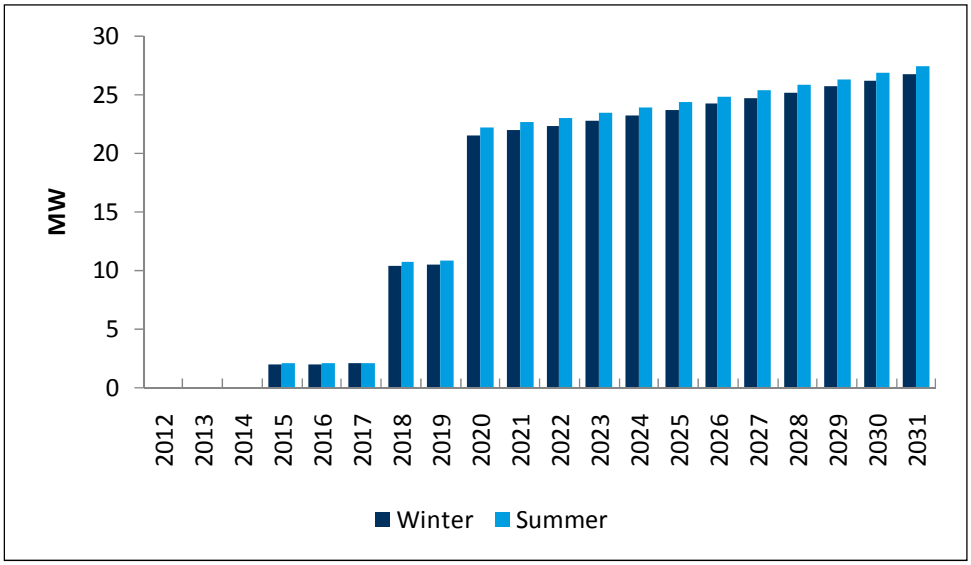
Inputs	Value	Sources or Assumptions
Annual Attrition	5%	Accounts for 5%change of service.
Annual Administrative Costs (%)	15%	Assumes administrative adder of 15%
Technology Cost (per new participant)	$515	Smart Thermostat: $200 installation and $315 for the meter, based on $150 for the installed cost of radio frequency devices (CEC 2004 report) plus an additional $150 to upgrade to AMI and $15/customer communication charge.
Marketing Cost (per new participant)	$25	Marketing costs are based on one-half hour of staff time valued at $50/hour (fully-loaded).
Incentives (annual costs per participant)	N/A	There are no customer incentives, but customers may have a lower bill than they would have on a standard rate.
Communication Costs (per Customer Per Year)	$7	This value accounts for annual per-customer communication of a one-way transmission system.
Overhead: First Costs	$400,000	Standard program development assumption, including necessary internal labor, research, and IT/billing system changes
Eligible Load (%)	100%	All residential customers are eligible.
Technical Potential	15%	An average statewide reduction of 27% was found for the California residential pilot CPP programs implemented in the summer (Charles River Associates, 2005). PSE's experience with a C&I pilot shows that winter events save about 50% less than summer events and, therefore, event participation was reduced to 15%.
Program Participation (%)	5%	Gulf Power reported 8,500 participants as of October 2006, out of 350,000 residential customers (2.4%). (Sources: Jim Thompson presentation to PURC Energy Policy Roundtable, October 31, 2006; and FERC Form 861 data, 2005.) Gulf Power expects to reach at least 10% penetration. (Source: Dynamic Pricing, Advanced Metering and Demand Response in Electricity Markets, Severin Borenstein, Michael Jaske, and Arthur Rosenfeld, October 2002.) 2009 FERC study reports a 5% maximum participation rate.
Event Participation (%)	95%	Opt-outs are typically less than 5% now that utilities are requiring customers to use the internet or call center to opt out of a CPP event (source: Comverge). With two-way communications (through AMI or Zigbee gateway for example) utilities can identify and replace malfunctioning thermostats, so event participation is much higher than in old one-way, switch-based DLC programs.

Nonresidential CPP

Cadmus has identified very few nonresidential CPP programs for medium-to-large customers; therefore, this analysis relies on engineering audit assumptions for technical potential estimates, which are consistent with CPP studies showing an average of 8 percent savings.[19] Event participation of 56 percent is based on the 2006 California C&I Pilot,[20] and it accounts for the higher rate of opt-outs expected for commercial customers.

Figure 37 shows the achievable technical potential for the nonresidential CPP program based on an acquisition schedule that begins with a three-year pilot program in 2015, accounting for the time needed to create a new tariff and put infrastructure in place. This is expected to be followed by two years of increased participation, reaching full participation in 2020.

Figure 37. Nonresidential CPP Acquisition Schedule



The nonresidential CPP program will also have a start-up cost of $400,000, since a new rate structure will be put in place. Additionally, the program will require the installation of metering and communication equipment (priced at $1,400) and ongoing communication costs of $7 per participant, respectively. Marketing costs are consistent with other program assumptions, and no incentives are given because the program is rate-based. Detailed assumptions for the nonresidential CPP program are shown in Tables 41 and 43.

[19] LBNL Fully Automated CPP study, 2006.

[20] Hopper, Nicole and Charles Goldman. The Summer of 2006: A Milestone in the Ongoing Maturation of Demand Response. 2007.

Table 41. Nonresidential CPP Program Basics

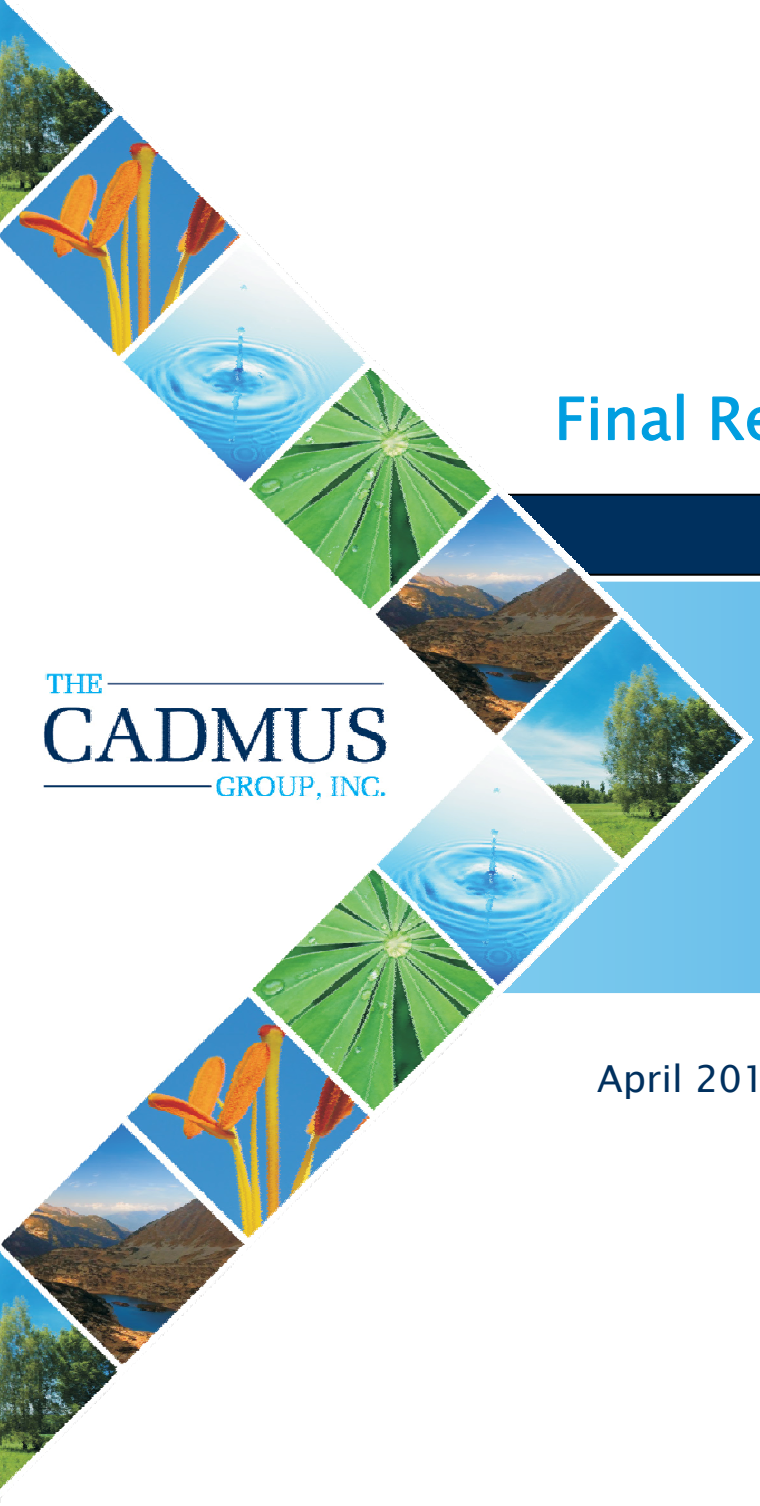
Program Concept	Assumptions
Customer Sectors Eligible	All nonresidential market segments
End Uses Eligible for Program	Total load of all end uses
Customer Size Requirements, if any	Nonresidential customers with monthly load greater than 100 kW
Winter Load Basis	Top 20 hours
Summer Load Basis	Top 20 hours

Table 42. Nonresidential CPP Inputs and Sources not Varying by Sector or Segment

Inputs	Value	Sources or Assumptions
Annual Administrative Costs (%)	15%	Assumes administrative adder of 15%
Technology Cost (per new participant)	$1,400	Technology costs include communications, connectivity and meters, if necessary, based on California spending of $32 million for hardware for 23,000 large C&I after energy crisis
Marketing Cost (per new participant)	$200	Assumes 4 hours of utility labor at $50/hour (fully-loaded) for account representatives.
Marketing Cost (first year)	$150,000	Assumes an additional one time FTE cost to implement the program.
Communication Costs (per Customer Per Year)	$7	This value accounts for annual per-customer communication of a one-way transmission system.
Incentives (annual costs per participant)	N/A	There are no customer incentives, but customers may have a lower bill than they would have on a standard rate.
Overhead: First Costs	$400,000	Standard program development assumption, including necessary internal labor, research and IT/billing system changes
Technical Potential as percent of Load Basis	Varies by Sector	Based on detailed engineering audits of demand response potential for commercial and industrial customers throughout California, with third-party verification of results. Studies of CPP results show that 8% was saved on average (LBNL Fully Automated CPP study, 2006), which is comparable to taking this technical potential and the event participation combined.
Program Participation (%)	Varies by Sector	Based on survey of PacifiCorp nonresidential customers. See Table 37 for details.
Event Participation (%)	56%	Based on 2006 California C&I results for CPP Pilot

Table 43. Nonresidential CPP Inputs and Sources Varying by Sector or Segment

Market Segment	End Use	Technical Potential as percent of Load Basis	Program Participation
Grocery	Segment Total	5%	12%
Hospital	Segment Total	12%	0%
Office	Segment Total	16%	8%
Dry Goods Retail	Segment Total	16%	16%
Hotel-Motel	Segment Total	17%	0%
Other	Segment Total	16%	12%
Restaurant	Segment Total	17%	25%
School	Segment Total	17%	18%
University	Segment Total	17%	18%
Warehouse	Segment Total	16%	12%
Chemical Manufacturing	Segment Total	17%	24%
Computer Electronic Manufacturing	Segment Total	17%	24%
Electrical Equipment Manufacturing	Segment Total	17%	24%
Fabricated Metal Products	Segment Total	17%	24%
Food Manufacturing	Segment Total	18%	24%
Industrial Machinery	Segment Total	17%	24%
Miscellaneous Manufacturing	Segment Total	17%	24%
Nonmetallic Mineral Products	Segment Total	17%	24%
Paper Manufacturing	Segment Total	17%	24%
Petroleum Refining	Segment Total	17%	0%
Plastic Rubber Products	Segment Total	17%	24%
Primary Metal Manufacturing	Segment Total	17%	24%
Printed Related Support	Segment Total	17%	24%
Transportation Equipment Manufacturing	Segment Total	17%	24%
Wastewater	Segment Total	17%	24%
Water	Segment Total	17%	24%



Final Report

Comprehensive Assessment of Demand-Side Resource Potentials (2012-2031): Appendices

Volume II

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Appendix A. Methodological Consistency with the 6th Northwest Power Plan

To facilitate a comparison with the 6th Power Plan, the Council has prepared an overview of the methodology used in the development of conservation potential estimates in the 6th Power Plan.[1] This appendix compares the methodology used in PSE's 2011 IRP to those benchmarks established by the Council.

Descriptions of methodology used in this study are in italics below.

Technical Resource Potential Assessment

Review a wide array of energy-efficiency technologies and practices across all sectors and major end uses.

The study considered measures from a variety of sources, including the 6th Plan, RTF, ENERGY STAR, and DEER. Descriptions of all measures analyzed are provided in Appendix B.2.

Methodology

- Technically feasibility savings = Number of applicable units * incremental savings/applicable unit
- "Applicable" Units accounts for:
  - Fuel saturations (e.g. electric vs. gas DHW)

    Fuel saturations were based on data specific to PSE's service territory whenever possible. PSE's 2008 Residential End Use Survey (REUS) and NEEA's 2008 Commercial Building Stock Assessment (CBSA) were the primary sources of this information.

  - Building characteristics (single family vs. mobile homes, basement/non-basement, etc.)

    Data came from PSE billing information and the REUS and CBSA studies.

[1] http://www.nwcouncil.org/energy/powerplan/6/supplycurves/I937/CouncilMethodology_outline%20_2_.pdf

- System saturations, (e.g., heat pump vs. zonal, central AC vs. window AC)

  System saturations were based on data specific to PSE's service territory whenever possible. PSE's 2008 Residential End Use Survey (REUS) and NEEA's 2008 Commercial Building Stock Assessment (CBSA) were the primary sources of this information.

- Current measure saturations

  Current saturations were incorporated into the applicability based on information from the REUS and CBSA, the 6th Plan, and the experience of PSE conservation staff.

- New and existing units

  Existing and new units are calculated based on current and forecasted customers, respectively.

- Measure life (stock turnover cycle)

  Measure decay rates are applied to lost opportunity measures, based on measure life. Discretionary measures are assumed to be reinstalled at the end of their useful life.

- Measure substitutions (e.g., duct sealing of homes with forced-air resistance furnaces vs. conversion of homes to heat pumps with sealed ducts)

  Competition between measures is accounted for in the measure share applicability factor to avoid double-counting.

- "Incremental" Savings/applicable unit accounts for:
  - Expected kW and kWh savings shaped by time-of-day, day of week and month of year

    Energy and demand savings are either based on deemed values or calculated as a percent reduction in baseline end use consumption. Hourly impacts are provided to PSE's IRP model.

  - Savings over baseline efficiency
    - Baseline set by codes/standards or current practices

      Baselines are set based on current codes, standards, or current practices. Standards that have been passed but not yet implemented become the baseline at the time mandated in the new standard.

    - Not always equivalent to savings over "current use" (e.g., new refrigerator savings are measured as "increment above current federal standards, not the refrigerator being replaced)

      Savings from equipment upgrades on burnout are calculated based on the minimum efficiency level available.

- Climate—heating, cooling degree days and solar availability

  Savings are based on typical climate in PSE's service territory.

- Measure interactions (e.g. lighting and HVAC, duct sealing and heat pump performance, heat pump conversion and weatherization savings)

  These interactive effects are treated as a reduction in measure savings (e.g., commercial lighting measures may save less due to increased heating requirements).

Economic Potential: Ranking Based on Resource Valuation

- Total Resource Cost (TRC) is the criterion for economic screening - TRC includes all cost and benefits of measure, regardless of who pays for or receives them.
  - TRC B/C Ratio > = 1.0

    Benefit-to-cost ratios were not calculated. The analysis used the levelized cost of conserved energy, as described below.

  - Levelized cost of conserved energy (CCE) < levelized avoided cost for the load shape of the savings may substitute for TRC if "CCE" is adjusted to account for "non-kWh" benefits, including deferred T&D, non-energy benefits, environmental benefits and Act's 10% conservation credit

    Levelized costs, on a TRC basis, were calculated for each measure for comparison with supply-side resources in the IRP. The levelized cost calculation incorporated deferred T&D (for electric resources), non-energy benefits, and Act's 10-percnet conservation credit (for electric resources).

Methodology

Valuation of energy and capacity savings was conducted in PSE's Integrated Resource Planning (IRP) model and is not included as part of this study.

- Energy and capacity value (i.e., benefit) of savings based on avoided cost of future wholesale market purchases (forward price curves).
- Energy and capacity value accounts for shape of savings (i.e., uses time and seasonally differentiated avoided costs and measure savings).
- Uncertainties in future market prices are accounted for by performing valuation under wide range of future market price scenario during Integrated Resource Planning process

- Costs Inputs (Resource Cost Elements):

  All of the costs listed below were included in the per-unit measure costs, where appropriate.

  - Full incremental measure costs (material and labor)
  - Applicable on-going O&M expenses (plus or minus)
  - Applicable periodic O&M expenses (plus or minus)
  - Utility administrative costs (program planning, marketing, delivery, on-going administration, evaluation)

- Benefit Inputs (Resource Value Elements):

  All of the benefits listed below were assessed in the calculation of levelized cost of conserved energy, where appropriate.

  - Direct energy savings
  - Direct capacity savings
  - Avoided T&D losses
  - Deferral value of transmission and distribution system expansion (if applicable)
  - Non-energy benefits (e.g. water savings)
  - Environmental externalities

- Discounted Presented Value Inputs:
  - Rate = After-tax average cost of capital weighted for project participants (real or nominal)

    The analysis used PSE's weighted average cost of capital of 8.1 percent, nominal.

  - Term = Project life, generally equivalent to life of resources added during planning period

    Costs were levelized over each measure's expected useful life.

  - Money is discounted, not energy savings

    This is the method used in the IRP analysis.

Achievable Potential

- Annual acquisition targets established through Integrated Resource Acquisition Planning (IRP) process (i.e., portfolio modeling)

  The results of the potentials assessment, bundled by levelized costs of conserved energy, were incorporated in the IRP model. Based on the value of the savings, the IRP model selected the appropriate amount of conservation.

- Conservation competes against all other resource options in portfolio analysis.
  - Conservation resource supply curves separated into:
    - Discretionary (non-lost opportunity)

      Defined as retrofit opportunities in existing facilities

    - Lost-opportunity

      Includes equipment replacement in existing facilities and all new construction measures

- Annual achievable potential constrained by historic "ramp rates" for discretionary and lost-opportunity resources:
  - Maximum ramp up/ramp down rate for discretionary is 3x prior year for discretionary, with upper limit of 85 percent over 20 year planning period

    Analysis assumed that 85 percent of discretionary resources could be acquired in a 10-year timeframe.
  - Ramp rate for lost-opportunity is 15 percent in first year, growing to 85 percent in twelfth year

    Lost opportunity ramp rates varied by measure, based on the assumptions used in the 6th Plan.
  - Achievable potentials may vary by type of measure, customer sector, and program design (e.g., measures subject to federal standards can have 100-percent "achievable" potential).

    While the analysis removed savings from known standards, it did not attempt to predict which savings would be acquired from future codes or standards.

- Revise Technical, Economic and Achievable Potential based on changes in market conditions (e.g., revised codes or standards), program accomplishments, evaluations and experience

  Changes taking effect after the finalization of the 2011 IRP will be reflected in the 2013 IRP.

  - All programs should incorporate Measurement and Verification (M&V) plans that at a minimum track administrative and measure costs and savings.
  - Use International Performance Measurement and Verification Protocols (IPMVP) as a guide.

Appendix B.1: Detailed Results

The following graphs show baseline electric and gas forecasts by sector and segment. The following tables show assumptions of gas and electric equipment saturations, fuel shares, annual per unit energy consumption for residential end uses, and annual per square foot energy consumption for commercial end uses.

Figure B.1.1. Residential Electric Baseline Forecast 2009 - 2031

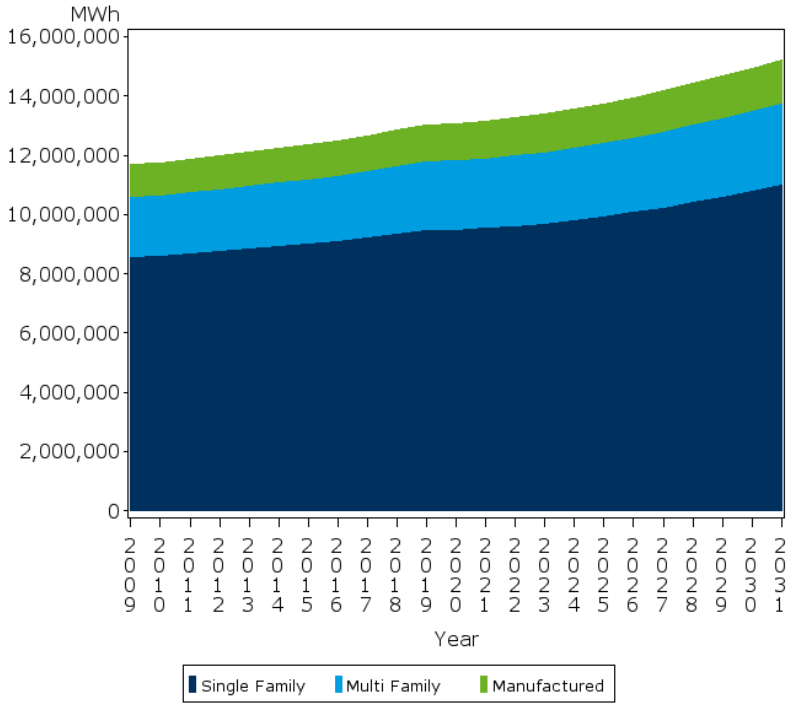


Figure B.1.2. Commercial Electric Baseline Forecast 2009 - 2031

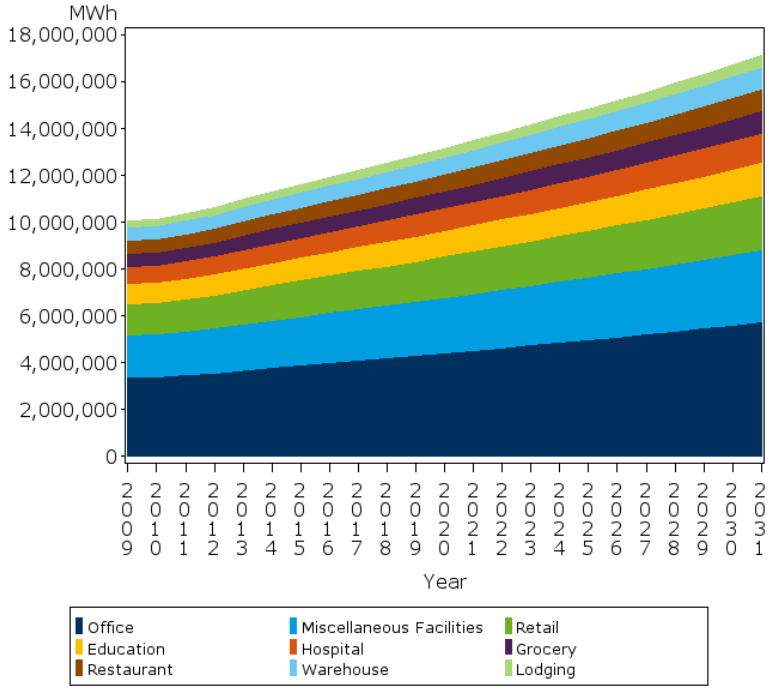
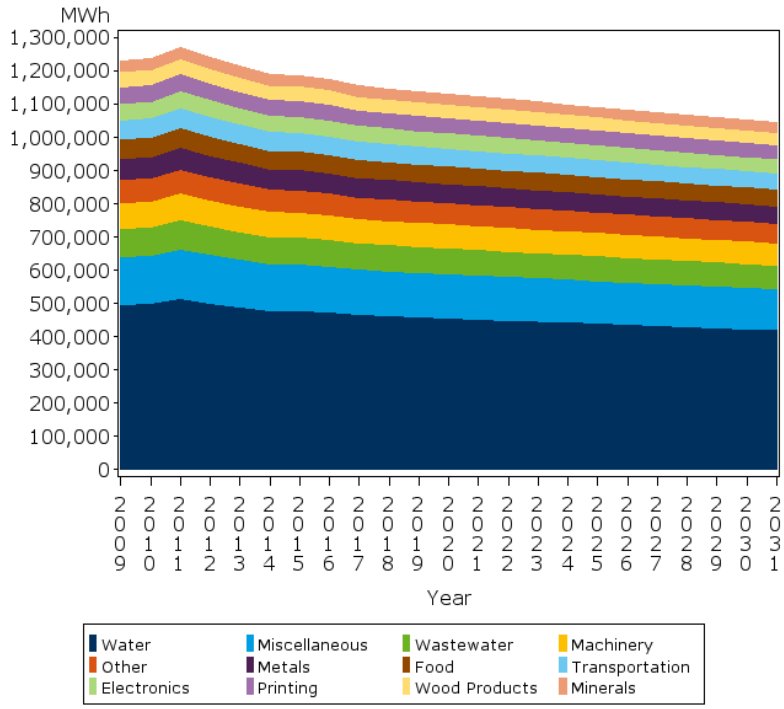


Figure B.1.3. Industrial Electric Baseline Forecast 2009 - 2031



*Note: “Other” includes Petroleum, Plastics/Rubber, Paper, Electrical Equipment Mfg, and Chemicals.

Figure B.1.4. Residential Gas Baseline Forecast 2009 – 2031

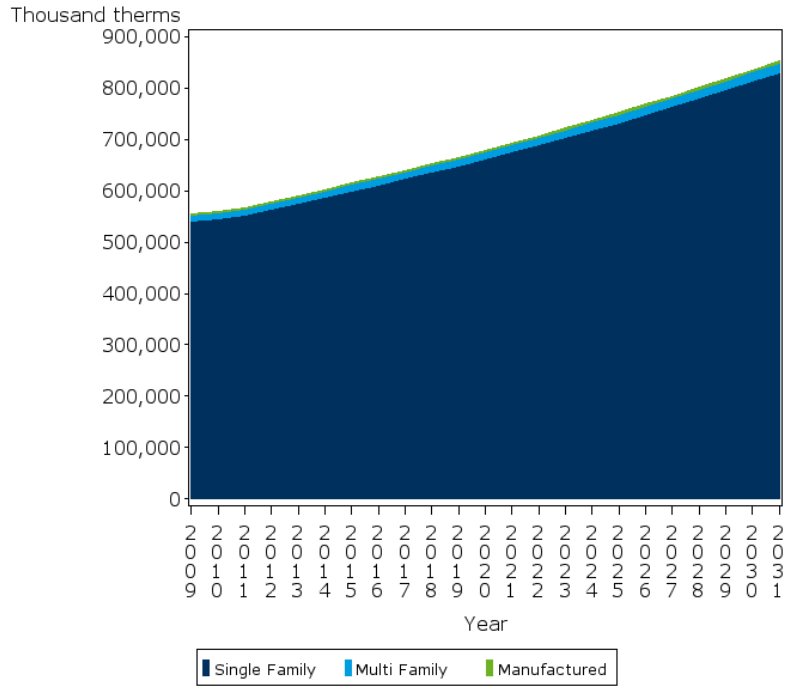


Figure B.1.5. Commercial Gas Baseline Forecast 2009 - 2031

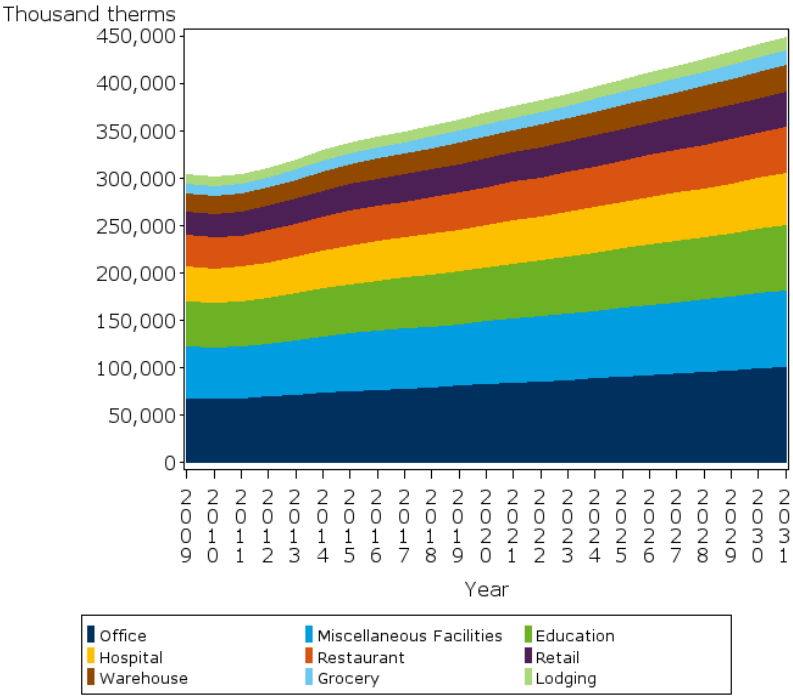
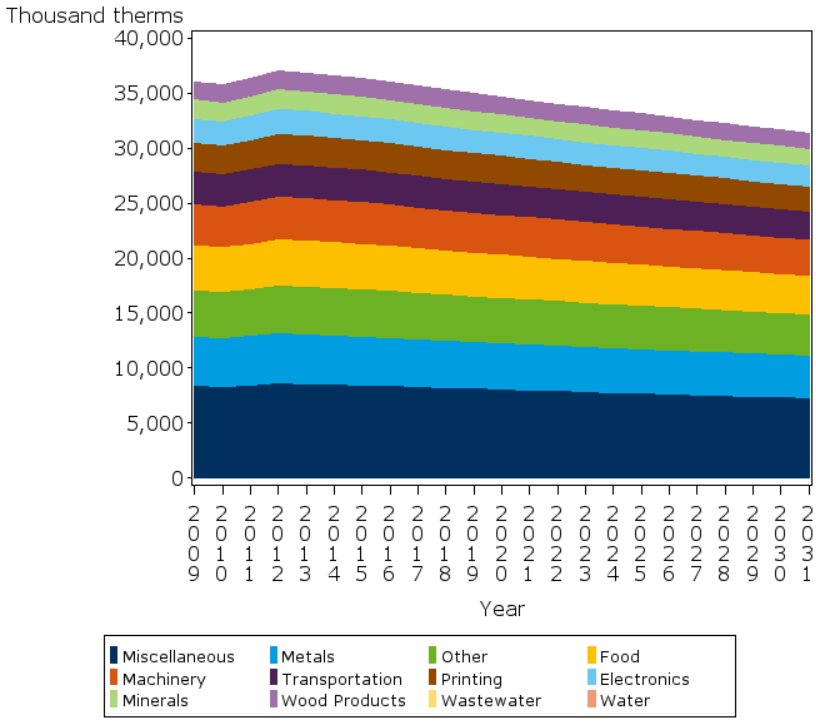


Figure B.1.6. Industrial Gas Baseline Forecast 2009 - 2031



*Note: “Other” includes Petroleum, Plastics/Rubber, Paper, Electrical Equipment Mfg, and Chemicals.

Table B.1.7. Residential Electric Saturations, Fuel Shares, and UECs

Segment	End Use	Saturation	Electric Fuel Share	Weighted Average UEC - Existing	Weighted Average UEC - New
Manufactured	Computer	93%	100%	156.68	156.68
Manufactured	Cooking Oven	103%	97%	153.62	153.62
Manufactured	Cooking Range	103%	93%	128.20	128.20
Manufactured	Cool Central	18%	100%	870.50	626.82
Manufactured	Cool Room	24%	100%	460.98	359.47
Manufactured	Dehumidifier	0%	100%	710.13	710.13
Manufactured	Dryer	98%	96%	607.38	577.25
Manufactured	DVD	145%	100%	101.20	101.20
Manufactured	Freezer	71%	100%	696.60	533.80
Manufactured	Heat Central	69%	58%	6,635.00	4,688.00
Manufactured	Heat Pump	16%	100%	5,622.38	3,478.19
Manufactured	Heat Room	16%	100%	5,109.00	3,610.00
Manufactured	Home Audio System	75%	100%	61.89	61.89
Manufactured	Lighting Exterior	100%	100%	156.70	210.65
Manufactured	Lighting Interior Specialty	100%	100%	231.43	311.10
Manufactured	Lighting Interior Standard	100%	100%	935.96	1,258.18
Manufactured	Microwave	100%	100%	148.18	148.18
Manufactured	Monitor	113%	100%	76.41	76.41
Manufactured	Plug Load Other	100%	100%	715.74	715.74
Manufactured	Refrigerator	109%	100%	626.85	561.98
Manufactured	Set Top Box	117%	100%	262.84	262.84
Manufactured	TV	145%	100%	195.88	195.88
Manufactured	TV Bigscreen	27%	100%	417.02	417.02
Manufactured	Ventilation And Circulation	100%	100%	653.25	399.75
Manufactured	Water Heat	100%	85%	3,333.85	2,791.91
Multi Family	Computer	100%	100%	155.89	155.89
Multi Family	Cooking Oven	106%	96%	153.62	153.62
Multi Family	Cooking Range	95%	90%	128.20	128.20
Multi Family	Cool Central	3%	100%	708.82	539.03
Multi Family	Cool Room	0%	100%	374.64	309.68
Multi Family	Dehumidifier	1%	100%	710.13	710.13
Multi Family	Dryer	64%	98%	607.38	577.25
Multi Family	DVD	176%	100%	101.20	101.20
Multi Family	Freezer	5%	100%	696.60	533.80
Multi Family	Heat Central	22%	25%	5,354.00	3,361.00
Multi Family	Heat Pump	0%	100%	4,278.89	2,876.02
Multi Family	Heat Room	64%	100%	4,123.00	2,588.00
Multi Family	Home Audio System	63%	100%	61.89	61.89
Multi Family	Lighting Exterior	57%	100%	148.13	206.69
Multi Family	Lighting Interior Specialty	100%	100%	190.75	266.16
Multi Family	Lighting Interior Standard	100%	100%	883.77	1,233.17
Multi Family	Microwave	91%	100%	148.18	148.18
Multi Family	Monitor	84%	100%	76.41	76.41
Multi Family	Plug Load Other	100%	100%	319.33	319.33
Multi Family	Refrigerator	103%	100%	634.73	566.34
Multi Family	Set Top Box	109%	100%	262.84	262.84
Multi Family	TV	160%	100%	195.88	195.88
Multi Family	TV Bigscreen	16%	100%	417.02	417.02
Multi Family	Ventilation And Circulation	100%	100%	429.98	335.40
Multi Family	Water Heat	100%	73%	1,973.43	1,692.31

Segment	End Use	Saturation	Electric Fuel Share	Weighted Average UEC - Existing	Weighted Average UEC - New
Single Family	Computer	163%	100%	148.35	148.35
Single Family	Cooking Oven	117%	83%	153.62	153.62
Single Family	Cooking Range	97%	68%	128.20	128.20
Single Family	Cool Central	14%	100%	996.51	871.38
Single Family	Cool Room	6%	100%	527.24	499.87
Single Family	Dehumidifier	2%	100%	710.13	710.13
Single Family	Dryer	99%	82%	709.92	577.25
Single Family	DVD	194%	100%	101.20	101.20
Single Family	Freezer	64%	100%	696.60	533.80
Single Family	Heat Central	73%	10%	9,000.00	5,561.00
Single Family	Heat Pump	5%	100%	7,218.50	5,496.39
Single Family	Heat Room	15%	94%	6,930.00	4,282.00
Single Family	Home Audio System	101%	100%	61.89	61.89
Single Family	Lighting Exterior	100%	100%	310.09	362.66
Single Family	Lighting Interior Specialty	100%	100%	419.28	490.36
Single Family	Lighting Interior Standard	100%	100%	1,850.80	2,164.58
Single Family	Microwave	99%	100%	148.18	148.18
Single Family	Monitor	134%	100%	76.41	76.41
Single Family	Plug Load Other	100%	100%	760.12	760.12
Single Family	Pool Pump	3%	100%	1,470.00	1,470.00
Single Family	Refrigerator	136%	100%	623.38	560.06
Single Family	Set Top Box	137%	100%	262.84	262.84
Single Family	TV	203%	100%	195.88	195.88
Single Family	TV Bigscreen	44%	100%	417.02	417.02
Single Family	Ventilation And Circulation	100%	100%	543.08	470.93
Single Family	Water Heat	100%	42%	3,447.11	2,893.68

Table B.1.8. Residential Gas Saturations, Fuel Shares, and UECs

Segment	End Use	Saturation	Gas Fuel Share	Weighted Average UEC - Existing	Weighted Average UEC - New
Manufactured	Cooking Oven	100%	20%	19.39	19.39
Manufactured	Cooking Range	100%	42%	23.62	23.62
Manufactured	Dryer	100%	21%	38.28	36.55
Manufactured	Heat Central Boiler	3%	100%	614.97	567.35
Manufactured	Heat Central Furnace	93%	100%	467.69	422.49
Manufactured	Water Heat	100%	82%	154.26	190.15
Multi Family	Cooking Oven	105%	31%	19.39	19.39
Multi Family	Cooking Range	91%	39%	23.62	23.62
Multi Family	Dryer	74%	7%	38.28	36.55
Multi Family	Heat Central Boiler	5%	100%	444.47	378.60
Multi Family	Heat Central Furnace	51%	100%	353.66	316.71
Multi Family	Water Heat	100%	82%	136.79	168.81
Single Family	Cooking Oven	115%	20%	19.39	19.39
Single Family	Cooking Range	98%	42%	23.62	23.62
Single Family	Dryer	99%	21%	38.28	36.55
Single Family	Heat Central Boiler	3%	100%	758.82	601.57
Single Family	Heat Central Furnace	93%	96%	616.03	459.91
Single Family	Pool Heat	3%	77%	257.41	257.41
Single Family	Water Heat	100%	85%	234.78	291.05

Table B.1.9. Commercial Electric Saturations, Fuel Shares, and EUIs

Segment	End Use	Saturation	Electric Fuel Share	Weighted Average EUI - Existing	Weighted Average EUI - New
Dry Goods Retail	Computers	100%	100%	0.03	0.03
Dry Goods Retail	Cooling Dx	48%	100%	2.04	1.06
Dry Goods Retail	Heat Pump	10%	100%	3.04	1.55
Dry Goods Retail	HVAC Aux	88%	100%	2.71	2.21
Dry Goods Retail	Lighting Exterior	100%	100%	1.11	1.11
Dry Goods Retail	Lighting Interior	100%	100%	5.33	4.18
Dry Goods Retail	Other Office Equipment	100%	100%	0.04	0.04
Dry Goods Retail	Other Plug Load	100%	100%	0.80	0.80
Dry Goods Retail	Space Heat	78%	24%	2.02	0.45
Dry Goods Retail	Water Heat	100%	68%	0.28	0.28
Grocery	Computers	100%	100%	0.16	0.16
Grocery	Cooking	100%	56%	2.67	2.67
Grocery	Cooling Dx	59%	100%	1.74	1.48
Grocery	Heat Pump	13%	100%	4.75	1.76
Grocery	HVAC Aux	87%	100%	2.14	2.57
Grocery	Lighting Exterior	100%	100%	1.05	1.05
Grocery	Lighting Interior	100%	100%	8.10	6.46
Grocery	Other Office Equipment	100%	100%	0.12	0.12
Grocery	Other Plug Load	100%	100%	1.02	1.02
Grocery	Refrigeration	100%	100%	20.39	20.39
Grocery	Space Heat	73%	11%	2.14	0.19
Grocery	Water Heat	100%	32%	0.30	0.30
Hospital	Computers	100%	100%	0.96	0.96
Hospital	Cooking	100%	32%	0.54	0.54
Hospital	Cooling Chillers	23%	100%	1.75	0.46
Hospital	Cooling Dx	49%	100%	1.91	0.50
Hospital	Heat Pump	7%	100%	3.74	1.64

Segment	End Use	Saturation	Electric Fuel Share	Weighted Average EUI - Existing	Weighted Average EUI - New
Hospital	HVAC Aux	93%	100%	5.37	4.19
Hospital	Lighting Exterior	100%	100%	0.58	0.58
Hospital	Lighting Interior	100%	100%	4.55	2.85
Hospital	Other Office Equipment	100%	100%	0.87	0.87
Hospital	Other Plug Load	100%	100%	2.54	2.54
Hospital	Refrigeration	100%	100%	0.50	0.50
Hospital	Space Heat	87%	48%	1.26	0.69
Hospital	Water Heat	100%	48%	1.36	1.37
Hotel Motel	Computers	100%	100%	0.10	0.10
Hotel Motel	Cooking	100%	8%	0.65	0.65
Hotel Motel	Cooling Chillers	27%	100%	1.59	0.50
Hotel Motel	Cooling Dx	16%	100%	1.74	0.54
Hotel Motel	Heat Pump	27%	100%	4.00	2.10
Hotel Motel	HVAC Aux	90%	100%	3.24	2.02
Hotel Motel	Lighting Exterior	100%	100%	0.66	0.66
Hotel Motel	Lighting Interior	100%	100%	2.87	1.90
Hotel Motel	Other Office Equipment	100%	100%	0.08	0.08
Hotel Motel	Other Plug Load	100%	100%	1.12	1.12
Hotel Motel	Space Heat	57%	53%	4.01	2.55
Hotel Motel	Water Heat	100%	39%	1.70	1.72
Office	Computers	100%	100%	0.52	0.52
Office	Cooling Chillers	23%	100%	1.53	0.57
Office	Cooling Dx	39%	100%	1.67	0.62
Office	Heat Pump	28%	100%	3.22	1.39
Office	HVAC Aux	85%	100%	1.53	1.29
Office	Lighting Exterior	100%	100%	0.51	0.51
Office	Lighting Interior	100%	100%	3.80	2.34
Office	Other Office Equipment	100%	100%	0.41	0.41
Office	Other Plug Load	100%	100%	0.65	0.65
Office	Space Heat	56%	61%	3.21	0.66
Office	Water Heat	100%	82%	0.46	0.46
Other	Computers	100%	100%	0.20	0.20
Other	Cooking	100%	53%	0.39	0.39
Other	Cooling Chillers	7%	100%	1.70	0.77
Other	Cooling Dx	29%	100%	1.85	0.84
Other	Heat Pump	9%	100%	3.13	1.47
Other	HVAC Aux	83%	100%	2.12	1.75
Other	Lighting Exterior	100%	100%	1.23	1.23
Other	Lighting Interior	100%	100%	2.75	1.95
Other	Other Office Equipment	100%	100%	0.22	0.22
Other	Other Plug Load	100%	100%	1.08	1.08
Other	Refrigeration	100%	100%	0.20	0.20
Other	Space Heat	73%	44%	2.62	0.55
Other	Water Heat	100%	60%	0.37	0.37
Restaurant	Computers	100%	100%	0.13	0.13
Restaurant	Cooking	100%	18%	9.42	9.42
Restaurant	Cooling Dx	51%	100%	4.16	1.58
Restaurant	Heat Pump	14%	100%	5.07	2.20
Restaurant	HVAC Aux	89%	100%	3.57	2.84
Restaurant	Lighting Exterior	100%	100%	2.36	2.36
Restaurant	Lighting Interior	100%	100%	5.71	3.23
Restaurant	Other Office Equipment	100%	100%	0.23	0.23
Restaurant	Other Plug Load	100%	100%	1.39	1.39
Restaurant	Refrigeration	100%	100%	5.50	5.50

Segment	End Use	Saturation	Electric Fuel Share	Weighted Average EUI - Existing	Weighted Average EUI - New
Restaurant	Space Heat	76%	12%	1.35	0.31
Restaurant	Water Heat	100%	38%	8.63	8.53
School	Computers	100%	100%	0.47	0.47
School	Cooking	100%	55%	0.22	0.22
School	Cooling Chillers	25%	100%	0.33	0.15
School	Cooling Dx	21%	100%	0.36	0.17
School	Heat Pump	25%	100%	2.82	1.22
School	HVAC Aux	99%	100%	1.32	0.89
School	Lighting Exterior	100%	100%	0.76	0.76
School	Lighting Interior	100%	100%	2.73	1.96
School	Other Office Equipment	100%	100%	0.25	0.25
School	Other Plug Load	100%	100%	0.26	0.26
School	Refrigeration	100%	100%	0.50	0.50
School	Space Heat	74%	9%	5.67	1.84
School	Water Heat	100%	34%	1.42	1.42
University	Computers	100%	100%	0.47	0.47
University	Cooking	100%	55%	0.42	0.42
University	Cooling Chillers	4%	100%	0.33	0.15
University	Cooling Dx	5%	100%	0.36	0.17
University	Heat Pump	1%	100%	2.82	1.22
University	HVAC Aux	96%	100%	1.32	0.89
University	Lighting Exterior	100%	100%	0.76	0.76
University	Lighting Interior	100%	100%	3.79	2.72
University	Other Office Equipment	100%	100%	0.25	0.25
University	Other Plug Load	100%	100%	0.26	0.26
University	Refrigeration	100%	100%	0.50	0.50
University	Space Heat	95%	9%	5.67	1.84
University	Water Heat	100%	34%	1.42	1.42
Warehouse	Computers	100%	100%	0.06	0.06
Warehouse	Cooling Chillers	4%	100%	0.17	0.21
Warehouse	Cooling Dx	14%	100%	0.19	0.23
Warehouse	Heat Pump	6%	100%	0.76	0.56
Warehouse	HVAC Aux	52%	100%	0.58	0.56
Warehouse	Lighting Exterior	100%	100%	0.28	0.28
Warehouse	Lighting Interior	100%	100%	2.50	1.67
Warehouse	Other Office Equipment	100%	100%	0.05	0.05
Warehouse	Other Plug Load	100%	100%	0.41	0.41
Warehouse	Refrigeration	100%	100%	0.05	0.05
Warehouse	Space Heat	48%	26%	1.13	0.37
Warehouse	Water Heat	100%	82%	0.19	0.19

Table B.1.10. Commercial Gas Saturations, Fuel Shares, and EUIs

Segment	End Use	Saturation	Gas Fuel Share	Weighted Average EUI - Existing	Weighted Average EUI - New
Dry Goods Retail	Other	100%	100%	0.00	0.00
Dry Goods Retail	Space Heat Boiler	9%	100%	0.07	0.04
Dry Goods Retail	Space Heat Furnace	83%	81%	0.10	0.06
Dry Goods Retail	Water Heat	100%	40%	0.03	0.03
Grocery	Cooking	100%	54%	0.19	0.19
Grocery	Other	100%	100%	0.00	0.00
Grocery	Space Heat Boiler	1%	100%	0.24	0.05
Grocery	Space Heat Furnace	96%	88%	0.34	0.07
Grocery	Water Heat	100%	80%	0.12	0.13
Hospital	Cooking	100%	67%	0.04	0.04
Hospital	Other	100%	100%	0.00	0.00
Hospital	Pool Heat	100%	3%	0.03	0.02
Hospital	Space Heat Boiler	35%	85%	0.33	0.32
Hospital	Space Heat Furnace	56%	78%	0.48	0.46
Hospital	Water Heat	100%	64%	0.41	0.42
Hotel Motel	Cooking	100%	98%	0.08	0.08
Hotel Motel	Other	100%	100%	0.00	0.00
Hotel Motel	Pool Heat	100%	44%	0.11	0.06
Hotel Motel	Space Heat Boiler	57%	69%	0.17	0.13
Hotel Motel	Space Heat Furnace	31%	44%	0.25	0.18
Hotel Motel	Water Heat	100%	77%	0.31	0.31
Office	Other	100%	100%	0.00	0.00
Office	Space Heat Boiler	28%	66%	0.22	0.11
Office	Space Heat Furnace	57%	41%	0.32	0.16
Office	Water Heat	100%	34%	0.03	0.04
Other	Cooking	100%	49%	0.04	0.04
Other	Other	100%	100%	0.00	0.00
Other	Space Heat Boiler	25%	100%	0.15	0.08
Other	Space Heat Furnace	68%	73%	0.21	0.11
Other	Water Heat	100%	58%	0.03	0.03
Restaurant	Cooking	100%	82%	1.61	1.61
Restaurant	Other	100%	100%	0.00	0.00
Restaurant	Space Heat Boiler	0%	100%	0.04	0.03
Restaurant	Space Heat Furnace	92%	96%	0.06	0.05
Restaurant	Water Heat	100%	67%	0.43	0.44
School	Cooking	100%	46%	0.02	0.02
School	Other	100%	100%	0.00	0.00
School	Pool Heat	100%	13%	0.17	0.03
School	Space Heat Boiler	75%	98%	0.12	0.10
School	Space Heat Furnace	23%	83%	0.17	0.14
School	Water Heat	100%	79%	0.06	0.06
University	Cooking	100%	46%	0.05	0.05
University	Other	100%	100%	0.00	0.00
University	Pool Heat	100%	13%	0.14	0.05
University	Space Heat Boiler	75%	98%	0.23	0.20
University	Space Heat Furnace	23%	83%	0.34	0.29
University	Water Heat	100%	79%	0.10	0.10
Warehouse	Other	100%	100%	0.00	0.00
Warehouse	Space Heat Boiler	1%	100%	0.09	0.05
Warehouse	Space Heat Furnace	65%	84%	0.13	0.07
Warehouse	Water Heat	100%	20%	0.02	0.02

Table B.1.11. Industrial Electric End Use Percents by Segment

End Use	Chemical Mfg	Computer Electronic Mfg	Electrical Equipment Mfg	Fabricated Metal Products	Food Mfg	Industrial Machinery	Misc. Mfg	Nonmetallic Mineral Products	Paper Mfg	Petroleum Coal Products	Plastics Rubber Products	Primary Metal Mfg	Printing Related Support	Transport. Equipment Mfg	Waste-water	Water	Wood Product Mfg
Fans	7%	4%	5%	7%	3%	6%	5%	8%	15%	12%	7%	4%	7%	4%	0%	10%	10%
HVAC	7%	28%	15%	10%	8%	23%	25%	6%	5%	3%	11%	3%	19%	19%	0%	0%	5%
Indirect Boiler	2%	1%	0%	0%	2%	0%	2%	0%	4%	1%	1%	0%	1%	1%	0%	0%	1%
Lighting	4%	12%	12%	9%	7%	15%	17%	5%	4%	2%	9%	3%	12%	15%	2%	2%	7%
Motors Other	16%	8%	10%	19%	17%	18%	20%	22%	30%	34%	20%	18%	20%	10%	0%	10%	29%
Other	3%	8%	4%	3%	4%	4%	6%	3%	2%	1%	4%	1%	6%	5%	14%	14%	4%
Process Aircomp	17%	1%	11%	8%	3%	7%	5%	9%	4%	14%	8%	4%	8%	10%	66%	0%	12%
Process Cool	9%	11%	5%	4%	27%	3%	6%	3%	2%	6%	9%	1%	6%	6%	0%	0%	1%
Process Electro Chemical	10%	1%	0%	2%	0%	0%	0%	0%	1%	0%	0%	32%	0%	1%	0%	0%	1%
Process Heat	5%	11%	23%	20%	6%	7%	10%	22%	3%	0%	16%	29%	3%	13%	0%	0%	7%
Process Other	1%	8%	3%	3%	1%	2%	1%	3%	1%	0%	0%	1%	0%	3%	0%	0%	0%
Process Refrig	5%	1%	3%	3%	13%	3%	0%	4%	4%	6%	3%	0%	4%	3%	0%	0%	5%
Pumps	16%	7%	10%	12%	7%	11%	3%	14%	24%	21%	13%	3%	13%	10%	18%	64%	18%

Table B.1.12. Industrial Gas End Use Percents by Segment

End Use	Chemical Mfg	Computer Electronic Mfg	Electrical Equipment Mfg	Fabricated Metal Products	Food Mfg	Industrial Machinery	Misc. Mfg	Nonmetallic Mineral Products	Paper Mfg	Petroleum Coal Products	Plastics Rubber Products	Primary Metal Mfg	Printing Related Support	Transport. Equipment Mfg	Waste-water	Water	Wood Product Mfg
HVAC	2%	40%	21%	15%	5%	40%	55%	4%	3%	1%	20%	6%	17%	41%	0%	0%	8%
Indirect Boiler	60%	47%	18%	16%	58%	27%	18%	5%	62%	34%	47%	9%	12%	20%	0%	0%	30%
Other	1%	3%	2%	2%	0%	1%	0%	2%	3%	0%	3%	11%	8%	0%	100%	100%	0%
Process Heat	28%	7%	57%	67%	34%	32%	23%	87%	28%	61%	26%	71%	62%	36%	0%	0%	58%
Process Other	9%	2%	3%	0%	4%	0%	5%	2%	4%	5%	5%	3%	0%	2%	0%	0%	4%

Appendix B.2: Measure Descriptions

This section contains a brief description of each measure used in the energy-efficiency potential.

Appendix B.2: Measure Descriptions

1. Residential Electric Retrofit Measure Descriptions

Heating and Cooling

Air-to-Air Heat Exchanger. This measure mechanically ventilates homes in cold climates. During the winter, it transfers heat from the air being exhausted to outside air entering the home. Between 50 and 80 percent of the heat normally lost in exhausted air is returned to the house. Air-to-air heat exchangers can be installed as part of a central heating and cooling system or in walls or windows. Wall- and window-mounted units resemble air conditioners and ventilate one room or area.[1]

Canned Lighting Air-Tight Sealing. Proper sealing around recessed lighting fixtures prevents unwanted heat loss through these air spaces due to air pressure differentials in conditioned and unconditioned spaces in homes. The baseline is no sealing around lighting fixtures.

Ceiling Fan. ENERGY STAR®-qualified ceiling fans have improved motor and blade designs that allow the user to increase the thermostat set point by a few degrees, which decreases the AC cooling runtime yet still feels at least 5° cooler. The fans do not create cooler temperatures. This measure does not include light fixtures; all savings are associated with installating an ENERGY STAR® ceiling fan where no prior fan was present.

Ceiling Insulation. This measure represents an increase in R-value. Added ceiling insulation increases the building's thermal performance and brings the resistance value up to and past code, depending on the building vintage. Table B-2.1 summarizes the different resistance values compared in the measure.

Table B-2.1. Ceiling R-Value Comparison

Measure Insulation	Baseline Insulation
R-49	R-0
R-49	R-10
R-60	R-49

Check Me! O&M Tune-up. Performing a system tune-up and regular maintenance ensures that the refrigerant charge and airflow through the evaporator coil (two factors that affect system efficiency) are properly tested and correctly adjusted. Maintenance includes changing filters and cleaning the coils to maintain the overall performance and efficiency of the unit.

Construction, ICF. Building a concrete home with insulating concrete forms (ICFs) saves energy. Greater insulation, tighter construction, and the temperature-moderating mass of the walls conserve heating and cooling energy much better than conventional wood-frame walls.

Construction, SIP. A structural insulated panel (SIP) uses continuous foam insulation throughout the panel, which provides excellent energy efficiency and low levels of air infiltration. The baseline is standard wood framing.

[1] http://cipco.apogee.net/res/reevhex.asp

Cool Roofs. ENERGY STAR®-qualified cool roofs have reflective coating and can decrease roof surface temperatures by up to 100º F, thereby decreasing the amount of heat transferred into a building. Cool roofs can reduce the amount of air conditioning needed in buildings and can reduce peak cooling demand by 10 percent to 15 percent.[2] This could be considered a passive measure.

Dehumidifier, Whole House. A high capacity whole house dehumidifier can stand alone in a basement or be ducted into an existing central air conditioning system. These units remove moisture content from the air and prevent mold, mildew, and damp conditions.

Doors. Composite or steel doors with a foam core increase overall insulation, slowing heat loss. This measure includes adding a thermal door with a resistance value of R-5 or R-11 to houses without a thermal or storm door (R-2.5).

Doors, Weatherization. Mounting weather stripping to the bottom of an exterior door minimizes infiltration door sweep. This type of weatherization consists of an extruded aluminum strip holding a flexible vinyl strip that blocks the air space between the door frame and the door. The baseline for this measure is no weather stripping.

Duct Fittings, Leak-Proof. The majority of duct leakage in residential HVAC systems is due to improperly sealed connections between ductwork and fittings. Even when duct connections are initially well-sealed, leakage may increase over time.

Duct Insulation Upgrade. The addition of insulation around ducts in a heating system reduces heat loss to unconditioned spaces. This measure improves existing duct insulation from R-4 to R-8.

Duct Location. Locating ducts in conditioned spaces reduces wasted heat loss.[3] Many homes have ducts that run through unconditioned areas (such as attics, garages, crawlspaces, and basements) for convenience and practical reasons. Ducts in unconditioned areas lose energy because of the temperature difference between conditioned air in the ducts and the surrounding space.

Duct Sealing. Duct sealing cost-effectively saves energy, improves air and thermal distribution (comfort and ventilation), and reduces cross contamination between different zones in the building (such as smoking vs. non-smoking, bio-aerosols, and localized indoor air pollutants).

Duct Sealing, Aerosol-Based. This aerosol technology seals duct holes up to 1/4-inch in diameter by spraying atomized latex aerosol into the inside of a pressurized duct system. A significant amount of energy use in residential buildings is associated with duct losses due to leakage.

Fan, Whole House. A whole house fan is a simple and inexpensive method of cooling a house when outdoor temperatures are lower than indoor temperatures. The fan draws cool outdoor air inside the home through open windows and exhausts hot indoor air through the attic to the outside.

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2 http://www.aceee.org/consumer/cooling

3 http://www.toolbase.org/pdf/techinv/ductsinconditionedspace_techspec.pdf

Floor Insulation. The addition of floor insulation increases the overall resistance value of a home and slows heat transfer from the basement to the upper levels. Table B-2.2 summarizes the different resistance values compared in the measure.

Table B-2.2. Floor R-Value Comparison

Measure Insulation	Baseline Insulation
R-30	R-0
R-38	R-30

Green Roof. The added mass and thermal resistance of green roofs reduces the heating and cooling loads of the building. These roofs reduce the ambient temperature of the roof surface and slow the transfer of heat into the building, which reduces cooling costs. They also add insulation to the roof structure, reducing heating requirements in the winter.[4] Additionally, they reduce the ambient temperature around the roof, which decreases the building's urban heat island effect.

HVAC Unit, Proper Sizing. Correctly-sized HVAC systems operate for longer periods of time (instead of cycling on and off frequently), which results in optimum equipment operating efficiency and better control.[5]

Infiltration Control (Caulk, Weather Strip, etc.) ***Blower Door Test.*** Sealing air leaks in windows, doors, the roof, crawlspaces, and outside walls prevents drafts and reduces overall heating and cooling losses.

Radiant Barrier, Ceiling. A radiant barrier generally consists of a thin piece of aluminum installed in a ceiling that reduces the solar heat gain from the sun during the summer and traps heat in during the winter. These barriers reduce heat transfer between the air space of the roof deck and the attic floor.

Smart Siting. This measure, which applies only to new construction, entails optimizing the building orientation to minimize the heating and cooling load on the HVAC system.

Solar Attic Fan. This measure provides forced attic fan ventilation, which reduces residential heat gains from the ceiling. Because this fan is solar-powered, it runs conveniently when the sun is shining. The baseline uses passive ventilation without a fan.

Thermal Shell, Infiltration at 0.2 ACH w/ HRV. Heat recovery ventilation (HRV) provides fresh air and improved climate control, while also saving energy by reducing the heating (or cooling) requirements of a building. Combining this feature with better infiltration control (0.2 air changes per hour) minimizes the energy needed to maintain a healthy level of fresh air and reduces heat loss due to air leakage.

Thermostat, Multi-Zone. A multi-zone programmable thermostat automatically controls the set point temperatures for multiple areas (rooms or zones), ensuring the HVAC system is not running during low-occupancy hours. The baseline for this measure is a programmable thermostat with central control only.

[4] http://www.toolbase.org/Technology-Inventory/Roofs/green-roofs
[5] http://www.toolbase.org/Technology-Inventory/HVAC/hvac-sizing-practice

Wall Insulation, 2x4 and 2x6. The presence of wall insulation slows the transfer of heat and reduces the heating and cooling loads in a house. Table B-2.3 compares the different insulation levels for 2x4 and 2x6 framing.

Table B-2.3. Wall Insulation Measures

Construction Type	Measure Insulation	Baseline Insulation
2x4	R-13	R-0
2x6	R-21	R-0
	R-21 + R-5 Sheathing	R-21

Windows. This measure provides increased building performance by reducing the U-value in existing and new construction windows, as shown in Table B-2.4.

Table B-2.4. High Efficiency Window Measures

Measure U-Value	Baseline U-Value
0.30	Single Pane
0.30	Double Pane
0.25	0.30
0.22	0.30

Window Overhang. A window overhang shades windows, which reduces solar heat gains and decreases the overall cooling load on the home.

Lighting

Daylighting Controls (Photocell), Indoor/Outdoor. Photocells adjust lighting levels according to the level of daylight the room is receiving. The baseline is no daylighting controls.

Occupancy Sensor. An occupancy sensor turns off the lights after a space is unoccupied for a designated amount of time. The lights turn on again when the sensor detects a person in the space.

Time Clock, Exterior Lighting. This technology allows users to program times for lights outside the residence to be turned on and off automatically. Programmed exterior lighting saves energy by ensuring that lights are not left on during the daytime.

Water Heat

Clothes Washer, ENERGY STAR®. This clothes washer uses less energy and water than regular washers.[6] We compared three levels of efficiency—in units of the corresponding Modified Energy Factor (MEF) —for this measure, as shown in Table B-2.5. The baseline MEF represents the average MEF of non-ENERGY STAR®-qualified models.

[6] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CW

Table B-2.5. Clothes Washer Modified Energy Factor Comparisons

Measure Level	Measure MEF	Baseline MEF
ENERGY STAR	2.0-2.19	1.66
CEE Tier 2	2.2-2.45	1.66
CEE Tier 3	2.46 +	1.66

Dishwasher, ENERGY STAR®. This dishwasher uses advanced technology to clean dishes with less water and energy. The efficient model uses less than 307 kWh/year (including standby consumption) and less than 5 gallons of water per cycle. The baseline model consumes 340 kWh/year.

Drain Water Heat Recovery. Also called gravity film heat exchanges, this device recovers heat energy from domestic drain water, which is then used to pre-heat cold water entering the hot water tank. This minimizes the temperature difference between the heating set point and the temperature of the water entering the system.

Hot Water Pipe Insulation. The addition of R-4 insulation around pipes decreases heat loss. The baseline is a hot water pipe without insulation.

Low-Flow Showerheads. Low-flow showerheads mix water and air to reduce the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen in the showerhead. This measure reduces a showerhead's flow rate from 2.5 gallons per minute to 2.0 gallons per minute.

Water Heater Tank Blanket. The installation of R-5 insulation on older models of water heaters helps reduce standby losses.

Water Heater Thermostat Setback. This measure generates savings by reducing the thermostat set point temperature from 135° to 120°F. The set point temperature on hot water systems is often set higher than necessary.

Appliances

Refrigerator/Freezer, Removal of Secondary. This refers to environmentally friendly disposal of unneeded or inefficient appliances such as secondary refrigerators or stand-alone freezers.

Stand-Alone Freezer, Removal. The removal of stand-alone freezers is beneficial because of the inefficient use of energy by these appliances. Proper disposal is required due to their use of hazardous materials such as Freon and CFCs.

Plug Load

1-Watt Standby Power. Standby power is the electricity used by small electrical equipment or appliances when they are switched off or are not performing their main function. Minimizing this loss to one watt or less can reduce this standby energy consumption by more than 50 percent.

Battery Charger, ENERGY STAR®. On average, these battery chargers use 35 percent less energy than conventional battery chargers, which draw as much as five to 20 times more energy than is actually stored in the battery (even when not actively charging a product). Battery

charging systems recharge a variety of cordless products, including power tools, small household appliances, and electric shavers. The baseline is a standard battery charger.[7]

Office Copier, ENERGY STAR®. These copy machines are 40 percent more efficient than standard office copy machines.[8]

Office Printer, ENERGY STAR®. These printers are 40 percent more efficient than standard printers.

Smart Strip. Power strips with an occupancy sensor will turn power to all devices plugged into the strip on and off, such as computers, desk lights, and audio equipment, based on occupancy within the work area.

Other (Pool)

Pool Pump Timers. A pool pump with a timer set to run during off-peak times (starting after 8:00 p.m. and cycling off before 10:00 a.m.) reduces energy costs. Cycling the pumps will further reduce monthly costs. The baseline is a continuously running pump.

7 http://www.energystar.gov/index.cfm?c=battery_chargers.pr_battery_chargers

8 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=IEQ

2. Residential Electric Equipment Measure Descriptions

Heating and Cooling

Air or Ground Source Heat Pump (ASHP or GSHP). Electric heat pumps move heat to or from the air or the ground to cool and heat a home. Table B-2.6 displays the different efficiency levels we compared for this measure. The baseline size is the same as the measure size.

Table B-2.6. Heat Pump SEER/HSPF Comparisons

Measure Efficiency	Baseline SEER & HSPF
ASHP 14 SEER, 8.5 HSPF	ASHP 13 SEER, 7.7 HSPF
ASHP 16 SEER, 8.8 HSPF	
GSHP 16.2 EER, 8.8 HSPF	

Central Cooling. This measure consists of several different air conditioner technology/efficiency levels, as summarized in Table B-2.7. The baseline size is the same as the measure size.

Table B-2.7. Central AC SEER Comparison

Measure	Baseline SEER
14 SEER	13 SEER
16 SEER	
18 SEER	

Conversion Baseboard Heating to Ductless Heat Pump (DHP). DHPs move heat to or from the air to cool and heat a home without the need for costly ductwork. This method of heating has a HSPF value of 7.7, consuming less energy than baseboard heating that has a HSPF value of 1.

Conversion Electric Furnace to Air Source Heat Pump (ASHP). ASHPs move heat to or from the air to cool and heat a home. This method of heating has a HSPF value of 7.7, consuming less energy than an electric furnace that has a HSPF value of 1.

Motor, ECM and ECM-VFD. Electronically commutated motors (ECMs) and ECMs with variable frequency drives (VFD) consume less power than the standard motor used in ventilation and circulation systems.

Room Air Conditioner (Room AC), 10,000 BTU/HR. ENERGY STAR®-qualified room ACs use less energy than conventional models through improved energy performance and timers, which allow for better temperature control. ENERGY STAR®-qualified room air conditioners have an efficiency rating of 10.8 EER, compared to standard models, which have an efficiency rating of 9.8 EER.

Room AC Conversion to Ductless Heat Pump (DHP). DHPs use less energy than room AC while also producing less noise and requiring no costly ductwork. DHPs have an efficiency of 13 SEER, replacing a room AC unit with an efficiency rating of 9.8 EER.

Lighting

Compact Fluorescent Lights (CFL), 13, 20, and 25 Watt. Specialty 3-way CFLs use 73 percent to 83 percent less energy and have a longer life than incandescent 3-way, 60, 75, or 150 watt light bulbs.

Compact Fluorescent Lights (CFL), 15 Watt. Standard CFLs use 62 percent less energy than the Energy Independence and Security Act (EISA) 43 watt incandescent bulbs. The baseline for this measure reflects the 2012-2014 changes to accommodate the EISA of 2007, reaching a baseline value of 43 watts.

Compact Fluorescent Lights (CFL), 17 Watt Flood Light. Exterior CFLs use 62 percent less energy than EISA 45 watt incandescent bulbs. The baseline for this measure reflects the 2012-2014 changes to accommodate the EISA of 2007, reaching a baseline value of 45 watts.

Light emitting diodes (LEDs), 7 Watts. LEDs are solid-state devices that convert electricity to light, use 80 percent less energy, and have a long life. The baseline for this measure reflects the 2012-2014 changes to accommodate the EISA of 2007, reaching a baseline value of 43 watts.

Water Heat

Water Heater, Heat Pump. This measure moves heat from a warm reservoir (such as air) into the hot water system.[9] This measure assumes an energy factor (EF) of 2.2, an increase from the standard EF of 0.92.

Water Heater, Storage. A high-efficiency water heater reduces standby loss and is more efficient than a standard electric water heater. This measure assumes an EF of 0.95, an increase from the standard EF of 0.92.

Appliances

Cooking Oven, High Efficiency. A high-efficiency cooking oven uses fans to circulate heat evenly throughout the oven (convection heat), operating at lower temperatures and achieving cook times quicker than a standard oven. The baseline is a standard oven.

Dryer, High Efficiency. A high-efficiency dryer has features (such as moisture sensors) that minimize energy usage while retaining performance. The efficiency levels for this measure are shown in Table B-2.8.

Table B-2.8. Dryer EF Comparison

Measure	Baseline
3.08 EF	
3.19 EF	3.01 EF
3.30 EF	

Freezer, ENERGY STAR. ENERGY STAR® -qualified freezers use 10 percent less energy than standard models due to improvements in insulation and compressors.

[9] Description source: U.S. Department of Energy; http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=12840

Microwave, High Efficiency. High-efficiency microwaves use more efficient power supplies, fans, magnetron, and reflective surfaces that provide energy savings compared to conventional microwaves.

Refrigerator, ***ENERGY STAR.*** ENERGY STAR®-qualified refrigerators use 20 percent less energy than standard models, due to improvements in insulation and compressors.

Plug Load

Computer, ENERGY STAR. ENERGY STAR® computers consume less than 2 watts in sleep and off modes, and are more efficient than conventional units in idle mode, resulting in 30 percent to 65 percent energy savings.

Dehumidifier, ENERGY STAR. ENERGY STAR®-qualified models have more efficient refrigeration coils, compressors, and fans than conventional models, and use less energy to remove moisture. Qualified models remove the same amount of moisture as a similarly-sized standard unit, but use 10 percent to 20 percent less energy. The baseline for this measure is a standard dehumidifier.[10]

DVD, ENERGY STAR. ENERGY STAR®-qualified DVD products meeting the new requirements use up to 60 percent less energy than standard models.[11] ENERGY STAR® DVD players use as little as one-fourth of the energy of standard models in the off mode. The baseline for this measure is a standard DVD player.

Home Audio System, ENERGY STAR. According to ENERGY STAR® products, a 6 percent energy savings can be achieved over standard home audio systems.[12]

Monitor, ENERGY STAR. ENERGY STAR® monitors feature: (1) on mode, where the maximum allowed power varies based on the computer monitor's resolution; (2) sleep mode, where computer monitors must consume 2 watts or less; and, (3) off mode, where computer monitors must consume 1 watt or less. The baseline equipment does not include these features.[13]

Set Top Box, ENERGY STAR. Set top boxes that have earned the ENERGY STAR® rating are at least 30 percent more efficient than conventional models.[14] The baseline measure is a standard receiver.

TV, ENERGY STAR. ENERGY STAR®-qualified TVs use roughly 40 percent less energy than standard units.[15] ENERGY STAR® models are required to consume no more than 1 watt while in sleep mode. The baseline is a standard television, which generally consumes more than 3 watts when turned off.

[10] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DE
[11] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DP
[12] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=HA
[13] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.ShowProductGroup&pgw_code=MO
[14] http://www.energystar.gov/index.cfm?c=settop_boxes.settop_boxes
[15] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=TV

Other (Pool)

Pool Pumps, Two Speed Motor. This measure enables a pool pump motor to operate at high and low speeds as opposed to constantly running at full power. The baseline for this measure is a standard one speed motor.

Pool Pumps, VSD. This measure enables a pool pump motor to operate at variable speeds as opposed to constantly running at full power. The baseline for this measure is a standard one speed motor.

3. Residential Gas Retrofit Measure Descriptions

Heating

Air-to-Air Heat Exchanger. An air-to-air heat exchanger mechanically ventilates homes in cold climates. During the winter, it transfers heat from the air being exhausted to the fresh, outside air entering the home. Between 50 and 80 percent of the heat normally lost in exhausted air is returned to the house. Air-to-air heat exchangers can be installed as part of a central heating and cooling system or in walls or windows. Wall- and window-mounted units resemble air conditioners and will ventilate one room or area.[16]

Canned Lighting Air-Tight Sealing. Proper sealing around recessed lighting fixtures prevents unwanted heat loss through these air spaces due to air pressure differentials in conditioned and unconditioned spaces in homes. The baseline is no sealing around lighting fixtures.

Ceiling Insulation. This measure represents an increase in R-value. Added ceiling insulation increases the building's thermal performance and brings the resistance value up to and past code, depending on the building vintage. Table B-2.9 summarizes the different resistance values compared in the measure.

Table B-2.9. Ceiling R-Value Comparison

Measure Insulation	Baseline Insulation
R-49	R-0
R-49	R-10
R-60	R-49

Construction, ICF. Building a concrete home with insulating concrete forms (ICFs) saves energy. Greater insulation, tighter construction, and the temperature-moderating mass of the walls conserve heating and cooling energy much better than conventional wood-frame walls.

Construction, SIP. A structural insulated panel (SIP) uses continuous foam insulation throughout the panel, which provides excellent energy efficiency and low levels of air infiltration. The baseline is standard wood framing.

Doors. Composite or steel doors with a foam core increase overall insulation, slowing heat loss. This measure includes adding a thermal door with a resistance value of R-5 or R-11 to houses without a thermal or storm door (R-2.5).

Doors, Weatherization. Mounting weather stripping to the bottom of an exterior door minimizes infiltration door sweep. This type of weatherization consists of an extruded aluminum strip holding a flexible vinyl strip that blocks the air space between the door frame and the door. The baseline for this measure is no weather stripping.

Duct Fittings, Leak-Proof. The majority of duct leakage in residential HVAC systems is due to improperly sealed connections between ductwork and fittings. Even when duct connections are initially well-sealed, leakage may increase over time.

[16] http://cipco.apogee.net/res/reevhex.asp

Duct Insulation Upgrade. The addition of insulation around ducts in a heating system reduces heat loss to unconditioned spaces. This measure improves existing duct insulation from R-4 to R-8.

Duct Location. Locating ducts in conditioned spaces reduces wasted heat loss.[17] Many homes have ducts that run through unconditioned areas (such as attics, garages, crawlspaces, and basements) for convenience and practical reasons. Ducts in unconditioned areas lose energy because of the temperature difference between conditioned air in the ducts and the surrounding space.

Duct Sealing. Duct sealing cost-effectively saves energy, improves air and thermal distribution (comfort and ventilation), and reduces cross contamination between different zones in the building (such as smoking vs. non-smoking, bio-aerosols, and localized indoor air pollutants).

Duct Sealing, Aerosol-Based. This aerosol technology seals duct holes up to 1/4-inch in diameter by spraying atomized latex aerosol into the inside of a pressurized duct system. A significant amount of energy use in residential buildings is associated with duct losses due to leakage.

Floor Insulation. The addition of floor insulation increases the overall resistance value of a home and slows heat transfer from the basement to the upper levels. Table B-2.10 summarizes the different resistance values compared in the measure.

Table B-2.10. Floor R-Value Comparison

Measure Insulation	Baseline Insulation
R-30	R-0
R-38	R-30

Green Roof. The added mass and thermal resistance of green roofs reduces the heating and cooling loads of the building. These roofs reduce the ambient temperature of the roof surface and slow the transfer of heat into the building, which reduces cooling costs. They also add insulation to the roof structure, reducing heating requirements in the winter.[18] Additionally, they reduce the ambient temperature around the roof, which decreases the building's urban heat island effect.

HVAC Unit, Proper Sizing. Correctly-sized HVAC systems operate for longer periods of time (instead of cycling on and off frequently), which results in optimum equipment operating efficiency and better control.[19]

Infiltration Control (Caulk, Weather Strip, etc.) Blower Door Test. Sealing air leaks in windows, doors, the roof, crawlspaces, and outside walls prevents drafts and reduces overall heating and cooling losses.

Radiant Barrier, Ceiling. A radiant barrier generally consists of a thin piece of aluminum installed in a ceiling that reduces the solar heat gain from the sun during the summer and traps

[17] http://www.toolbase.org/pdf/techinv/ductsinconditionedspace_techspec.pdf
[18] http://www.toolbase.org/Technology-Inventory/Roofs/green-roofs
[19] http://www.toolbase.org/Technology-Inventory/HVAC/hvac-sizing-practice

heat in during the winter. These barriers reduce heat transfer between the air space of the roof deck and the attic floor.

Smart Siting. This measure, which applies only to new construction, entails optimizing the building orientation to minimize the heating and cooling load on the HVAC system.

Thermal Shell, Infiltration at 0.2 ACH w/ HRV. Heat recovery ventilation (HRV) provides fresh air and improved climate control, while also saving energy by reducing the heating (or cooling) requirements of a building. Combining this feature with better infiltration control (0.2 air changes per hour) minimizes the energy needed to maintain a healthy level of fresh air and reduces heat loss due to air leakage.

Thermostat, Multi-Zone. A multi-zone programmable thermostat automatically controls the set point temperatures for multiple areas (rooms or zones), ensuring the HVAC system is not running during low-occupancy hours. The baseline for this measure is a programmable thermostat with central control only.

Wall Insulation, 2x4 and 2x6. The presence of wall insulation slows the transfer of heat and reduces the heating and cooling loads in a house. Table B-2.11 compares the different insulation levels for 2x4 and 2x6 framing.

Table B-2.11. Wall Insulation Measures

Construction Type	Measure Insulation	Baseline Insulation
2x4	R-13	R-0
2x6	R-21	R-0
	R-21 + R-5 Sheathing	R-21

Windows. This measure provides increased building performance by reducing the U-value in existing and new construction windows, as shown in Table B-2.12.

Table B-2.12. High Efficiency Window Measures

Measure U-Value	Baseline U-Value
0.30	Single Pane
0.30	Double Pane
0.25	0.30
0.22	0.30

Water Heat

Clothes Washer, ENERGY STAR®. This clothes washer uses less energy and water than regular washers.[20] Three levels of efficiency—in units of the corresponding Modified Energy Factor (MEF) —are shown in Table B-2.13. The baseline MEF represents the average MEF of non-ENERGY STAR®-qualified models.

[20] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CW

Table B-2.13. Clothes Washer Modified Energy Factor Comparisons

Measure Level	Measure MEF	Baseline MEF
ENERGY STAR	2.0-2.19	1.66
CEE Tier 2	2.2-2.45	1.66
CEE Tier 3	2.46 +	1.66

Dishwasher, ENERGY STAR®. This dishwasher uses advanced technology to clean dishes with less water and energy. The efficient model uses less than 307 kWh/year (including standby consumption) and less than 5 gallons of water per cycle. The baseline model consumes 340 kWh/year.

Drain Water Heat Recovery. Also called gravity film heat exchanges, this device recovers heat energy from domestic drain water, which is then used to pre-heat cold water entering the hot water tank. This minimizes the temperature difference between the heating set point and the temperature of the water entering the system.

Hot Water Pipe Insulation. The addition of R-4 insulation around pipes decreases heat loss. The baseline is a hot water pipe without insulation.

Low-Flow Showerheads. Low-flow showerheads mix water and air to reduce the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen in the showerhead. This measure reduces a showerhead's flow rate from 2.5 gallons per minute to 2.0 gallons per minute.

Water Heater Tank Blanket. The installation of R-5 insulation on older models of water heaters helps reduce standby losses.

Water Heater Thermostat Setback. This measure generates savings by reducing the thermostat set point temperature from 135° to 120°F. The set point temperature on hot water systems is often set higher than necessary.

4. Residential Gas Equip Measure Descriptions

Heating

Gas Boiler. Boilers are classified as condensing or non-condensing. Condensing boilers condense the flue gas and water vapor, extracting useful heat and improving the boiler efficiency. This measure compares several boilers with different thermal efficiencies and is applicable to both new and existing construction. The overall efficiency of the boiler is defined as the gross energy output divided by the energy input, and is affected by combustion efficiency, standby losses, cycling losses, and heat transfer. Table B-2.14 displays the measure and baseline thermal efficiencies.

Table B-2.14. Gas Boiler Efficiency Comparison

Measure AFUE	Baseline AFUE
90%	82%
94%	

Gas Furnace. Improvements in furnace technology, such as new ignition and heat exchange design, have led to increased furnace efficiency. The AFUE levels considered in this measure are shown in Table B-2.15.

Table B-2.15. Gas Furnace Efficiency Comparison

Measure AFUE	Baseline AFUE
90%	80%
95%	

Water Heat

Water Heater, Storage. A high-efficiency water heater reduces standby loss and is more efficient than a standard electric water heater. The energy factors (EF) considered in this measure are shown in Table B-2.16.

Table B-2.16. Water Heater EF Comparison

Measure EF	Baseline EF
0.67	0.62
0.80	

Water Heater, Tankless. This measure provides hot water at a preset temperature as needed without storage, thereby reducing or eliminating standby losses. Tankless systems have an EF of 0.82, compared to standard water heaters with an EF of 0.62.[21]

[21] http://www.toolbase.org/Technology-Inventory/Plumbing/tankless-water-heaters

Appliances

High Efficiency Dryer. High efficiency dryers have features, such as moisture sensors, that minimize energy usage while retaining performance. The efficiency levels for this measure are shown in Table B-2.17.

Table B-2.17. Dryer EF Comparison

Measure	Baseline
2.74 EF	
2.83 EF	2.67 EF
2.93 EF	

Other (Pool)

Energy Efficient Pool Heater. Gas pool heaters use natural gas or propane. The water circulated by the pump passes through a filter and then travels to the heater. Gas burns in the heater combustion chamber, generating heat that warms the water returning to the pool. This measure assumes an efficiency level of 88 percent, compared to a standard 83 percent efficient pool heater.

5. Commercial Electric Retrofit Measure Descriptions

HVAC (and Envelope)

Automated Ventilation Variable Frequency Drive (VFD) Control, Occupancy/CO_2 sensors. This measure is also known as demand-control ventilation (DCV), where the ventilation system automatically adjusts air flow when CO_2 is above a specified level. CO_2 controls maintain a minimum ventilation rate at all times to control non-occupant contaminants, such as off-gassing from furniture, equipment, and building components. The baseline of this measure is a ventilation system that runs constantly.

Chilled Water/Condenser Water Settings, Optimization. Making adjustments to the chilled and condenser water system settings to better match the building load will reduce unnecessary use of the compressor and pumps.

Chilled Water Piping Loop with Variable Speed Drive (VSD) Control. A VSD controller, with two-way valves at the cooling coils, controls the chilled water pump speed to vary based on the cooling load, thus reducing pumping energy requirements. The baseline is a constant speed pump with three-way valves.

Chiller Water-Side Economizer. This measure consists of a heat exchanger attached to a condenser water piping loop that operates when outdoor conditions can produce colder condenser water than the mixed air temperature. A water side economizer is used when an outdoor-air economizer is not practical. The baseline measure is no economizer.

Convert Constant Volume Air System to Variable Air Volume (VAV). This measure allows the airflow volume of a HVAC system to vary the heating or cooling load rather than over-conditioning and short-cycling. The baseline is a constant volume system.

Cooling Tower, Decrease Approach Temperature. An oversized cooling tower allows a reduced approach temperature, which saves energy. The approach temperature is the difference between the water leaving the tower and the wet-bulb temperature. This measure assumes a 6 degree delta compared to the baseline of a 10 degree delta.

Cooling Tower, Two-Speed Fan Motor. A two-speed fan cycles between off, low, and high speeds to maintain the tower set point. The low-speed setting uses less energy than a single, high speed fan. The baseline measure is a single-speed fan motor.

Cooling Tower, Variable Speed Drive (VSD) Fan Control. VSDs modulate the air flow so that heat rejection exactly matches load at the desired set point, which saves energy. The baseline measure is a two-speed fan motor.

Direct Digital Control (DDC) System, Installation. DDC systems allow for both HVAC and lighting to be controlled and monitored. For lighting, the DDC system allows for direct control of lights from a remote location. Entire HVAC systems, including pumps, motors, fans, and set points, can be digitally programmed for tighter control of the system.

Direct Digital Control (DDC) System, Optimization. DDC is also known as an energy management system (EMS), which allows for digital monitoring and control of HVAC and

lighting systems. The optimization refers to upgrading a high-efficiency energy management system to a premium efficiency system.

Direct Digital Control (DDS) System, Wireless Performance Monitoring. This second-generation building automation systems allows for wireless optimization and operation of building systems (such as HVAC) through computerized monitoring and control software and interfaces.

Direct Expansion (DX) Package Air-Side Economizer. An air-side economizer mixes return air with outside air to cool indoor spaces, which saves energy as less air needs to be cooled.

Direct Expansion (DX) Tune-Up/Diagnostics. Regular maintenance of DX air-conditioning systems includes checking controls, replacing filters, cleaning coils and blowers, and checking refrigerant levels.

Direct/Indirect Evaporative Cooling, Pre-Cooling. Direct evaporative coolers are low-energy systems that evaporate water into the air stream, thus reducing air temperature and increasing humidity. Indirect evaporative coolers use a secondary air stream that is cooled by water and travels through a heat exchanger with the primary air stream, cooling the air but not affecting the humidity. Direct/indirect systems cool the air stream via the indirect cooler, then cool it further through the direct cooler. Including an evaporative cooler before the DX system reduces the overall cooling load.

Duct Fittings, Leak-Proof. The majority of duct leakage in residential HVAC systems is due to improperly sealed connections between ductwork and fittings. Even when duct connections are initially well-sealed, leakage may increase over time.

Duct Repair and Sealing. This maintenance creates significant energy savings by ensuring conditioned air only goes to occupied spaces, thereby reducing an excessive runtime/load on the HVAC system.

Exhaust Air to Ventilation Air Heat Recovery. This measure captures heated air exhausted out of a building and transfers it to the incoming air, decreasing the overall heating load.

Exhaust Hood Makeup Air. This measure provides exhaust air at the hood instead of allowing the hood to exhaust conditioned air in the room. The baseline measure is for conditioned air to be expelled through exhaust hoods.

Green Roof. The added mass and thermal resistance of green roofs reduces the heating and cooling loads of the building. These roofs reduce the ambient temperature of the roof surface and slow the transfer of heat into the building, which reduces cooling costs. They also add insulation to the roof structure, reducing heating requirements in the winter.[22] Additionally, they reduce the ambient temperature around the roof, which decreases the building's urban heat island effect.

Hotel Key Card Energy Control System. This measure controls room HVAC and lighting during non-occupied periods. Occupancy is determined by the presence of a key card and/or additional sensors. The central system sets heating and cooling to a minimum and turns off lighting when the key card is removed. Once the key card is inserted, the hotel guest has full control of the room systems.

[22] http://www.toolbase.org/Technology-Inventory/Roofs/green-roofs

Infiltration Reduction (Caulking, Weather Stripping, etc.). Sealing air leaks in windows, doors, the roof, crawlspaces, and outside walls decreases overall heating and cooling losses. Baseline and measure values, in units of air changes per hour (ACH), are presented in Table B-2.18.

Table B-2.18. Infiltration Reduction Measures

Measure (ACH)	Baseline (ACH)
0.65	1.00

Insulation, Ceiling. These measures represent an increase in R-value from existing building conditions to current state code or from current state code to better than code. Baseline and measure values are presented in Table B-2.19.

Table B-2.19. Ceiling Insulation Measures

Measure	Baseline
R-38 (State Code)	R-7
R-38 (State Code)	R-8
R-38 (State Code)	R-11
R-49	R-38 (State Code)

Insulation, Duct. Packaged direct expansion and heat-pump equipment are generally coupled with a ducting system inside the building. Insulating these ducts reduces energy loss to the unconditioned plenum space. This measure assumes that R-7 insulation is installed where no insulation previously existed.

Insulation, Floor (Non-Slab). These measures represent an increase in R-value from existing building conditions to current state code or from current state code to better than code. The baseline and measure R-values are presented in Table B-2.20.

Table B-2.20. Floor Insulation Measures

Measure	Baseline
R-30 (State Code)	R-7
R-30 (State Code)	R-8
R-30 (State Code)	R-11
R-30 (State Code)	R-19
R-38	R-30 (State Code)

Insulation, Wall. These measures represent an increase in R-value from existing building conditions to the current state code value of R-13 + 7.5. The baseline value of R-3 represents the average existing insulation level.

Natural Ventilation System. This measure relies on pressure differences to move fresh air through buildings. Natural ventilation, unlike fan-forced ventilation, uses the natural forces of wind and buoyancy to deliver fresh air into buildings. The specific approach and design varies by building type and local climate. The amount of ventilation depends on internal space design and

the size and placement of openings in the building. Natural ventilation offsets the energy required to run forced air ventilation systems. [23]

Pipe Insulation. Adding 1.5-inches of insulation to water pipes yields an approximate R-value of R-6, which decreases temperature losses, thereby reducing demand on chilled water systems.

Programmable Thermostat. This measure controls set point temperature automatically, ensuring the HVAC system is not running during low-occupancy hours.

Retro-Commissioning. Commissioning ensures that energy-using systems are operating in an optimal fashion in order to maximize energy efficiency. This commissioning process can be applied to existing buildings to restore them to optimal performance. Retro-commissioning is a systematic, documented process that identifies low-cost operational and maintenance improvements in existing buildings and brings them up to the design intentions.[24,25] The baseline measure is no commissioning.

Sensible Heat Recovery Devices. This measure preconditions incoming air by transferring energy between the exhaust air stream and the supply air stream. This raises the temperature of incoming air during the winter and decreases it in the summer. Energy savings results from the reduced need for mechanical heating or cooling.

Total Heat Recovery Devices. This measure, also called enthalpy recovery, transfers sensible and latent heat. Latent heat, which is released or absorbed due to a phase change (such as the condensation of water vapor), significantly raises the outdoor air humidity in the winter and reduces it in the summer.[26]

Window Film. Solar control window films applied to existing windows reduces peak demand during hot months and conserves air conditioning energy. The use of these films also reduces exposure to ultraviolet radiation and glare.[27]

Windows, High Efficiency. This measure increases building performance by reducing the U-value, as shown in Table B-2.21.

Table B-2.21. High-efficiency Window Measures

Measure U-Value	Baseline U-Value
0.40 (State Code)	0.68
0.40 (State Code)	0.67
0.40 (State Code)	0.65
0.40 (State Code)	0.60
0.32	0.40 (State Code)

[23] National Renewable Energy Laboratory; http://www.nrel.gov/docs/fy03osti/33698.pdf
[24] http://www.green.ca.gov/CommissioningGuidelines/default.htm
[25] http://cbs.lbl.gov/BPA/cct.html
[26] http://www.mcquay.com/mcquaybiz/marketing_tools/mt_corporate/EngNews/0701.pdf
[27] http://www.iwfa.com/iwfa/Consumer_Info/windowfilmbenefits.html

Lighting

Bi-Level Control, Stairwell Lighting. This measure allows an occupancy sensor to reduces the light load in an unoccupied stairwell by 50 percent for a set amount of time. The baseline is continuous operation at full power.

Cold Cathode Lighting. This measure is a tubular light or bulb that passes an electrical current through a gas or vapor, much like neon lighting. A cold cathode light is up to five times brighter than neon, and has one of the longest lives of any lighting fixture at roughly 50,000 hours.[28] Cold cathode lighting uses 5 watts compared to 30 watts for an incandescent bulb.

Covered Parking Lighting. This measure reducing the energy use of covered parking garages by replacing inefficient metal halide lamps with LED and replacing high pressure sodium lamps with LED low bay lighting.

Daylighting Controls, Outdoors (Photocell). Exterior photocells adjust lighting levels according to sunlight levels reaching desired set points. This measure achieves savings over time-clock or manual controls through changes in seasonal and site conditions by improving night time durations.

Dimming, Continuous: Fluorescent Fixtures. A continuous dimming switch allows light level brightness to vary from 0 percent to 100 percent, increasing electricity savings. The baseline measure is fluorescent fixtures operating at full power.

Dimming, Stepped: Fluorescent Fixtures. This measure allows the user to vary the light level by a number of specified tiers to adjust for the amount of outside daylight. The baseline measure is fluorescent fixtures operating at full power.

Exit Sign, Light Emitting Diodes (LED). LED exit signs use only 2 watts of power and last over 50,000 hours, compared to CFL exit signs that use 9 watts of power and have a shorter life.

Exit Sign, Photoluminescent or Tritium. This measure uses no energy and provides lighting suitable for exit signage.

Exterior Building Lighting, Package. This measure decreases lighting power density by 30 percent. The baseline lighting technology includes all available technologies in a building that make up the total watts per square foot.

Light Emitting Diodes (LED) Refrigeration Case Lights. These highly efficient bulbs create 55 percent energy savings over standard 60 watt fluorescent refrigeration case light.

Lighting Reduction Package, High Efficiency. This measure results in a 15 percent decrease in lighting power density (W/sqft). The baseline lighting technology includes all available technologies in a building that make up the total watts per square foot. Installation of the lighting reduction package reduces lighting power density with higher efficiency technologies, such as high performance T8 or T5 tubes, high-efficiency ballasts, reflective lighting fixtures, etc.

Lighting Reduction Package, Premium Efficiency. This measure results in a 20 percent decrease in lighting power density (W/sqft). The baseline lighting technology includes all available technologies in a building that make up the total watts per square foot. Installation of

[28] Conjecture Corporation of wisegeek.com; http://www.wisegeek.com/what-is-a-cold-cathode-light.htm

the lighting reduction package reduces lighting power density with higher efficiency technologies, such as high performance T8 or T5 tubes, high-efficiency ballasts, reflective lighting fixtures, etc.

Lighting Reduction Package, Super Premium Efficiency. This measure results in a 25 percent decrease in lighting power density (W/sqft). The baseline lighting technology includes all available technologies in a building that make up the total watts per square foot. Installation of the lighting reduction package reduces lighting power density (W/sqft) with higher efficiency technologies, such as high performance T8 or T5 tubes, high-efficiency ballasts, reflective lighting fixtures, etc.

Lighting Reduction Package, Super Premium High Bay. Lighting reduction packages, such as T5HO (High Output) for high bay applications in a warehouse or grocery, can reduce the power density by 35 percent. The baseline lighting technology includes all available technologies in a building that make up the total watts per square foot.

Occupancy Sensor, Fluorescent. This measure turns off fluorescent lights after a space is unoccupied for a designated amount of time. The lights turn on again when the sensor detects a person in the space. Occupancy measures can control single or multiple lighting zones. The controlled lighting wattage varies depending on application. The baseline assumes no lighting controls.

Solid State Light Emitting Diode (LED), White Lighting. LEDs are solid-state devices that convert electricity to light, with very high efficiency and long life. Recently, lighting manufacturers have indirectly produced 'cool' white LED lighting using ultraviolet LEDs to excite phosphors that emit a white-appearing light. This measure applies to exterior lighting for landscape, merchandise, signage, and structures. The baseline for this measure is 50 watts, 10 hrs/day, 365 days/yr.

Surface Parking Lighting. Replacing inefficient metal halide lamps that consume between 100-150 watts with LED lighting that consumes 60-111 watts reduces the energy use of surface parking lots. LED lights also last longer than metal halide lamps, reducing the labor of replace lamps.

Time Clock. This technology allows users to program lights and other loads to be turned on and off automatically in response to a time schedule, an occupancy sensor, or a building automation system.

Water Heat

Clothes Washer, Ozonating. This measure disinfects water with ozone-enriched air, which suppresses subsequent biological activity and controls biological growth within the appliance, thus reducing the need for hot water. The baseline measure is a standard commercial clothes washer.[29]

[29] http://www.patentstorm.us/patents/6607672-description.html

Clothes Washer Commercial, ENERGY STAR®. This measure has more capacity than conventional top-load models with an agitator. Some front-loaders can wash over 20 pounds of laundry at once, compared to 10–15 pounds for a standard top-loader.[30]

Demand-Controlled Circulating Systems. This measure circulates hot water only when required. The baseline measure is a continuously circulating hot water system, resulting in energy loss through pipes.

Dishwasher, Residential ENERGY STAR®. Residential sized ENERGY STAR® dishwashers are often appropriate for smaller commercial buildings, and are 10 percent more efficient than the federal minimum standard used as the baseline.[31]

Dishwasher, Commercial: High Temperature ENERGY STAR®. This measure has a minimal idle rate, consumes a minimal amount of water per rack of loaded dishes, and is on average 25 percent more efficient than standard high temp commercial dishwashers.[32]

Dishwasher, Commercial: Low Temperature ENERGY STAR®. This measure uses chemicals combined with low temperatures to save energy compared to standard high temperature commercial dishwashers.

Drain Water Heat Recovery, Water Heater. This measure recovers heat energy from drain water and uses it to heat water entering the hot water tank, minimizing the temperature rise required to achieve the water heater set point.[33]

Hot Water (SHW) Pipe Insulation. One inch of extra insulation on hot water pipes yields an approximate R-value of R-4, decreasing temperature losses. This measure is only applicable for existing construction. The baseline measure is no insulation.

Low-Flow Faucet Aerators. This measure mixes water and air, reducing the amount of water that flows through the faucet. It creates a fine water spray through an inserted screen in the faucet head. Flow rate requirements for this measure are presented in Table B-2.22.

Table B-2.22. Faucet Aerator Flow Rates

Measure Flow Rate (GPM*)	Baseline Flow Rate (GPM)
2.2	3.0
1.5	2.2
* Gallons per minute	

Low-Flow Pre-Rinse Spray Valves. This measure mixes water and air, reducing the amount of water that flows through the spray head. The head creates a fine water spray through an inserted screen, achieving a flow reduction from 1.6 GPM (federal standard) to 0.6 GPM.

30 http://www.energystar.gov/index.cfm?c=clotheswash.pr_clothes_washers_comm
31 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DW
32 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COH
33 www.toolbase.org/Techinventory/TechDetails.aspx?ContentDetailID=858&BucketID=6&CategoryID=9

Low-Flow Showerheads. This measure mixes water and air, reducing the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen. Flow rate requirements for this measure are presented in Table B-2.23.

Table B-2.23. Low-Flow Showerhead Flow Rates

Measure Flow Rate (GPM)	Baseline Flow Rate (GPM)
2.5	4.5
2.0	2.5

Ultrasonic Faucet Control. Ultrasonic sensors automatically turn faucet water on and off when motion is detected at the sink. This eliminates water running continuously while the sink is in use.

Water Cooled Refrigeration with Heat Recovery. Heat recovery gathers and uses thermal energy for the water heater that would normally be rejected to the ambient environment.

Water Heater Temperature Setback. This measure reduces the set point temperature from 130°F to 120°F.

Refrigeration

Anti-Sweat (Humidistat) Controls. This measure enables the user to turn refrigeration display case anti-sweat heaters off when ambient relative humidity is low enough that sweating will not occur. Without controls, heaters generally run continuously.

Case Electronically Commutated Motor (ECM). A case fan is one component of a refrigeration system. ECMs are smaller variable speed motors that operate from a single-phase power source with an electronic controller in or on the motor. The baseline measure is a standard efficiency motor.

Case Replacement, Low and Medium Temperatures. Efficient refrigerated display cases achieve higher performance efficiency and reduce overall energy consumption by incorporating high performance evaporative fans, such as ECMs, energy-efficient double-pane glass doors, anti-sweat controls, high efficiency lighting and ballast, such as T8 or LED lamps, and improved insulation.

Compressor VSD Retrofit. This measure modulates motor speed in response to load changes. When low-load conditions exist, current to the compressor motor is decreased, slowing the compressor motor. Baseline is a constant-speed compressor.

Demand Control Defrost, Hot Gas. Evaporator frost reduces coil capacity by acting as a layer of insulation and reducing the airflow between fins. With hot gas defrost, refrigerant vapor from the compressor discharge or the high pressure receiver is used to warm the evaporator coil and melt the frost.[34]

Evaporative Condenser, High Efficiency. This water cooled measure can cycle a refrigerator with less energy than a standard air-cooled system.

[34] Parker Refrigeration Specialists; http://www.parker.com/literature/Refrigerating%20Specialties%20Division/90-11a.pdf

Floating Condenser Head Pressure Controls. This measure adds controls to float head pressure temperature down during periods of low load. The base case is a standard multiplex system with a fixed condensing set point.

Glass Door, ENERGY STAR® Refrigerators/Freezers. Low-E, double-pane thermal glass doors reduce cooling loses in refrigerated reach-in cases.

High Efficiency Compressors. A component of refrigeration systems, this measure operates up to 15 percent more efficiently than standard-efficiency compressors.

Night Covers for Display Cases. This measure eliminates wasted refrigeration cooling by insulating display cases. In addition, it reduces the heating load of buildings by allowing less refrigerated air to escape and need reheated.

Refrigeration Commissioning or Re-Commissioning. Commissioning ensures that refrigeration systems are operating in an optimal fashion in order to maximize energy efficiency. Retro-commissioning checks previously commissioned equipment to ensure that it is continuing to run efficiently. The baseline measure is no commissioning.[35]

Refrigerator eCube. Refrigerators monitor circulating air temperatures to determine when to switch on and off. When the refrigerator door is opened, circulating air temperature increases more rapidly than food temperature, causing the equipment to work harder to maintain the set point. Instead of measuring air temperature, the eCube, a device with similar heat transfer characteristics to food, allows the refrigerator to monitor the more stable food temperature, resulting in less frequent cycling of the compressor.

Solid-Door Refrigerators/Freezers, ENERGY STAR®. This measure is designed with high efficiency components such as an ECM evaporator, condenser fan motors, hot gas anti-sweat heaters, or high-efficiency compressors, saving energy compared to standard models.[36]

Standalone to Multiplex Compressor. This measure consists of multiple compressors drawing from a common suction header, serving any number of refrigerated display fixtures. The suction group is controlled to satisfy the lowest temperature required by any of the attached display fixtures, and therefore the fixtures served by a given suction group usually have similar temperature requirements. Baseline is a single dedicated compressor system for each refrigeration load.[37, 38]

Strip Curtains on Walk-In Refrigerators. This measure reduces the infiltration of warm air into the refrigerated space by improving the barrier between the refrigerated and the ambient air.

Walk-In Electronically Commutated Motor (ECM). A walk-in fan is one component of refrigeration systems. ECMs typically have small horse power motors (less than 1 HP) that are factory programmed to run at certain speeds. ECMs operate from a single-phase power source

35 http://cbs.lbl.gov/BPA/cct.html
36 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CRF
37 http://www.energysmartgrocer.org/pdfs/PGE/BridgeEquipment%20SpecificationTandCs.pdf
38 http://www.bizlink.com/HPAC_articles/March2007/306.pdf

with an electronic controller in or on the motor. The baseline measure is a standard efficiency motor.[39]

Other

Battery Charger, ENERGY STAR®. On average, these battery chargers use 35 percent less energy than conventional battery chargers, which draw as much as five to 20 times more energy than is actually stored in the battery (even when not actively charging a product). Battery charging systems recharge a variety of cordless products, including power tools, small household appliances, and electric shavers. The baseline is a standard battery charger.[40]

Combination Oven. This measure uses both dry heat and steam, which are injected into the oven when the food being cooked needs it. High efficiency combination ovens with 60 percent efficiency use roughly half the energy of standard combination ovens.[41]

Cooking Hood Controls. Utilizing sensors and two-speed or variable speed fans, hood controls reduce exhaust (and makeup) airflow when appliances are not at capacity (or have been turned off). The baseline for this measure is no hood controls.

Copier, ENERGY STAR®. This measure delivers the same performance as conventional equipment, powers down when not in use, and averages 40 percent more efficiency. The baseline measure is a non-ENERGY STAR® copier.[42]

Deep Fat Fryer, Consortium for Energy Efficiency (CEE). Commercial, 15 inch CEE rated electric fryers have a heavy load cooking efficiency of 80 percent or better, and use less than 1,000 watts when idle.[43] The baseline is standard electric deep fat fryer.

Fax, ENERGY STAR®. This measure enters sleep mode after inactivity, reducing total power consumption by 40 percent.[44]

Griddle, ENERGY STAR®. This measure is approximately 10 percent more efficient than standard models, and must have a minimum cooking efficiency of 38 percent. They must use less than 0.026 therm/hour/ft^2 when idle. The baseline measure is a standard grill at 32 percent efficiency.[45]

High Efficiency Convection Oven, ENERGY STAR®. This measure must meet the specification requirements of 70 percent cooking energy efficiency and an idle energy rate of 1.6 kW. Standard electric convection ovens have a 65 percent cooking energy efficiency and an idle energy rate of 2 kW.[46]

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39 http://www.fishnick.com/publications/appliancereports/refrigeration/GE_ECM_revised.pdf
40 http://www.energystar.gov/index.cfm?c=battery_chargers.pr_battery_chargers
41 http://www.energystar.gov/ia/partners/publications/pubdocs/restaurants_guide.pdf
42 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=IEQ
43 http://www.energystar.gov/index.cfm?c=fryers.pr_fryers
44 http://www.energystar.gov/ia/products/fap/IE_Prog_Req.pdf
45 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COG
46 http://www.energystar.gov/index.cfm?c=ovens.pr_comm_ovens

High Efficiency Ice Maker. This measure uses high efficiency compressors, fan motors, and thicker insulation to achieve 15 percent more efficiency than the baseline measure, which is a conventional automatic commercial ice maker.[47]

Hot Food Holding Cabinet, ENERGY STAR®. This measure uses a maximum of 40 watts/cubic foot. The baseline measure is a conventional holding cabinet.[48]

Low Pressure Air Distribution Complex HVAC. This under-floor measure introduces air into occupancy zones at relatively low velocities. The decrease in pressure differentials and, therefore in air velocity, results in lower energy consumption by the air handlers. The baseline for this measure is a variable air volume or constant volume HVAC system.

Monitor, ENERGY STAR®. This measure enters sleep mode and consumes less than 2 watts. The sleep mode needs to be enabled.

Motor, Consortium for Energy Efficiency (CEE) Premium-Efficiency Plus. These motors (also known as "super" or "enhanced") are more efficient than standard NEMA premium efficiency motors.[49] This measure specifically relates to HVAC motors ranging from 1 HP to 200 HP.

Motor, Pump and Fan System: Variable Speed Control. This measure allows pump and fan motors to operate at a lower speed while still maintaining set points during partial load conditions. This reduces energy consumption as motor operation can vary with load rather than frequently cycling on and off at constant speed.

Motor Rewind. This measure follows the Green Motors Practices Group™ recommendations of best practices to maintain original efficiency, commonly called a Green Rewind.[50, 51] A failed motor can be rewound to a lower efficiency, rewound to maintain the original efficiency, or replaced.

Motor: Variable Air Volume (VAV) Box High Efficiency Electronically Commutated Motor (ECM). High efficiency fan-powered boxes prevent hot and cold spots by maintaining room air circulation while modulating supply-air temperature to match load. This measure applies to a motor efficiency upgrade. An ECM powers the fan in each VAV box. An ECM is a brushless DC motor with electronically built-in speed and torque controls, which allows the motor speed to adjust for optimal airflow. The baseline assumes a standard VAV with induction motors including silicon controlled rectifier speed control.[52]

Network PC Power Management. This software tool intelligently manages computer powers remotely and automatically across a network overnight, on weekends, and when not in use. This significantly lowers energy consumption without impacting user productivity, desktop maintenance, or upgrades. Workstations operating on a local area network or a wide area

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47 Consortium for Energy Efficiency (CEE); http://www.cee1.org/com/com-kit/com-kit-equip.php3

48 http://www.energystar.gov/index.cfm?c=hfhc.pr_hfhc

49 CEE motor nominal efficiencies are higher than the NEMA federal minimum efficiency levels that became effective in December 2010. On December 19, 2010, the 2007 Energy Independence and Security Act updated the minimum efficiency standards for motors, and the previous NEMA premium efficiency specifications became the federal standard.

50 http://www.bpa.gov/energy/n/industrial/Green_motors/

51 http://www.greenmotors.org/downloads/RTFSubmittalMay_08%20_2_.pdf

52 LEED-qualified Justice Center, reported by DCJ.com and the Minnesota Power Incentive Program.

network can implement PC power-management policies across a network to maximize energy savings .

Optimized Variable Volume Lab Hood Design. This measure allows volumetric flow rate to vary, which causes a constant speed through the duct regardless of sash opening. The baseline measure is a constant volume lab hood.

Power Supply Transformer/Converter. This measure applies to the 80 PLUS performance specification requirements for power in computers and servers. 80 PLUS specifies 80 percent or greater efficiency at 20 percent, 50 percent, and 100 percent of rated load with a true power factor of 0.9 or greater.[53] The baseline assumes an 85 percent efficient power supply (>51 watts).

Printer, ENERGY STAR®. This measure deploys a maximum time delay to sleep depending on the size of the equipment, which reduces power consumption during periods of inactivity.[54]

Residential Refrigerator, ENERGY STAR®.This measure uses at least 20 percent less energy than required by current federal standards.[55]

Residential Refrigerator/Freezer Recycling. This refers to the environmentally-friendly disposal of unneeded appliances such as secondary refrigerators or stand-alone freezers.

Residential-Size Refrigerator/Freezer: Early Replacement, ENERGY STAR®. Replacing equipment before the end of its useful life is advantageous because of significant inefficiencies in older models.

Scanner, ENERGY STAR®. This measure enters a low power sleep mode after inactivity.[56]

Server Virtualization. This measure replaces multiple under-utilized servers with one server. Many data center servers operate at 10 percent capacity or less, allowing their functions to be consolidated onto one virtual server that operates in the range of 85 percent capacity. This measure applies to the plug load end use, although it has a savings effect on the cooling load by reducing power and, therefore, the heat generated by equipment.

Smart Strip. Power strips with an occupancy sensor will turn power to all devices plugged into the strip on and off, such as computers, desk lights, and audio equipment, based on occupancy within the work area.

Steam Cooker, ENERGY STAR®. This measure has a cooking efficiency of 50 percent, with idle energy rates that vary depending upon pan size.[57] The baseline efficiency is a standard commercial steam cooker with 35 percent efficiency.

Vending Machines, High Efficiency ENERGY STAR®. New and rebuilt refrigerated beverage vending machines are 50 percent more energy efficient than the standard model, through more

[53] www.80PLUS.org
[54] http://www.energystar.gov/ia/products/fap/IE_Prog_Req.pdf
[55] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=RF
[56] http://www.energystar.gov.au/products/scanners.html
[57] http://www.energystar.gov/index.cfm?c=steamcookers.pr_steamcookers

efficient compressors, fan motors, lighting systems, and low-power mode options during non-use periods.[58]

Vending Miser. This measure senses occupancy and cycles the vending machine cooling off when no occupancy is detected.

Water Cooler, ENERGY STAR®. This measure provides only cold water and consumes less than 0.16 kWh per day. A unit providing hot and cold water consumes less than 1.20 kWh per day. ENERGY STAR®-qualified water coolers consume 45 percent less energy than standard models.[59]

[58] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=VMCc

[59] http://www.energystar.gov/index.cfm?c=water_coolers.pr_water_coolers

6. Commercial Electric Equipment Measure Descriptions

HVAC

Air or Ground Source Heat Pump (ASHP or GSHP). Electric heat pumps move heat to or from the air or the ground to cool and heat a home. Table B-2.24 displays the different efficiency levels we compared for this measure. The baseline size is the same as the measure size.

Table B-2.24. Heat Pump SEER/HSPF Comparisons

Measure Efficiency	Baseline SEER & HSPF
ASHP 14 SEER, 8.5 HSPF	ASHP 13 SEER, 7.7 HSPF
ASHP 16 SEER, 8.8 HSPF	
GSHP 16.2 EER, 8.8 HSPF	

Centrifugal Chiller. This measure uses the vapor compression cycle to chill water and rejects heat from the chilled water and from the compressor to a second water loop cooled by a cooling tower. The advantage of centrifugal compressors is their high flow rate capability and good efficiency. Table B-2.25compares different efficiencies greater than 300 tons, rated in kW/ton.

Table B-2.25. Centrifugal Chiller kW/ton Comparison

Measure kW / ton	Baseline kW / ton
0.55	0.576 (State Code)
0.52	0.576 (State Code)
0.47	0.576 (State Code)

Direct Expansion (DX) Package. DX systems transfer heat with a refrigerant piping circuit, compressor, and refrigerant coils. All components are in a single package typically installed on the building roof. Commercial-sized units are normally rated by their Energy Efficient Ratio (EER). Table B-2.26 displays the different models compared in this measure.

Table B-2.26. DX AC Unit EER / Advanced Technology Comparisons

kBTU / hr	Measure EER	Baseline EER
65 – 135	11.5	11.2 (State Code)
65 – 135	12.0	11.2 (State Code)
135 – 240	11.5	11.0 (State Code)
135 – 240	12.0	11.0 (State Code)
240 – 760	10.5	10.0 (State Code)
240 – 760	10.8	10.0 (State Code)

Screw Chiller. Screw compressors are positive displacement devices. The refrigerant chamber actively compresses to a smaller volume by the twisting motion of two interlocking, rotating screws. Refrigerant trapped in the space between the two rotating screws is compressed as it travels from the inlet to the outlet of the compressor. A slide valve adjusts the compression effect

by varying the amount of compression that occurs before the refrigerant is discharged. Screw chillers are generally used for small- to medium-sized buildings. Table B-2.27compares different efficiencies, rated in kW/ton.

Table B-2.27. Screw Chiller kW/ton Comparison

Tons	Measure kW / ton	Baseline kW / ton
<150	0.71	0.79 (State Code)
<150	0.63	0.79 (State Code)
<150	0.58	0.79 (State Code)
150-300	0.65	0.68 (State Code)
150-300	0.57	0.68 (State Code)
150-300	0.50	0.68 (State Code)

Water Heating

Water Heater, Heat Pump. This measure moves heat from a warm reservoir (such as air) into the hot water system.[60] Baseline and efficient measure EF values are given in Table B-2.28.

Table B-2.28. Water Heater EF Comparisons

Water Heater Type	Measure EF	Baseline EF
Electric Storage Water Heater	0.95	0.92
Heat Pump Water Heater	2.2	0.92

Other

Computer, ENERGY STAR. This measure consumes less than 2 watts in sleep and off modes, and is more efficient than conventional units in idle mode, resulting in 30 to 65 percent energy savings.

[60] Description source: U.S. Department of Energy; http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=12840

7. Commercial Gas Retrofit Measure Descriptions

HVAC (and Envelope)

Automated Ventilation Variable Frequency Drive (VFD) Control, Occupancy/CO_2 sensors. This measure is also known as demand-control ventilation (DCV), where the ventilation system automatically adjusts air flow when CO_2 is above a specified level. CO_2 controls maintain a minimum ventilation rate at all times to control non-occupant contaminants, such as off-gassing from furniture, equipment, and building components. The baseline of this measure is a ventilation system that runs constantly.

Boiler Economizer. This measure recovers heat energy that would otherwise be lost out the boiler stack by using a heat exchanger located on the stack to preheat boiler feed water.

Convert Constant Volume Air System to Variable Air Volume (VAV). TThis measure allows the airflow volume of a HVAC system to vary the heating or cooling load rather than over-conditioning and short-cycling. The baseline is a constant volume system.

Direct Digital Control (DDC) System, Installation. DDC systems allow for both HVAC and lighting to be controlled and monitored. For lighting, the DDC system allows for direct control of lights from a remote location. Entire HVAC systems, including pumps, motors, fans, and set points, can be digitally programmed for tighter control of the system.

Direct Digital Control (DDC) System, Optimization. DDC is also known as an energy management system (EMS), which allows for digital monitoring and control of HVAC and lighting systems. The optimization refers to upgrading a high-efficiency energy management system to a premium efficiency system.

Direct Digital Control (DDS) System, Wireless Performance Monitoring. This second-generation building automation systems allows for wireless optimization and operation of building systems (such as HVAC) through computerized monitoring and control software and interfaces.

Duct Fittings, Leak-Proof. The majority of duct leakage in residential HVAC systems is due to improperly sealed connections between ductwork and fittings. Even when duct connections are initially well-sealed, leakage may increase over time.

Duct Repair and Sealing. This maintenance creates significant energy savings by ensuring conditioned air only goes to occupied spaces, thereby reducing an excessive runtime/load on the HVAC system.

Exhaust Air to Ventilation Air Heat Recovery. This measure captures heated air exhausted out of a building and transfers it to the incoming air, decreasing the overall heating load.

Exhaust Hood Makeup Air. This measure provides exhaust air at the hood instead of allowing the hood to exhaust conditioned air in the room. The baseline measure is for conditioned air to be expelled through exhaust hoods.

Infiltration Reduction (Caulking, Weather Stripping, etc.). Sealing air leaks in windows, doors, the roof, crawlspaces, and outside walls decreases overall heating and cooling losses. This measure reduces the number of air changes per hour from 1.00 to 0.65.

Insulation, Ceiling. These measures represent an increase in R-value from existing building conditions to current state code or from current state code to better than code. Baseline and measure values are presented in Table B-2.29.

Table B-2.29. Ceiling Insulation Measures

Measure	Baseline
R-38 (State Code)	R-7
R-38 (State Code)	R-8
R-38 (State Code)	R-11
R-49	R-38 (State Code)

Insulation, Duct. Packaged direct expansion and heat-pump equipment are generally coupled with a ducting system inside the building. Insulating these ducts reduces energy loss to the unconditioned plenum space. This measure assumes that R-7 insulation is installed where no insulation previously existed.

Insulation, Floor (Non-Slab). These measures represent an increase in R-value from existing building conditions to current state code or from current state code to better than code. Baseline and measure values are presented in Table B-2.30.

Table B-2.30. Floor Insulation Measures

Measure	Baseline
R-30 (State Code)	R-7
R-30 (State Code)	R-8
R-30 (State Code)	R-11
R-30 (State Code)	R-19
R-38	R-30 (State Code)

Insulation, Wall. These measures represent an increase in R-value from existing building conditions to the current state code value of R-13 + 7.5. The baseline value of R-3 represents the average existing insulation level.

Programmable Thermostat. This measure controls set point temperature automatically, ensuring the HVAC system is not running during low-occupancy hours.

Retro-Commissioning. Commissioning ensures that energy-using systems are operating in an optimal fashion in order to maximize energy efficiency. This commissioning process can be applied to existing buildings to restore them to optimal performance. Retro-commissioning is a systematic, documented process that identifies low-cost operational and maintenance improvements in existing buildings and brings them up to the design intentions.[61,62] The baseline measure is no commissioning.

Sensible Heat Recovery Devices. This measure preconditions incoming air by transferring energy between the exhaust air stream and the supply air stream. This raises the temperature of

[61] http://www.green.ca.gov/CommissioningGuidelines/default.htm
[62] http://cbs.lbl.gov/BPA/cct.html

incoming air during the winter and decreases it in the summer. Energy savings results from the reduced need for mechanical heating or cooling.

Total Heat Recovery Devices. This measure, also called enthalpy recovery, transfers sensible and latent heat. Latent heat, which is released or absorbed due to a phase change (such as the condensation of water vapor), significantly raises the outdoor air humidity in the winter and reduces it in the summer.[63]

Steam Pipe Insulation. R-4 insulation reduces heat loss from a steam pipe. The loss size depends on the pipe diameter and steam temperature.

Steam Trap Maintenance. This measure prevents the dirt created by chemical treatments or pipe scaling from becoming plugged. In most cases, plugging prevents the valve from closing, allowing live steam to escape into the condensate return line or atmosphere, wasting energy.[64]

Windows, High Efficiency. This measure increases building performance by reducing the U-value, as shown in Table B-2.31.

Table B-2.31. High-efficiency Window Measures

Measure U-Value	Baseline U-Value
0.40 (State Code)	0.68
0.40 (State Code)	0.67
0.40 (State Code)	0.65

Water Heat

Clothes Washer, Ozonating. This measure disinfects water with ozone-enriched air, which suppresses subsequent biological activity and controls biological growth within the appliance, thus reducing the need for hot water. The baseline measure is a standard commercial clothes washer.[65]

Demand-Controlled Circulating Systems. This measure circulates hot water only when required. The baseline measure is a continuously circulating hot water system, resulting in energy loss through pipes.

Dishwasher, Commercial: High Temperature ENERGY STAR®. This measure has a minimal idle rate, consumes a minimal amount of water per rack of loaded dishes, and is on average 25 percent more efficient than standard high temp commercial dishwashers.[66]

Dishwasher, Commercial: Low Temperature ENERGY STAR®. This measure uses chemicals combined with low temperatures to save energy compared to standard high temperature commercial dishwashers.

63 http://www.mcquay.com/mcquaybiz/marketing_tools/mt_corporate/EngNews/0701.pdf
64 http://www.steamtraptesting.com/
65 http://www.patentstorm.us/patents/6607672-description.html
66 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COH

Dishwasher, Residential ENERGY STAR®. Residential sized ENERGY STAR® dishwashers are often appropriate for smaller commercial buildings, and are 10 percent more efficient than the federal minimum standard used as the baseline.[67]

Drain Water Heat Recovery, Water Heater. This measure recovers heat energy from drain water and uses it to heat water entering the hot water tank, minimizing the temperature rise required to achieve the water heater set point.[68]

Hot Water (SHW) Pipe Insulation. One inch of extra insulation on hot water pipes yields an approximate R-value of R-4, decreasing temperature losses. This measure is only applicable for existing construction. The baseline measure is no insulation.

Integrated Space Heating/Water Heating. These systems provide space conditioning and hot water heating in one appliance/energy source. Domestic hot water is heated directly and space is heated by a hot water heat exchanger coil piped to the forced air heating system. This combination space/water heating system provides high efficiency heating for the cost of one high efficiency appliance.

Low-Flow Faucet Aerators. This measure mixes water and air, reducing the amount of water that flows through the faucet. It creates a fine water spray through an inserted screen in the faucet head. Flow rate requirements for this measure are presented in Table B-2.32.

Table B-2.32. Faucet Aerator Flow Rates

Measure Flow Rate (GPM*)	Baseline Flow Rate (GPM)
2.2	3.0
1.5	2.2
* Gallons per minute	

Low-Flow Pre-Rinse Spray Valves. This measure mixes water and air, reducing the amount of water that flows through the spray head. The head creates a fine water spray through an inserted screen, achieving a flow reduction from 1.6 GPM (federal standard) to 0.6 GPM.

Low-Flow Showerheads. Low-flow showerheads mix water and air to reduce the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen in the showerhead. Flow rate requirements for this measure are presented in Table B-2.33.

Table B-2.33. Low-Flow Showerhead Flow Rates

Measure Flow Rate (GPM)	Baseline Flow Rate (GPM)
2.5	4.5
2.0	2.5

Ultrasonic Faucet Control. Ultrasonic sensors automatically turn faucet water on and off when motion is detected at the sink. This eliminates water running continuously while the sink is in use.

[67] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DW

[68] www.toolbase.org/Techinventory/TechDetails.aspx?ContentDetailID=858&BucketID=6&CategoryID=9

Water Cooled Refrigeration with Heat Recovery. Heat recovery gathers and uses thermal energy for the water heater that would normally be rejected to the ambient environment.

Water Heater Temperature Setback. This measure reduces the set point temperature from 130°F to 120°F.

Other

Broiler. High efficiency broiler ovens have rigorous start-up, shut down, and turn down schedules for additional energy savings over standard units. Improved efficiency broilers have an efficiency of 34 percent, compared to baseline models at 15 percent.

Convection Oven, High Efficiency ENERGY STAR®. This measure must meet the specification requirements of 70 percent cooking energy efficiency and an idle energy rate of 18,000 Btu/h. Standard electric convection ovens have a 65 percent cooking energy efficiency and an idle energy rate of 13,000 Btu/h.[69]

Fryers, Commercial Gas Cooking ENERGY STAR®. These measures are 50 percent efficient, and when idle use less than 9,000 Btu/hr.[70] The baseline efficiency is 35 percent for a non-ENERGY STAR® commercial fryer.

Griddle, ENERGY STAR®. This measure is approximately 10 percent more efficient than standard models, and must have a minimum cooking efficiency of 38 percent. They must use less than 0.026 therm/hour/ft^2 when idle. The baseline measure is a standard grill at 32 percent efficiency.[71]

Oven, Conveyor. A high efficiency conveyor oven is 23 percent efficient, compared to a standard conveyor oven with 15 percent efficiency.

Oven, Power Burner. A power burner incorporates a larger burner and is often sold on range-oven combination units. This measure mixes a greater percentage of air to the gas to increase the overall combustion efficiency of the burner from 40 to 50 percent efficiency to 60 percent efficiency.

Steam Cooker, ENERGY STAR®. This measure has a cooking efficiency of 50 percent, with idle energy rates that vary depending upon pan size.[72] The baseline efficiency is a standard commercial steam cooker with 35 percent efficiency.

Swimming Pool/Spa Covers. This measure reduces evaporation, which is the largest source of pool/spa energy loss. It takes one British thermal unit (Btu) to raise one pound of water by one degree. Each pound of 80º F water that evaporates takes 1,048 Btus of heat out of the pool.[73] The baseline measure is an uncovered pool or spa.

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69 http://www.energystar.gov/index.cfm?c=ovens.pr_comm_ovens
70 http://www.energystar.gov/index.cfm?c=fryers.pr_fryers
71 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COG
72 http://www.energystar.gov/index.cfm?c=steamcookers.pr_steamcookers
73 http://www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13140

8. Commercial Gas Equipment Measure Descriptions

HVAC

Gas Boiler. Boilers are classified as condensing or non-condensing. Condensing boilers condense the flue gas and water vapor, extracting useful heat and improving the boiler efficiency. This measure compares several boilers with different thermal efficiencies and is applicable to both new and existing construction. The overall efficiency of the boiler is defined as the gross energy output divided by the energy input, and is affected by combustion efficiency, standby losses, cycling losses, and heat transfer. Table B-2.34 displays the measure and baseline thermal efficiencies.

Table B-2.34. Gas Boiler Efficiency Comparison

Measure AFUE	Baseline AFUE
90%	82%
94%	

Gas Furnace. Improvements in furnace technology, such as new ignition and heat exchange design, have led to increased furnace efficiency. The AFUE levels considered in this measure are shown in Table B-2.15.

Table B-2.35. Gas Furnace Efficiency Comparison

Measure AFUE	Baseline AFUE
90%	80%
95%	

Water Heat

Water Heater. This measure has a range of thermal efficiencies as shown in Table B-2.36. High efficiency models have better insulation, which reduces standby losses.

Table B-2.36. Commercial Gas Water Heater Comparison

Measure Efficiency	Baseline Efficiency
0.82 EF	0.67 EF
0.90 EF	

9. Industrial Electric Measure Descriptions

Air Compressor Improvements (Demand Reduction, Optimization, Equipment). These measures improve the overall compressed air system by improved system design, leak repair, usage practices, more efficient dryer and storage systems, and compressor upgrades.

Clean Room Improvements (Change Filter Strategy, Chiller Optimize, HVAC). These measures aim to save energy through improved clean room equipment and practices. Savings are attributable to optimization of chiller operating parameters, upgrading to more efficient equipment, and improving filter replacement strategies.

Efficiency Centrifugal Fan. This measure achieves energy savings through improved fan design.

Electric Chip Fab Improvements (Eliminate Exhaust, Exhaust Injector, Reduce Gas Pressure, Solid-state Chiller). These measures are general improvements that increase efficiency in the electric chip fabrication process.

Fan System Optimization. This measure involves the overall optimization of the fan system with improved system design, enhanced flow design, better maintenance practices, and adjustments to system parameters.

Food Manufacturing (Cooling and Storage, Refrigerator Storage Tune-up). These measures maintain and enhance the cooling equipment for each facility type. Tune-ups may include refrigerant charge, equipment cleaning, general maintenance, and improved practices.

General Process Improvements (Paper: Premium Fan, Paper: Large Material Handling, Paper: Material Handling, Paper: Premium Control Large Material, Efficient Pulp Screen, Wood: Replace Pneumatic Conveyor, Metal: New Arc Furnace). These measures include upgrading equipment, replacing hydraulic/pneumatic equipment with electrical equipment, and using optimum size and capacity equipment.

High Efficiency Fans (Fan Equipment Upgrade). This measure involves upgrading motors to higher efficiency. Since NEMA Premium motors are becoming the baseline code requirement in 2010, this measure is based off of super premium motors with efficiency levels at least one efficiency band above NEMA premium.

Lighting Improvements (Efficient Lighting 1, 2, and 3 Shift; HighBay Lighting 1, 2, and 3 Shift; Lighting Controls). Changes to overall illumination levels, use of natural lighting, or technology improvements to more efficient bulbs or ballasts will decrease the overall lighting energy consumption. These measures include upgrades from T12 to T8 systems, T8 to high-performance T8 systems, HID to fluorescent conversions, standard HID to high-efficiency HID systems, and occupancy and day lighting controls.

Material Handling (Material Handling Variable Speed Drive (VFD) 1 and 2, Material Handling 1 and 2). This measure includes equipment upgrades (such as to VSDs) and enhanced system design or practices.

Motor Rewind. This measure follows the Green Motors Practices Group™ recommendations of best practices to maintain original efficiency, commonly called a Green Rewind.[74, 75] A failed motor can be rewound to a lower efficiency, rewound to maintain the original efficiency, or replaced.

Pump Equipment Upgrade. This measure achieves energy savings through improved pump design and sizing.

Pump Improvements (Pump Energy Management, Pump System Optimization). This measure involves optimizing the overall pump system with improved system design, enhanced flow design, better maintenance practices, and adjustments to system parameters.

Synchronous Belts. This measure contains mating, corresponding grooves in the drive sprocket, preventing slip and thus reducing energy losses.

Transformers (New & Retrofit). Energy efficient transformers provide improved power quality while minimizing losses.

Whole Plant Improvements (Fan Energy Management, Plant Energy Management, Integrated Plant Energy Management, Energy Project Management). These measures include synergistic savings of plant-wide energy management and improvements across multiple systems such as compressed air, pumping, and fan systems.

74 http://www.bpa.gov/energy/n/industrial/Green_motors/

75 http://www.greenmotors.org/downloads/RTFSubmittalMay_08%20_2_.pdf

10. Industrial Gas Measure Descriptions

Boiler Improvements. A boiler generally creates steam or hot water for process or non-process applications. Savings are generated by installation of a waste heat boiler to provide direct power or use of flue gas heat to preheat boiler feed water.

Boiler Operation and Maintenance. This measure includes analyzing flue gas for proper air/fuel ration, establishing maintenance schedules, or reducing excessive boiler blow down.

HVAC Improvements. Many measures can reduce a plants' HVAC energy consumption, such as conditioning only space in use, installing timers and/or thermostats, lowering ceilings to reduce conditioned space, and installing or upgrading insulation on distribution systems.

HVAC Operation and Maintenance. These measures include sizing air handling grills/ducts/coils to minimize air resistance, adjusting vents to minimize energy use, and maintaining air filters by cleaning or replacing.

Other Process Improvements/Operation and Maintenance. These measures include upgrading obsolete equipment, reducing fluid flow rates, and using optimum size and capacity equipment.

Process Heating Improvements. These measures decrease the energy required for process-related heating. Examples include optimizing the drying oven schedule, reducing the temperature of process equipment when on standby, and modifying equipment to improve the drying process.

Process Heating Operation and Maintenance. These measures improve the a plants overall energy efficiency. Examples include repairing faulty insulation, adjusting burners for efficient operation, and eliminating leaks in combustible gas lines.

Steam Distribution Systems. These measures include leak elimination and improved duct insulation to reduce distribution system loss.

Appendix B.3: Measure Details

The following tables show electric and gas technical measure inputs for the residential, commercial, and industrial sectors.

Table B.3.1. Residential Electric Measure Details

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Computer	Computer, Energy Star	Energy Star Computer	Standard Computer	Per installation	Existing	51	5	$24	100%	N/A	$0.12	4,076
Manufactured	Computer	Computer, Energy Star	Energy Star Computer	Standard Computer	Per installation	New	51	5	$24	100%	N/A	$0.12	463
Manufactured	Cooking Oven	Cooking Oven, High Efficiency	High Efficiency Oven	Standard Oven	Per installation	Existing	58	20	$282	100%	N/A	$0.55	2,703
Manufactured	Cooking Oven	Cooking Oven, High Efficiency	High Efficiency Oven	Standard Oven	Per installation	New	58	20	$282	100%	N/A	$0.55	1,617
Manufactured	Cool Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	87	5	$576	25%	95%	$1.85	305
Manufactured	Cool Central	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	3	30	$25	95%	50%	$0.73	94
Manufactured	Cool Central	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	Existing	34	10	$93	85%	35%	$0.44	306
Manufactured	Cool Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	11	25	$338	40%	95%	$2.99	42
Manufactured	Cool Central	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	180	25	$1,559	75%	35%	$0.91	495
Manufactured	Cool Central	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	361	25	$1,559	75%	1%	$0.45	33
Manufactured	Cool Central	Central Cooling, SEER 18	SEER 18	SEER 13	Per installation	Existing	161	15	$1,490	100%	N/A	$1.21	1,154
Manufactured	Cool Central	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	Existing	78	5	$204	95%	75%	$0.72	825
Manufactured	Cool Central	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	Existing	10	20	$282	85%	95%	$3.12	76
Manufactured	Cool Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	9	20	$25	95%	80%	$0.30	90
Manufactured	Cool Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	6	20	$54	95%	60%	$0.97	35
Manufactured	Cool Central	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	4	6	$46	95%	50%	$2.72	37
Manufactured	Cool Central	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	25	20	$672	75%	75%	$3.03	132
Manufactured	Cool Central	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	87	18	$383	75%	60%	$0.52	469
Manufactured	Cool Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	17	25	$445	25%	85%	$2.68	36
Manufactured	Cool Central	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	344	25	$1,680	25%	20%	$0.51	209
Manufactured	Cool Central	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	87	11	$449	75%	50%	$0.81	369
Manufactured	Cool Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	82	15	$5	95%	65%	$0.00	454
Manufactured	Cool Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	52	25	$672	25%	90%	$1.35	116
Manufactured	Cool Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	59	11	$1,083	50%	95%	$2.87	271
Manufactured	Cool Central	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	205	25	$1,647	85%	25%	$0.84	355
Manufactured	Cool Central	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	Existing	131	20	$1,621	50%	95%	$1.42	458
Manufactured	Cool Central	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	Existing	65	25	$204	50%	50%	$0.32	203
Manufactured	Cool Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	25	$341	65%	85%	$24.34	7
Manufactured	Cool Central	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	15	25	$3,514	65%	50%	$23.46	46
Manufactured	Cool Central	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	24	25	$3,514	65%	20%	$14.97	29
Manufactured	Cool Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	64	5	$576	25%	95%	$2.50	106

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Cool Central	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	New	25	10	$93	85%	35%	$0.60	106
Manufactured	Cool Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	12	25	$454	60%	95%	$3.93	35
Manufactured	Cool Central	Central Cooling, SEER 18	SEER 18	SEER 13	Per installation	New	148	15	$1,490	100%	N/A	$1.32	544
Manufactured	Cool Central	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	New	58	5	$204	95%	75%	$0.98	288
Manufactured	Cool Central	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	New	7	20	$375	85%	95%	$5.62	24
Manufactured	Cool Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	7	20	$25	95%	80%	$0.40	31
Manufactured	Cool Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	4	20	$54	95%	60%	$1.32	15
Manufactured	Cool Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	12	25	$599	75%	85%	$4.89	41
Manufactured	Cool Central	Green Roof	ecoroof	Standard Roof	Per installation	New	32	40	$19,076	20%	95%	$55.06	6
Manufactured	Cool Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	60	15	$5	95%	65%	$0.01	183
Manufactured	Cool Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	38	25	$893	50%	90%	$2.43	96
Manufactured	Cool Central	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	35	25	$795	75%	75%	$2.36	113
Manufactured	Cool Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	43	11	$1,083	50%	95%	$3.88	109
Manufactured	Cool Central	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	33	25	$973	50%	95%	$3.07	85
Manufactured	Cool Central	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	New	96	20	$1,621	50%	95%	$1.92	159
Manufactured	Cool Central	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	New	48	25	$204	75%	50%	$0.44	106
Manufactured	Cool Central	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	2	25	$458	95%	75%	$21.55	7
Manufactured	Cool Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	25	$395	95%	75%	$27.53	5
Manufactured	Cool Room	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	1	30	$25	95%	50%	$1.37	85
Manufactured	Cool Room	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	Existing	18	10	$93	85%	35%	$0.84	230
Manufactured	Cool Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	6	25	$338	40%	95%	$5.47	40
Manufactured	Cool Room	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	98	25	$1,559	75%	35%	$1.67	456
Manufactured	Cool Room	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	196	25	$1,559	75%	1%	$0.83	29
Manufactured	Cool Room	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	Existing	5	20	$282	85%	95%	$5.87	72
Manufactured	Cool Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	5	20	$25	95%	80%	$0.56	78
Manufactured	Cool Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	3	20	$54	95%	60%	$1.83	32
Manufactured	Cool Room	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	2	6	$46	95%	50%	$5.12	34
Manufactured	Cool Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	9	25	$445	25%	85%	$5.00	32
Manufactured	Cool Room	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	184	25	$1,680	25%	20%	$0.96	182
Manufactured	Cool Room	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	46	11	$449	75%	50%	$1.52	333
Manufactured	Cool Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	27	25	$672	25%	90%	$2.54	104

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Cool Room	Room AC conversion to Ductless Heat Pump	SEER 13	EER 9.8	Per installation	Existing	56	20	$5,621	75%	N/A	$11.37	734
Manufactured	Cool Room	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	111	25	$1,647	85%	25%	$1.55	327
Manufactured	Cool Room	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	Existing	34	25	$204	50%	50%	$0.61	175
Manufactured	Cool Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	0.81	25	$341	65%	85%	$44.33	7
Manufactured	Cool Room	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	8	25	$3,514	65%	50%	$42.73	45
Manufactured	Cool Room	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	13	25	$3,514	65%	20%	$27.26	28
Manufactured	Cool Room	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	New	14	10	$93	85%	35%	$1.06	82
Manufactured	Cool Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	7	25	$454	60%	95%	$6.66	33
Manufactured	Cool Room	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	New	4	20	$375	85%	95%	$9.82	22
Manufactured	Cool Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	4	20	$25	95%	80%	$0.71	27
Manufactured	Cool Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	2	20	$54	95%	60%	$2.30	13
Manufactured	Cool Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	7	25	$599	75%	85%	$8.46	37
Manufactured	Cool Room	Green Roof	ecoroof	Standard Roof	Per installation	New	18	40	$19,076	20%	95%	$96.10	5
Manufactured	Cool Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	22	25	$893	50%	90%	$4.25	84
Manufactured	Cool Room	Room AC conversion to Ductless Heat Pump	SEER 13	EER 9.8	Per installation	New	46	20	$5,621	75%	N/A	$14.02	145
Manufactured	Cool Room	Room AC, EER 10.8	EER 10.8	EER 9.8	Per installation	New	18	9	$7	100%	N/A	$0.06	30
Manufactured	Cool Room	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	20	25	$795	75%	75%	$4.13	100
Manufactured	Cool Room	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	19	25	$973	50%	95%	$5.24	76
Manufactured	Cool Room	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	New	27	25	$204	75%	50%	$0.77	94
Manufactured	Cool Room	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	1	25	$458	95%	75%	$36.08	7
Manufactured	Cool Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	0.89	25	$395	95%	75%	$46.55	4
Manufactured	Dryer	Dryer, Advanced Efficiency EF 3.30	Advanced Efficiency Dryer 3.30	Standard Dryer EF 3.01	Per installation	Existing	50	14	$224	100%	N/A	$0.59	3,242
Manufactured	Dryer	Dryer, Advanced Efficiency EF 3.30	Advanced Efficiency Dryer 3.30	Standard Dryer EF 3.01	Per installation	New	50	14	$224	100%	N/A	$0.59	1,179
Manufactured	Freezer	Freezer, Energy Star	Energy Star Freezer	Standard Freezer	Per installation	Existing	46	20	$22	76%	N/A	$0.04	590
Manufactured	Freezer	Stand-Alone Freezer - Removal	Proper Disposal of Freezer	Existing Non-Efficient Freezer	Per installation	Existing	535	8	$99	24%	**%	$0.02	5,877
Manufactured	Freezer	Freezer, Energy Star	Energy Star Freezer	Standard Freezer	Per installation	New	46	20	$22	76%	N/A	$0.04	536
Manufactured	Heat Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	663	5	$576	25%	95%	$0.22	4,677
Manufactured	Heat Central	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	36	30	$25	95%	50%	$0.04	2,297
Manufactured	Heat Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	124	25	$338	40%	95%	$0.26	1,027
Manufactured	Heat Central	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	1,884	25	$1,559	75%	35%	$0.06	12,273
Manufactured	Heat Central	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	3,774	25	$1,559	75%	1%	$0.02	811

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Heat Central	Conversion Electric Furnace to ASHP	Air Source Heat Pump Seer 13 HSPF 7.7	Electric Furnace HSPF 1	Per installation	Existing	3,582	20	$2,883	100%	N/A	$0.06	49,273
Manufactured	Heat Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	99	20	$25	95%	80%	$0.00	2,192
Manufactured	Heat Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	66	20	$54	95%	60%	$0.07	868
Manufactured	Heat Central	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	43	6	$46	95%	50%	$0.23	895
Manufactured	Heat Central	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	265	20	$672	75%	75%	$0.26	3,218
Manufactured	Heat Central	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	663	18	$383	75%	60%	$0.04	8,286
Manufactured	Heat Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	182	25	$445	25%	85%	$0.23	854
Manufactured	Heat Central	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	3,596	25	$1,680	25%	20%	$0.02	5,129
Manufactured	Heat Central	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	663	11	$449	75%	50%	$0.08	5,680
Manufactured	Heat Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	132	15	$5	15%	65%	$-0.02	258
Manufactured	Heat Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	132	25	$672	25%	90%	$0.51	608
Manufactured	Heat Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	451	11	$1,083	50%	95%	$0.35	4,515
Manufactured	Heat Central	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	2,145	25	$1,647	85%	25%	$0.05	8,944
Manufactured	Heat Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	15	25	$341	65%	85%	$2.31	171
Manufactured	Heat Central	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	165	25	$3,514	65%	50%	$2.22	1,084
Manufactured	Heat Central	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	259	25	$3,514	65%	20%	$1.41	683
Manufactured	Heat Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	468	5	$576	25%	95%	$0.32	1,442
Manufactured	Heat Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	122	25	$454	60%	95%	$0.37	835
Manufactured	Heat Central	Conversion Electric Furnace to ASHP	Air Source Heat Pump Seer 13 HSPF 7.7	Electric Furnace HSPF 1	Per installation	New	2,531	20	$2,758	100%	N/A	$0.10	25,227
Manufactured	Heat Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	70	20	$25	95%	80%	$0.01	675
Manufactured	Heat Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	46	20	$54	95%	60%	$0.10	334
Manufactured	Heat Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	129	25	$599	75%	85%	$0.46	975
Manufactured	Heat Central	Green Roof	ecoroof	Standard Roof	Per installation	New	328	40	$19,076	20%	95%	$5.49	138
Manufactured	Heat Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	93	15	$5	15%	65%	$-0.02	100
Manufactured	Heat Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	93	25	$893	50%	90%	$0.98	474
Manufactured	Heat Central	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	14	25	$795	75%	75%	$5.75	90
Manufactured	Heat Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	318	11	$1,083	50%	95%	$0.51	1,760
Manufactured	Heat Central	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	334	25	$973	50%	95%	$0.28	1,975
Manufactured	Heat Central	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	22	25	$458	95%	75%	$2.13	178
Manufactured	Heat Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	15	25	$395	95%	75%	$2.73	120

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	556	5	$576	25%	95%	$0.27	1,484
Manufactured	Heat Pump	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	29	30	$25	95%	50%	$0.06	697
Manufactured	Heat Pump	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	Existing	26	10	$93	85%	35%	$0.57	176
Manufactured	Heat Pump	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	41	25	$338	40%	95%	$0.83	130
Manufactured	Heat Pump	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	661	25	$1,559	75%	35%	$0.23	1,591
Manufactured	Heat Pump	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	1,325	25	$1,559	75%	1%	$0.10	96
Manufactured	Heat Pump	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	Existing	59	5	$204	95%	75%	$0.94	475
Manufactured	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	Existing	7	20	$282	85%	95%	$4.12	51
Manufactured	Heat Pump	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	80	20	$25	95%	80%	$0.01	663
Manufactured	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	53	20	$54	95%	60%	$0.09	301
Manufactured	Heat Pump	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	36	6	$46	95%	50%	$0.29	303
Manufactured	Heat Pump	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	215	20	$672	75%	75%	$0.34	1,061
Manufactured	Heat Pump	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	556	18	$383	75%	60%	$0.06	2,601
Manufactured	Heat Pump	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	153	25	$445	25%	85%	$0.29	289
Manufactured	Heat Pump	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	3,014	25	$1,680	25%	20%	$0.04	1,610
Manufactured	Heat Pump	Heat Pump Premium Efficiency, SEER 16, HSPF 8.8	ASHP SEER 16, HSPF 8.8	ASHP SEER 13, HSPF 7.7	Per installation	Existing	394	20	$1,233	100%	N/A	$0.34	1,587
Manufactured	Heat Pump	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	556	11	$449	75%	50%	$0.11	2,029
Manufactured	Heat Pump	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	524	15	$5	95%	65%	$-0.02	2,640
Manufactured	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	144	25	$672	25%	90%	$0.47	268
Manufactured	Heat Pump	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	378	11	$1,083	50%	95%	$0.43	1,538
Manufactured	Heat Pump	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	749	25	$1,647	85%	25%	$0.21	1,118
Manufactured	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	Existing	99	20	$1,621	50%	95%	$1.86	264
Manufactured	Heat Pump	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	Existing	49	25	$204	50%	50%	$0.42	106
Manufactured	Heat Pump	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	5	25	$341	65%	85%	$6.70	24
Manufactured	Heat Pump	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	57	25	$3,514	65%	50%	$6.46	152
Manufactured	Heat Pump	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	89	25	$3,514	65%	20%	$4.11	95
Manufactured	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	347	5	$576	25%	95%	$0.44	420
Manufactured	Heat Pump	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	New	16	10	$93	85%	35%	$0.93	50
Manufactured	Heat Pump	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	34	25	$454	60%	95%	$1.38	87
Manufactured	Heat Pump	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	New	37	5	$204	95%	75%	$1.52	134
Manufactured	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	New	4	20	$375	85%	95%	$8.79	13

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Heat Pump	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	50	20	$25	95%	80%	$0.04	188
Manufactured	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	33	20	$54	95%	60%	$0.16	93
Manufactured	Heat Pump	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	96	25	$599	75%	85%	$0.64	294
Manufactured	Heat Pump	Green Roof	ecoroof	Standard Roof	Per installation	New	235	40	$19,076	20%	95%	$7.67	39
Manufactured	Heat Pump	Heat Pump Premium Efficiency, SEER 16, HSPF 8.8	ASHP SEER 16, HSPF 8.8	ASHP SEER 13, HSPF 7.7	Per installation	New	258	20	$1,233	100%	N/A	$0.53	950
Manufactured	Heat Pump	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	327	15	$5	95%	65%	$-0.02	888
Manufactured	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	90	25	$893	50%	90%	$1.03	185
Manufactured	Heat Pump	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	25	25	$795	75%	75%	$3.30	63
Manufactured	Heat Pump	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	236	11	$1,083	50%	95%	$0.70	529
Manufactured	Heat Pump	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	94	25	$973	50%	95%	$1.07	201
Manufactured	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	New	61	20	$1,621	50%	95%	$2.99	74
Manufactured	Heat Pump	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	New	30	25	$204	75%	50%	$0.68	54
Manufactured	Heat Pump	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	6	25	$458	95%	75%	$7.70	19
Manufactured	Heat Pump	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	4	25	$395	95%	75%	$9.47	13
Manufactured	Heat Room	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	28	30	$25	95%	50%	$0.06	778
Manufactured	Heat Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	98	25	$338	40%	95%	$0.34	356
Manufactured	Heat Room	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	1,484	25	$1,559	75%	35%	$0.08	4,249
Manufactured	Heat Room	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	2,974	25	$1,559	75%	1%	$0.03	268
Manufactured	Heat Room	Conversion Baseboard Heating to DHP	Ductless Heat Pump HSPF 7.7	HSPF = 1	Per installation	Existing	2,580	20	$7,444	50%	N/A	$0.30	8,192
Manufactured	Heat Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	76	20	$25	95%	80%	$0.01	709
Manufactured	Heat Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	51	20	$54	95%	60%	$0.09	293
Manufactured	Heat Room	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	33	6	$46	95%	50%	$0.31	302
Manufactured	Heat Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	142	25	$445	25%	85%	$0.30	291
Manufactured	Heat Room	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	2,793	25	$1,680	25%	20%	$0.04	1,674
Manufactured	Heat Room	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	510	11	$449	75%	50%	$0.11	1,918
Manufactured	Heat Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	102	25	$672	25%	90%	$0.67	217
Manufactured	Heat Room	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	1,687	25	$1,647	85%	25%	$0.08	3,095
Manufactured	Heat Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	12	25	$341	65%	85%	$2.91	63
Manufactured	Heat Room	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	131	25	$3,514	65%	50%	$2.80	399
Manufactured	Heat Room	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	205	25	$3,514	65%	20%	$1.78	251

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Heat Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	96	25	$454	60%	95%	$0.47	278
Manufactured	Heat Room	Conversion Baseboard Heating to DHP	Ductless Heat Pump HSPF 7.7	HSPF = 1	Per installation	New	1,823	20	$7,444	50%	N/A	$0.44	3,946
Manufactured	Heat Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	54	20	$25	95%	80%	$0.03	218
Manufactured	Heat Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	36	20	$54	95%	60%	$0.14	108
Manufactured	Heat Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	100	25	$599	75%	85%	$0.60	318
Manufactured	Heat Room	Green Roof	ecoroof	Standard Roof	Per installation	New	252	40	$19,076	20%	95%	$7.14	46
Manufactured	Heat Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	72	25	$893	50%	90%	$1.28	158
Manufactured	Heat Room	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	11	25	$795	75%	75%	$7.48	30
Manufactured	Heat Room	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	263	25	$973	50%	95%	$0.36	652
Manufactured	Heat Room	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	18	25	$458	95%	75%	$2.66	62
Manufactured	Heat Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	12	25	$395	95%	75%	$3.44	41
Manufactured	Lighting Exterior	CFL, Flood (17 W)	CFL, Flood	Standard Incandescent Flood	Per installation	Existing	56	5	$0.91	100%	N/A	$-0.01	3,948
Manufactured	Lighting Exterior	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Per installation	Existing	8	10	$16	80%	85%	$0.31	402
Manufactured	Lighting Exterior	CFL, Flood (17 W)	CFL, Flood	Standard Incandescent Flood	Per installation	New	56	5	$0.91	100%	N/A	$-0.01	618
Manufactured	Lighting Exterior	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Per installation	New	11	10	$16	80%	85%	$0.23	223
Manufactured	Lighting Interior Specialty	CFL (13 W, 20 W, 25 W)	CFL (3-Way)	Standard Incandescent (3-Way)	Per installation	Existing	49	5	$3	100%	N/A	$0.00	6,089
Manufactured	Lighting Interior Specialty	CFL (13 W, 20 W, 25 W)	CFL (3-Way)	Standard Incandescent (3-Way)	Per installation	New	49	5	$3	100%	N/A	$0.00	787
Manufactured	Lighting Interior Standard	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Per installation	Existing	7	20	$147	40%	95%	$2.31	56
Manufactured	Lighting Interior Standard	Lighting CFL 15 W	15 W CFL	Standard 60 W Incandescent	Per installation	Existing	47	5	$2	100%	N/A	$-0.00	11,644
Manufactured	Lighting Interior Standard	Lighting LED 7 W	7 W LED	Standard 60 W Incandescent	Per installation	Existing	56	20	$36	50%	N/A	$0.06	19,040
Manufactured	Lighting Interior Standard	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Per installation	Existing	4	10	$32	85%	95%	$1.30	733
Manufactured	Lighting Interior Standard	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Per installation	New	9	20	$147	40%	95%	$1.76	31
Manufactured	Lighting Interior Standard	Lighting CFL 15 W	15 W CFL	Standard 60 W Incandescent	Per installation	New	47	5	$2	100%	N/A	$-0.00	2,120
Manufactured	Lighting Interior Standard	Lighting LED 7 W	7 W LED	Standard 60 W Incandescent	Per installation	New	56	20	$36	50%	N/A	$0.06	3,092
Manufactured	Lighting Interior Standard	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Per installation	New	5	10	$32	85%	95%	$0.99	407
Manufactured	Microwave	Microwave, High Efficiency	High Efficiency Microwave	Standard Microwave	Per installation	Existing	9	15	$79	100%	N/A	$1.05	601

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Microwave	Microwave, High Efficiency	High Efficiency Microwave	Standard Microwave	Per installation	New	9	15	$79	100%	N/A	$1.05	244
Manufactured	Monitor	Monitor, Energy Star	Energy Star Monitor	Standard Monitor	Per installation	Existing	36	5	$3	100%	N/A	$0.01	3,365
Manufactured	Monitor	Monitor, Energy Star	Energy Star Monitor	Standard Monitor	Per installation	New	36	5	$3	100%	N/A	$0.01	390
Manufactured	Plug Load Other	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Per installation	Existing	17	7	$30	50%	50%	$0.35	1,900
Manufactured	Plug Load Other	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Per installation	Existing	1	7	$2	50%	80%	$0.43	463
Manufactured	Plug Load Other	Office Copier	Office Copier	Standard Copier	Per installation	Existing	39	6	$5	10%	50%	$0.01	180
Manufactured	Plug Load Other	Office Printer	Office Printer	Standard Copier	Per installation	Existing	5	5	$5	20%	50%	$0.26	46
Manufactured	Plug Load Other	Smart Strip	Smart Strip	Standard PowerStrip	Per installation	Existing	102	5	$22	50%	85%	$0.04	3,991
Manufactured	Plug Load Other	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Per installation	New	17	7	$30	50%	50%	$0.35	829
Manufactured	Plug Load Other	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Per installation	New	1	7	$2	50%	80%	$0.43	202
Manufactured	Plug Load Other	Office Copier	Office Copier	Standard Copier	Per installation	New	39	6	$5	10%	50%	$0.01	78
Manufactured	Plug Load Other	Office Printer	Office Printer	Standard Copier	Per installation	New	5	5	$5	20%	50%	$0.26	20
Manufactured	Plug Load Other	Smart Strip	Smart Strip	Standard PowerStrip	Per installation	New	102	5	$22	50%	85%	$0.04	1,742
Manufactured	Refrigerator	Refrigerator, Energy Star	Energy Star Refrigerator	Standard Refrigerator	Per installation	Existing	122	20	$15	92%	N/A	$0.00	3,392
Manufactured	Refrigerator	Refrigerator/Freezer - Removal of Secondary	Proper Disposal of Refrigerator/Freezer	Existing Non-Efficient Refrigerator/Freezer	Per installation	Existing	474	9	$102	8%	**%	$0.03	2,891
Manufactured	Refrigerator	Refrigerator, Energy Star	Energy Star Refrigerator	Standard Refrigerator	Per installation	New	122	20	$15	100%	N/A	$0.00	2,376
Manufactured	Set Top Box	Set Top Box, Energy Star	Energy Star Set Top Box	Standard Set Top Box	Per installation	Existing	164	5	$12	100%	N/A	$0.01	19,763
Manufactured	Set Top Box	Set Top Box, Energy Star	Energy Star Set Top Box	Standard Set Top Box	Per installation	New	164	5	$12	100%	N/A	$0.01	2,123
Manufactured	Tv	TV CRT, Energy Star	Energy Star CRT TV	Standard CRT TV	Per installation	Existing	112	10	$19	100%	N/A	$0.01	12,414
Manufactured	Tv	TV CRT, Energy Star	Energy Star CRT TV	Standard CRT TV	Per installation	New	112	10	$19	100%	N/A	$0.01	2,998
Manufactured	Tv Bigscreen	TV LCD, Energy Star	Energy Star LCD TV	Standard LCD TV	Per installation	Existing	223	10	$19	100%	N/A	$0.00	4,594
Manufactured	Tv Bigscreen	TV LCD, Energy Star	Energy Star LCD TV	Standard LCD TV	Per installation	New	223	10	$19	100%	N/A	$0.00	1,109
Manufactured	Ventilation And Circulation	Motor, ECM	ECM Motor	Standard Motor	Per installation	Existing	167	20	$172	50%	N/A	$0.10	3,792
Manufactured	Ventilation And Circulation	Motor, ECM - VFD	ECM/VFD Motor	Standard Motor	Per installation	Existing	502	20	$194	50%	N/A	$0.02	11,378
Manufactured	Ventilation And Circulation	Motor, ECM	ECM Motor	Standard Motor	Per installation	New	102	20	$172	50%	N/A	$0.17	1,430
Manufactured	Ventilation And Circulation	Motor, ECM - VFD	ECM/VFD Motor	Standard Motor	Per installation	New	307	20	$194	50%	N/A	$0.05	4,290
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	111	14	$227	100%	83%	$-0.25	2,008
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	148	14	$296	100%	90%	$-0.23	2,918
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	169	14	$317	100%	95%	$-0.21	3,509

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	32	12	$42	71%	50%	$0.16	767
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	32	12	$42	71%	50%	$3.50	74,969
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	370	40	$540	29%	90%	$2.77	41,990
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	370	40	$540	29%	90%	$0.13	5,873
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	39	5	$23	95%	75%	$0.15	1,644
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	39	5	$23	95%	75%	$3.33	23,861
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	111	10	$16	95%	65%	$-1.21	16,975
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	111	10	$16	95%	65%	$-0.06	4,504
Manufactured	Water Heat	Water Heater, Heat Pump EF 2.2	Heat Pump Water Heater EF = 2.2	Standard Storage Water Heater EF = 0.92	Per installation	Existing	1,878	15	$1,365	59%	N/A	$0.09	45,976
Manufactured	Water Heat	Water Heater, Storage EF 0.95	Standard Storage Water Heater EF = 0.95	Standard Storage Water Heater EF = 0.92	Per installation	Existing	105	15	$47	100%	N/A	$0.05	832
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	198	5	$8	95%	45%	$0.27	49,148
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	198	5	$8	95%	45%	$-0.00	5,217
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	112	14	$227	100%	83%	$-0.24	921
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	149	14	$296	100%	90%	$-0.22	1,339
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	170	14	$317	100%	95%	$-0.21	1,610
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	32	12	$42	71%	50%	$0.16	352
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	32	12	$42	71%	50%	$3.45	88,297
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	373	40	$459	59%	90%	$2.33	94,870
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	373	40	$459	59%	90%	$0.10	5,320
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	39	5	$23	95%	75%	$3.28	69,188
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	39	5	$23	95%	75%	$0.15	713
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	111	10	$9	95%	65%	$-1.48	838
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	111	10	$9	95%	65%	$-0.08	2,066
Manufactured	Water Heat	Water Heater, Heat Pump EF 2.2	Heat Pump Water Heater EF = 2.2	Standard Storage Water Heater EF = 0.92	Per installation	New	1,622	15	$1,365	59%	N/A	$0.10	15,440
Manufactured	Water Heat	Water Heater, Storage EF 0.95	Standard Storage Water Heater EF = 0.95	Standard Storage Water Heater EF = 0.92	Per installation	New	91	15	$47	100%	N/A	$0.06	223
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	167	5	$8	95%	45%	$0.22	24,795
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	167	5	$8	95%	45%	$0.00	1,978
Multi Family	Computer	Computer, Energy Star	Energy Star Computer	Standard Computer	Per installation	Existing	51	5	$24	100%	N/A	$0.12	12,511
Multi Family	Computer	Computer, Energy Star	Energy Star Computer	Standard Computer	Per installation	New	51	5	$24	100%	N/A	$0.12	1,423
Multi Family	Cooking Oven	Cooking Oven, High Efficiency	High Efficiency Oven	Standard Oven	Per installation	Existing	58	20	$282	100%	N/A	$0.55	8,013

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Multi Family	Cooking Oven	Cooking Oven, High Efficiency	High Efficiency Oven	Standard Oven	Per installation	New	58	20	$282	100%	N/A	$0.55	4,796
Multi Family	Cool Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	71	5	$576	25%	95%	$2.27	106
Multi Family	Cool Central	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	7	30	$25	95%	50%	$0.35	33
Multi Family	Cool Central	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	Existing	28	10	$93	85%	50%	$0.55	151
Multi Family	Cool Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	9	30	$119	75%	95%	$1.23	27
Multi Family	Cool Central	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	146	30	$549	75%	35%	$0.37	188
Multi Family	Cool Central	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	294	30	$549	95%	1%	$0.18	14
Multi Family	Cool Central	Central Cooling, SEER 18	SEER 18	SEER 13	Per installation	Existing	139	15	$1,177	100%	N/A	$1.11	410
Multi Family	Cool Central	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	Existing	64	5	$204	95%	75%	$0.89	286
Multi Family	Cool Central	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	Existing	8	20	$104	85%	95%	$1.42	26
Multi Family	Cool Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	15	20	$25	95%	80%	$0.18	31
Multi Family	Cool Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	10	20	$54	95%	60%	$0.59	12
Multi Family	Cool Central	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	6	6	$46	95%	50%	$1.67	12
Multi Family	Cool Central	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	20	20	$672	75%	75%	$3.73	43
Multi Family	Cool Central	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	71	18	$383	75%	60%	$0.64	138
Multi Family	Cool Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	14	30	$157	25%	85%	$1.10	12
Multi Family	Cool Central	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	280	30	$592	25%	20%	$0.21	70
Multi Family	Cool Central	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	71	11	$358	75%	50%	$0.79	110
Multi Family	Cool Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	67	15	$5	95%	65%	$0.01	150
Multi Family	Cool Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	42	30	$249	50%	90%	$0.58	85
Multi Family	Cool Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	48	11	$1,083	50%	95%	$3.53	88
Multi Family	Cool Central	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	167	30	$978	85%	25%	$0.58	123
Multi Family	Cool Central	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	Existing	106	20	$1,621	50%	95%	$1.74	159
Multi Family	Cool Central	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	Existing	99	30	$204	50%	50%	$0.20	130
Multi Family	Cool Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	30	$202	51%	85%	$16.86	1
Multi Family	Cool Central	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	12	30	$2,086	51%	50%	$16.25	11
Multi Family	Cool Central	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	20	30	$2,086	51%	20%	$10.37	7
Multi Family	Cool Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	55	5	$576	25%	95%	$2.91	39
Multi Family	Cool Central	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	New	22	10	$93	85%	50%	$0.70	56
Multi Family	Cool Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	10	30	$166	90%	95%	$1.58	20
Multi Family	Cool Central	Central Cooling, SEER 18	SEER 18	SEER 13	Per installation	New	123	15	$1,281	100%	N/A	$1.37	183
Multi Family	Cool Central	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	New	50	5	$204	95%	75%	$1.14	106

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Multi Family	Cool Central	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	177	45	$3,569	50%	95%	$1.87	9
Multi Family	Cool Central	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	66	45	$1,387	50%	95%	$1.94	3
Multi Family	Cool Central	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	New	6	20	$143	85%	95%	$2.50	8
Multi Family	Cool Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	12	20	$25	95%	80%	$0.23	11
Multi Family	Cool Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	8	20	$54	95%	60%	$0.76	5
Multi Family	Cool Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	11	30	$219	75%	85%	$1.97	15
Multi Family	Cool Central	Green Roof	ecoroof	Standard Roof	Per installation	New	28	40	$7,290	50%	95%	$24.46	5
Multi Family	Cool Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	52	15	$5	95%	65%	$0.01	64
Multi Family	Cool Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	33	30	$341	75%	90%	$1.02	52
Multi Family	Cool Central	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	30	45	$795	40%	75%	$2.43	19
Multi Family	Cool Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	37	11	$1,083	50%	95%	$4.52	37
Multi Family	Cool Central	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	28	30	$588	50%	95%	$2.04	26
Multi Family	Cool Central	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	New	83	20	$1,621	50%	95%	$2.23	58
Multi Family	Cool Central	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	New	77	30	$204	75%	50%	$0.26	72
Multi Family	Cool Central	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	1	30	$277	95%	75%	$14.38	2
Multi Family	Cool Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	30	$239	95%	75%	$18.38	1
Multi Family	Dryer	Dryer, Advanced Efficiency EF 3.30	Advanced Efficiency Dryer 3.30	Standard Dryer EF 3.01	Per installation	Existing	50	14	$224	100%	N/A	$0.59	7,468
Multi Family	Dryer	Dryer, Advanced Efficiency EF 3.30	Advanced Efficiency Dryer 3.30	Standard Dryer EF 3.01	Per installation	New	50	14	$224	100%	N/A	$0.59	2,476
Multi Family	Freezer	Freezer, Energy Star	Energy Star Freezer	Standard Freezer	Per installation	Existing	46	20	$22	76%	N/A	$0.04	127
Multi Family	Freezer	Stand-Alone Freezer - Removal	Proper Disposal of Freezer	Existing Non-Efficient Freezer	Per installation	Existing	535	8	$99	24%	**%	$0.02	1,265
Multi Family	Freezer	Freezer, Energy Star	Energy Star Freezer	Standard Freezer	Per installation	New	46	20	$22	76%	N/A	$0.04	115
Multi Family	Heat Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	535	5	$576	25%	95%	$0.28	1,484
Multi Family	Heat Central	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	73	30	$25	95%	50%	$0.01	762
Multi Family	Heat Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	100	30	$119	75%	95%	$0.09	614
Multi Family	Heat Central	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	1,520	30	$549	75%	35%	$0.01	4,294
Multi Family	Heat Central	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	3,045	30	$549	95%	1%	$-0.01	325
Multi Family	Heat Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	160	20	$25	95%	80%	$-0.01	695
Multi Family	Heat Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	107	20	$54	95%	60%	$0.03	288
Multi Family	Heat Central	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	69	6	$46	95%	50%	$0.14	279
Multi Family	Heat Central	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	214	20	$672	75%	75%	$0.34	1,004
Multi Family	Heat Central	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	535	18	$383	75%	60%	$0.06	2,261
Multi Family	Heat Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	147	30	$157	25%	85%	$0.08	270
Multi Family	Heat Central	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	2,901	30	$592	25%	20%	$-0.01	1,625

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Multi Family	Heat Central	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	535	11	$358	75%	50%	$0.08	1,800
Multi Family	Heat Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	107	15	$5	15%	65%	$-0.02	81
Multi Family	Heat Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	107	30	$249	50%	90%	$0.21	405
Multi Family	Heat Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	364	11	$1,083	50%	95%	$0.44	1,409
Multi Family	Heat Central	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	1,731	30	$978	85%	25%	$0.03	2,746
Multi Family	Heat Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	12	30	$202	51%	85%	$1.60	41
Multi Family	Heat Central	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	133	30	$2,086	51%	50%	$1.54	265
Multi Family	Heat Central	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	209	30	$2,086	51%	20%	$0.98	166
Multi Family	Heat Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	336	5	$576	25%	95%	$0.46	406
Multi Family	Heat Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	87	30	$166	90%	95%	$0.17	365
Multi Family	Heat Central	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	1,478	45	$3,569	50%	95%	$0.20	167
Multi Family	Heat Central	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	403	45	$1,387	50%	95%	$0.30	43
Multi Family	Heat Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	100	20	$25	95%	80%	$0.00	190
Multi Family	Heat Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	67	20	$54	95%	60%	$0.07	94
Multi Family	Heat Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	92	30	$219	75%	85%	$0.21	279
Multi Family	Heat Central	Green Roof	ecoroof	Standard Roof	Per installation	New	235	40	$7,290	50%	95%	$2.91	95
Multi Family	Heat Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	67	15	$5	15%	65%	$-0.02	27
Multi Family	Heat Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	67	30	$341	75%	90%	$0.48	203
Multi Family	Heat Central	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	10	45	$795	40%	75%	$7.10	13
Multi Family	Heat Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	228	11	$1,083	50%	95%	$0.72	481
Multi Family	Heat Central	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	239	30	$588	50%	95%	$0.22	476
Multi Family	Heat Central	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	16	30	$277	95%	75%	$1.70	49
Multi Family	Heat Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	10	30	$239	95%	75%	$2.18	33
Multi Family	Heat Room	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	56	30	$25	95%	50%	$0.02	7,068
Multi Family	Heat Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	79	30	$119	75%	95%	$0.12	6,154
Multi Family	Heat Room	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	1,198	30	$549	75%	35%	$0.02	40,744
Multi Family	Heat Room	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	2,400	30	$549	95%	1%	$-0.00	3,129
Multi Family	Heat Room	Conversion Baseboard Heating to DHP	Ductless Heat Pump HSPF 7.7	HSPF = 1	Per installation	Existing	2,082	20	$7,444	89%	N/A	$0.39	30,613
Multi Family	Heat Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	123	20	$25	95%	80%	$-0.00	6,415
Multi Family	Heat Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	82	20	$54	95%	60%	$0.05	2,663

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Multi Family	Heat Room	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	53	6	$46	95%	50%	$0.18	2,723
Multi Family	Heat Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	67	30	$157	25%	85%	$0.21	1,518
Multi Family	Heat Room	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	2,254	30	$592	25%	20%	$0.00	15,209
Multi Family	Heat Room	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	412	11	$358	75%	50%	$0.11	17,424
Multi Family	Heat Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	82	30	$249	50%	90%	$0.28	3,931
Multi Family	Heat Room	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	1,362	30	$978	85%	25%	$0.05	25,972
Multi Family	Heat Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	9	30	$202	51%	85%	$2.02	443
Multi Family	Heat Room	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	106	30	$2,086	51%	50%	$1.95	2,804
Multi Family	Heat Room	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	166	30	$2,086	51%	20%	$1.23	1,765
Multi Family	Heat Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	69	30	$166	90%	95%	$0.22	3,491
Multi Family	Heat Room	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	1,138	45	$3,569	50%	95%	$0.27	1,555
Multi Family	Heat Room	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	310	45	$1,387	50%	95%	$0.39	406
Multi Family	Heat Room	Conversion Baseboard Heating to DHP	Ductless Heat Pump HSPF 7.7	HSPF = 1	Per installation	New	1,306	20	$7,444	89%	N/A	$0.63	55,673
Multi Family	Heat Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	77	20	$25	95%	80%	$0.01	1,767
Multi Family	Heat Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	51	20	$54	95%	60%	$0.09	873
Multi Family	Heat Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	42	30	$219	75%	85%	$0.50	1,479
Multi Family	Heat Room	Green Roof	ecoroof	Standard Roof	Per installation	New	181	40	$7,290	50%	95%	$3.79	918
Multi Family	Heat Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	51	30	$341	75%	90%	$0.64	1,901
Multi Family	Heat Room	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	8	45	$795	40%	75%	$9.23	127
Multi Family	Heat Room	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	188	30	$588	50%	95%	$0.29	4,589
Multi Family	Heat Room	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	12	30	$277	95%	75%	$2.13	494
Multi Family	Heat Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	8	30	$239	95%	75%	$2.75	329
Multi Family	Lighting Exterior	CFL, Flood (17 W)	CFL, Flood	Standard Incandescent Flood	Per installation	Existing	56	5	$0.91	100%	N/A	$-0.01	6,543
Multi Family	Lighting Exterior	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Per installation	Existing	16	10	$16	80%	85%	$0.16	569
Multi Family	Lighting Exterior	CFL, Flood (17 W)	CFL, Flood	Standard Incandescent Flood	Per installation	New	56	5	$0.91	100%	N/A	$-0.01	1,059
Multi Family	Lighting Exterior	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Per installation	New	22	10	$16	80%	85%	$0.11	325
Multi Family	Lighting Interior Specialty	CFL (13 W, 20 W, 25 W)	CFL (3-Way)	Standard Incandescent (3-Way)	Per installation	Existing	49	5	$3	100%	N/A	$0.00	14,683
Multi Family	Lighting Interior Specialty	CFL (13 W, 20 W, 25 W)	CFL (3-Way)	Standard Incandescent (3-Way)	Per installation	New	49	5	$3	100%	N/A	$0.00	1,949
Multi Family	Lighting Interior Standard	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Per installation	Existing	20	20	$147	25%	95%	$0.81	89

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Multi Family	Lighting Interior Standard	Lighting CFL 15 W	15 W CFL	Standard 60 W Incandescent	Per installation	Existing	47	5	$2	100%	N/A	$-0.00	38,600
Multi Family	Lighting Interior Standard	Lighting LED 7 W	7 W LED	Standard 60 W Incandescent	Per installation	Existing	56	20	$36	50%	N/A	$0.06	45,696
Multi Family	Lighting Interior Standard	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Per installation	Existing	5	10	$32	85%	95%	$1.03	1,829
Multi Family	Lighting Interior Standard	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Per installation	New	28	20	$147	25%	95%	$0.59	51
Multi Family	Lighting Interior Standard	Lighting CFL 15 W	15 W CFL	Standard 60 W Incandescent	Per installation	New	47	5	$2	100%	N/A	$-0.00	7,237
Multi Family	Lighting Interior Standard	Lighting LED 7 W	7 W LED	Standard 60 W Incandescent	Per installation	New	56	20	$36	50%	N/A	$0.06	7,663
Multi Family	Lighting Interior Standard	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Per installation	New	7	10	$32	85%	95%	$0.75	1,047
Multi Family	Microwave	Microwave, High Efficiency	High Efficiency Microwave	Standard Microwave	Per installation	Existing	9	15	$79	100%	N/A	$1.05	1,778
Multi Family	Microwave	Microwave, High Efficiency	High Efficiency Microwave	Standard Microwave	Per installation	New	9	15	$79	100%	N/A	$1.05	703
Multi Family	Monitor	Monitor, Energy Star	Energy Star Monitor	Standard Monitor	Per installation	Existing	36	5	$3	100%	N/A	$0.01	7,262
Multi Family	Monitor	Monitor, Energy Star	Energy Star Monitor	Standard Monitor	Per installation	New	36	5	$3	100%	N/A	$0.01	843
Multi Family	Plug Load Other	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Per installation	Existing	17	7	$30	50%	50%	$0.35	5,032
Multi Family	Plug Load Other	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Per installation	Existing	0.55	7	$2	50%	80%	$0.98	598
Multi Family	Plug Load Other	Office Copier	Office Copier	Standard Copier	Per installation	Existing	39	6	$5	10%	50%	$0.01	522
Multi Family	Plug Load Other	Office Printer	Office Printer	Standard Copier	Per installation	Existing	5	5	$5	20%	50%	$0.26	133
Multi Family	Plug Load Other	Smart Strip	Smart Strip	Standard PowerStrip	Per installation	Existing	102	5	$22	50%	85%	$0.04	11,494
Multi Family	Plug Load Other	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Per installation	New	17	7	$30	50%	50%	$0.35	2,196
Multi Family	Plug Load Other	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Per installation	New	0.55	7	$2	50%	80%	$0.98	261
Multi Family	Plug Load Other	Office Copier	Office Copier	Standard Copier	Per installation	New	39	6	$5	10%	50%	$0.01	227
Multi Family	Plug Load Other	Office Printer	Office Printer	Standard Copier	Per installation	New	5	5	$5	20%	50%	$0.26	58
Multi Family	Plug Load Other	Smart Strip	Smart Strip	Standard PowerStrip	Per installation	New	102	5	$22	50%	85%	$0.04	5,016
Multi Family	Refrigerator	Refrigerator, Energy Star	Energy Star Refrigerator	Standard Refrigerator	Per installation	Existing	122	20	$15	97%	N/A	$0.00	11,252
Multi Family	Refrigerator	Refrigerator/Freezer - Removal of Secondary	Proper Disposal of Refrigerator/Freezer	Existing Non-Efficient Refrigerator/Freezer	Per installation	Existing	473	9	$102	3%	**%	$0.03	2,939
Multi Family	Refrigerator	Refrigerator, Energy Star	Energy Star Refrigerator	Standard Refrigerator	Per installation	New	122	20	$15	100%	N/A	$0.00	6,864
Multi Family	Set Top Box	Set Top Box, Energy Star	Energy Star Set Top Box	Standard Set Top Box	Per installation	Existing	164	5	$12	100%	N/A	$0.01	53,480
Multi Family	Set Top Box	Set Top Box, Energy Star	Energy Star Set Top Box	Standard Set Top Box	Per installation	New	164	5	$12	100%	N/A	$0.01	5,745
Multi Family	Tv	TV CRT, Energy Star	Energy Star CRT TV	Standard CRT TV	Per installation	Existing	112	10	$19	100%	N/A	$0.01	39,584
Multi Family	Tv	TV CRT, Energy Star	Energy Star CRT TV	Standard CRT TV	Per installation	New	112	10	$19	100%	N/A	$0.01	9,560
Multi Family	Tv Bigscreen	TV LCD, Energy Star	Energy Star LCD TV	Standard LCD TV	Per installation	Existing	223	10	$19	100%	N/A	$0.00	7,715
Multi Family	Tv Bigscreen	TV LCD, Energy Star	Energy Star LCD TV	Standard LCD TV	Per installation	New	223	10	$19	100%	N/A	$0.00	1,863

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Multi Family	Ventilation And Circulation	Motor, ECM	ECM Motor	Standard Motor	Per installation	Existing	110	20	$172	50%	N/A	$0.16	7,312
Multi Family	Ventilation And Circulation	Motor, ECM - VFD	ECM/VFD Motor	Standard Motor	Per installation	Existing	330	20	$194	50%	N/A	$0.05	21,936
Multi Family	Ventilation And Circulation	Motor, ECM	ECM Motor	Standard Motor	Per installation	New	86	20	$172	50%	N/A	$0.21	3,470
Multi Family	Ventilation And Circulation	Motor, ECM - VFD	ECM/VFD Motor	Standard Motor	Per installation	New	258	20	$194	50%	N/A	$0.07	10,411
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	111	14	$227	79%	87%	$-0.25	4,151
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	148	14	$296	79%	95%	$-0.23	6,064
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	169	14	$317	79%	99%	$-0.21	7,200
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	32	12	$42	58%	50%	$0.16	1,551
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	32	12	$42	58%	50%	$3.50	6,553
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	370	40	$540	29%	90%	$0.13	14,161
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	370	40	$540	29%	90%	$2.77	91,576
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	39	5	$23	95%	75%	$0.15	3,880
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	39	5	$23	95%	75%	$3.33	28,001
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	111	10	$16	95%	65%	$-0.06	11,232
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	111	10	$16	95%	65%	$-1.21	41,776
Multi Family	Water Heat	Water Heater, Storage EF 0.95	Standard Storage Water Heater EF = 0.95	Standard Storage Water Heater EF = 0.92	Per installation	Existing	62	15	$47	100%	N/A	$0.09	1,491
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	117	5	$8	95%	45%	$0.31	61,354
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	117	5	$8	95%	45%	$0.01	7,446
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	112	14	$227	79%	87%	$-0.24	1,906
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	149	14	$296	79%	95%	$-0.22	2,784
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	170	14	$317	79%	99%	$-0.21	3,306
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	32	12	$42	58%	50%	$0.16	712
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	32	12	$42	58%	50%	$3.45	71,756
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	373	40	$459	59%	90%	$0.10	12,780

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	373	40	$459	59%	90%	$2.33	44,355
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	39	5	$23	95%	75%	$0.15	1,628
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	39	5	$23	95%	75%	$3.28	90,470
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	111	10	$9	95%	65%	$-0.08	5,157
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	111	10	$9	95%	65%	$-1.48	9,304
Multi Family	Water Heat	Water Heater, Storage EF 0.95	Standard Storage Water Heater EF = 0.95	Standard Storage Water Heater EF = 0.92	Per installation	New	55	15	$47	100%	N/A	$0.10	385
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	101	5	$8	95%	45%	$0.01	2,881
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	101	5	$8	95%	45%	$0.25	44,728
Single Family	Computer	Computer, Energy Star	Energy Star Computer	Standard Computer	Per installation	Existing	48	5	$22	100%	N/A	$0.12	63,823
Single Family	Computer	Computer, Energy Star	Energy Star Computer	Standard Computer	Per installation	New	48	5	$22	100%	N/A	$0.12	7,262
Single Family	Cooking Oven	Cooking Oven, High Efficiency	High Efficiency Oven	Standard Oven	Per installation	Existing	58	20	$282	100%	N/A	$0.55	25,020
Single Family	Cooking Oven	Cooking Oven, High Efficiency	High Efficiency Oven	Standard Oven	Per installation	New	58	20	$282	100%	N/A	$0.55	14,975
Single Family	Cool Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	99	5	$576	50%	95%	$1.62	5,311
Single Family	Cool Central	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	2	30	$25	95%	50%	$1.02	716
Single Family	Cool Central	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	Existing	26	10	$93	85%	50%	$0.58	3,802
Single Family	Cool Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	13	30	$564	75%	95%	$4.15	619
Single Family	Cool Central	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	206	30	$2,602	75%	35%	$1.26	4,048
Single Family	Cool Central	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	413	30	$2,602	95%	1%	$0.63	344
Single Family	Cool Central	Central Cooling, SEER 18	SEER 18	SEER 13	Per installation	Existing	235	15	$1,177	100%	N/A	$0.65	11,944
Single Family	Cool Central	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	Existing	89	5	$204	95%	75%	$0.63	7,175
Single Family	Cool Central	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	Existing	11	20	$462	85%	95%	$4.48	604
Single Family	Cool Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	10	20	$25	95%	80%	$0.26	732
Single Family	Cool Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	7	20	$54	95%	60%	$0.85	338
Single Family	Cool Central	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	4	6	$46	95%	50%	$2.38	308
Single Family	Cool Central	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	29	20	$672	75%	75%	$2.65	1,119
Single Family	Cool Central	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	99	18	$535	75%	60%	$0.64	3,927
Single Family	Cool Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	20	30	$743	25%	85%	$3.72	272
Single Family	Cool Central	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	393	30	$2,802	25%	20%	$0.71	1,642
Single Family	Cool Central	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	99	11	$575	75%	50%	$0.90	3,051
Single Family	Cool Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	94	15	$5	95%	65%	$0.00	3,609
Single Family	Cool Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	59	30	$1,101	50%	90%	$1.84	1,906
Single Family	Cool Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	67	11	$1,271	75%	95%	$2.95	3,259
Single Family	Cool Central	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	234	30	$2,128	85%	25%	$0.90	2,935
Single Family	Cool Central	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	Existing	149	20	$1,621	50%	95%	$1.24	3,983

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Cool Central	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	Existing	139	30	$204	50%	50%	$0.14	3,204
Single Family	Cool Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	30	$440	65%	75%	$26.11	51
Single Family	Cool Central	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	18	30	$4,539	65%	25%	$25.17	183
Single Family	Cool Central	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	28	30	$4,539	65%	25%	$16.06	288
Single Family	Cool Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	89	5	$576	50%	95%	$1.80	2,273
Single Family	Cool Central	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	New	23	10	$93	85%	50%	$0.65	1,627
Single Family	Cool Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	17	30	$659	90%	95%	$3.89	450
Single Family	Cool Central	Central Cooling, SEER 18	SEER 18	SEER 13	Per installation	New	204	15	$1,281	100%	N/A	$0.82	4,546
Single Family	Cool Central	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	New	80	5	$204	95%	75%	$0.70	3,070
Single Family	Cool Central	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	287	45	$7,109	50%	95%	$2.31	239
Single Family	Cool Central	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	107	45	$2,763	50%	95%	$2.39	85
Single Family	Cool Central	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	New	10	20	$538	85%	95%	$5.80	206
Single Family	Cool Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	9	20	$25	95%	80%	$0.29	307
Single Family	Cool Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	6	20	$54	95%	60%	$0.94	152
Single Family	Cool Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	18	30	$869	75%	85%	$4.84	349
Single Family	Cool Central	Green Roof	ecoroof	Standard Roof	Per installation	New	45	40	$27,367	50%	95%	$56.82	129
Single Family	Cool Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	84	15	$5	95%	65%	$0.00	1,545
Single Family	Cool Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	53	30	$1,282	75%	90%	$2.38	1,264
Single Family	Cool Central	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	49	45	$795	75%	75%	$1.50	1,005
Single Family	Cool Central	Thermal Shell - Infiltration @0.2 ACH w/HRV	0.2 ACH w/HRV	Standard New Construction Home 0.35 ACH	Per installation	New	127	30	$1,209	85%	95%	$0.95	4,190
Single Family	Cool Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	61	11	$1,271	75%	95%	$3.28	1,415
Single Family	Cool Central	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	46	30	$1,172	50%	95%	$2.52	662
Single Family	Cool Central	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	New	134	20	$1,621	50%	95%	$1.38	1,704
Single Family	Cool Central	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	New	125	30	$204	75%	50%	$0.16	2,057
Single Family	Cool Central	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	3	30	$552	95%	75%	$17.72	66
Single Family	Cool Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	2	30	$476	95%	75%	$22.64	44
Single Family	Cool Room	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	1	30	$25	95%	50%	$1.92	196
Single Family	Cool Room	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	Existing	14	10	$93	85%	50%	$1.11	846
Single Family	Cool Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	7	30	$564	75%	95%	$7.60	187
Single Family	Cool Room	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	112	30	$2,602	75%	35%	$2.33	1,138
Single Family	Cool Room	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	224	30	$2,602	95%	1%	$1.16	92

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Cool Room	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	Existing	6	20	$462	85%	95%	$8.44	177
Single Family	Cool Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	5	20	$25	95%	80%	$0.49	192
Single Family	Cool Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	3	20	$54	95%	60%	$1.60	93
Single Family	Cool Room	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	2	6	$46	95%	50%	$4.49	84
Single Family	Cool Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	10	30	$743	25%	85%	$6.95	80
Single Family	Cool Room	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	210	30	$2,802	25%	20%	$1.33	455
Single Family	Cool Room	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	53	11	$575	75%	50%	$1.71	806
Single Family	Cool Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	31	30	$1,101	50%	90%	$3.47	523
Single Family	Cool Room	Room AC conversion to Ductless Heat Pump	SEER 13	EER 9.8	Per installation	Existing	64	20	$7,204	75%	N/A	$12.90	1,833
Single Family	Cool Room	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	127	30	$2,128	85%	25%	$1.67	856
Single Family	Cool Room	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	Existing	74	30	$204	50%	50%	$0.27	841
Single Family	Cool Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	0.92	30	$440	65%	75%	$47.66	15
Single Family	Cool Room	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	9	30	$4,539	65%	25%	$45.94	55
Single Family	Cool Room	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	15	30	$4,539	65%	25%	$29.31	87
Single Family	Cool Room	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	New	13	10	$93	85%	50%	$1.14	371
Single Family	Cool Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	10	30	$659	90%	95%	$6.60	130
Single Family	Cool Room	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	164	45	$7,109	50%	95%	$4.03	64
Single Family	Cool Room	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	61	45	$2,763	50%	95%	$4.18	22
Single Family	Cool Room	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	New	6	20	$538	85%	95%	$10.13	58
Single Family	Cool Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	5	20	$25	95%	80%	$0.51	82
Single Family	Cool Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	3	20	$54	95%	60%	$1.65	36
Single Family	Cool Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	10	30	$869	75%	85%	$8.38	99
Single Family	Cool Room	Green Roof	ecoroof	Standard Roof	Per installation	New	26	40	$27,367	50%	95%	$99.14	36
Single Family	Cool Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	30	30	$1,282	75%	90%	$4.16	338
Single Family	Cool Room	Room AC conversion to Ductless Heat Pump	SEER 13	EER 9.8	Per installation	New	64	20	$7,204	75%	N/A	$12.92	378
Single Family	Cool Room	Room AC, EER 10.8	EER 10.8	EER 9.8	Per installation	New	17	9	$7	100%	N/A	$0.07	80
Single Family	Cool Room	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	28	45	$795	75%	75%	$2.62	269
Single Family	Cool Room	Thermal Shell - Infiltration @0.2 ACH w/HRV	0.2 ACH w/HRV	Standard New Construction Home 0.35 ACH	Per installation	New	76	30	$1,209	85%	95%	$1.58	1,191
Single Family	Cool Room	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	27	30	$1,172	50%	95%	$4.31	181
Single Family	Cool Room	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	New	72	30	$204	75%	50%	$0.28	554
Single Family	Cool Room	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	1	30	$552	95%	75%	$29.67	19

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Cool Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	30	$476	95%	75%	$38.27	12
Single Family	Dryer	Dryer, Advanced Efficiency EF 3.30	Advanced Efficiency Dryer 3.30	Standard Dryer EF 3.01	Per installation	Existing	50	14	$224	100%	N/A	$0.59	26,174
Single Family	Dryer	Dryer, Advanced Efficiency EF 3.30	Advanced Efficiency Dryer 3.30	Standard Dryer EF 3.01	Per installation	New	50	14	$224	100%	N/A	$0.59	9,541
Single Family	Freezer	Freezer, Energy Star	Energy Star Freezer	Standard Freezer	Per installation	Existing	46	20	$22	76%	N/A	$0.04	5,027
Single Family	Freezer	Stand-Alone Freezer - Removal	Proper Disposal of Freezer	Existing Non-Efficient Freezer	Per installation	Existing	535	8	$99	24%	**%	$0.02	50,032
Single Family	Freezer	Freezer, Energy Star	Energy Star Freezer	Standard Freezer	Per installation	New	46	20	$22	76%	N/A	$0.04	4,570
Single Family	Heat Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	900	5	$576	50%	95%	$0.15	21,233
Single Family	Heat Central	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	30	30	$25	95%	50%	$0.05	4,791
Single Family	Heat Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	168	30	$564	75%	95%	$0.30	3,962
Single Family	Heat Central	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	2,556	30	$2,602	75%	35%	$0.07	25,980
Single Family	Heat Central	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	5,119	30	$2,602	95%	1%	$0.02	2,274
Single Family	Heat Central	Conversion Electric Furnace to ASHP	Air Source Heat Pump Seer 13 HSPF 7.7	Electric Furnace HSPF 1	Per installation	Existing	4,860	20	$2,883	92%	N/A	$0.04	96,251
Single Family	Heat Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	135	20	$25	95%	80%	$-0.01	4,854
Single Family	Heat Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	90	20	$54	95%	60%	$0.04	2,321
Single Family	Heat Central	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	58	6	$46	95%	50%	$0.16	1,991
Single Family	Heat Central	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	360	20	$672	75%	75%	$0.18	7,211
Single Family	Heat Central	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	900	18	$535	75%	60%	$0.04	18,224
Single Family	Heat Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	248	30	$743	25%	85%	$0.27	1,835
Single Family	Heat Central	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	4,877	30	$2,802	25%	20%	$0.02	11,345
Single Family	Heat Central	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	900	11	$575	75%	50%	$0.07	13,576
Single Family	Heat Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	180	15	$5	15%	65%	$-0.03	558
Single Family	Heat Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	180	30	$1,101	50%	90%	$0.58	2,631
Single Family	Heat Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	612	11	$1,271	75%	95%	$0.29	15,089
Single Family	Heat Central	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	2,910	30	$2,128	85%	25%	$0.04	19,931
Single Family	Heat Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	20	30	$440	65%	75%	$2.08	325
Single Family	Heat Central	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	224	30	$4,539	65%	25%	$2.00	1,165
Single Family	Heat Central	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	351	30	$4,539	65%	25%	$1.26	1,838
Single Family	Heat Central	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	556	5	$576	50%	95%	$0.26	5,725
Single Family	Heat Central	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	144	30	$659	90%	95%	$0.42	2,026
Single Family	Heat Central	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	2,446	45	$7,109	50%	95%	$0.24	994
Single Family	Heat Central	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	667	45	$2,763	50%	95%	$0.35	260

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Heat Central	Conversion Electric Furnace to ASHP	Air Source Heat Pump Seer 13 HSPF 7.7	Electric Furnace HSPF 1	Per installation	New	3,002	20	$2,758	92%	N/A	$0.07	36,292
Single Family	Heat Central	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	83	20	$25	95%	80%	$0.00	1,308
Single Family	Heat Central	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	55	20	$54	95%	60%	$0.08	647
Single Family	Heat Central	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	153	30	$869	75%	85%	$0.54	1,488
Single Family	Heat Central	Green Roof	ecoroof	Standard Roof	Per installation	New	389	40	$27,367	50%	95%	$6.64	541
Single Family	Heat Central	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	111	15	$5	15%	65%	$-0.03	157
Single Family	Heat Central	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	111	30	$1,282	75%	90%	$1.12	1,122
Single Family	Heat Central	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	17	45	$795	75%	75%	$4.27	142
Single Family	Heat Central	Thermal Shell - Infiltration @0.2 ACH w/HRV	0.2 ACH w/HRV	Standard New Construction Home 0.35 ACH	Per installation	New	1,082	30	$1,209	85%	95%	$0.08	17,738
Single Family	Heat Central	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	378	11	$1,271	75%	95%	$0.50	4,310
Single Family	Heat Central	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	396	30	$1,172	50%	95%	$0.26	2,871
Single Family	Heat Central	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	26	30	$552	95%	75%	$2.05	280
Single Family	Heat Central	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	17	30	$476	95%	75%	$2.63	188
Single Family	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	714	5	$576	50%	95%	$0.20	10,390
Single Family	Heat Pump	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	23	30	$25	95%	50%	$0.08	2,345
Single Family	Heat Pump	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	Existing	26	10	$93	85%	50%	$0.56	1,039
Single Family	Heat Pump	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	53	30	$564	75%	95%	$1.03	811
Single Family	Heat Pump	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	849	30	$2,602	75%	35%	$0.28	5,233
Single Family	Heat Pump	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	1,701	30	$2,602	95%	1%	$0.13	399
Single Family	Heat Pump	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	Existing	89	5	$204	95%	75%	$0.61	1,961
Single Family	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	Existing	11	20	$462	85%	95%	$4.46	201
Single Family	Heat Pump	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	103	20	$25	95%	80%	$0.00	2,241
Single Family	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	68	20	$54	95%	60%	$0.06	1,081
Single Family	Heat Pump	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	46	6	$46	95%	50%	$0.22	1,064
Single Family	Heat Pump	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	274	20	$672	75%	75%	$0.25	3,706
Single Family	Heat Pump	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	714	18	$535	75%	60%	$0.06	8,796
Single Family	Heat Pump	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	197	30	$743	25%	85%	$0.35	952
Single Family	Heat Pump	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	3,870	30	$2,802	25%	20%	$0.05	5,473
Single Family	Heat Pump	Ground Source Heat Pump, EER 16.2, COP 3.6	GSHP EER 16.2, HSPF 8.8	ASHP SEER 13, HSPF 7.7	Per installation	Existing	2,499	20	$10,045	40%	N/A	$0.43	13,401
Single Family	Heat Pump	Heat Pump Premium Efficiency, SEER 16, HSPF 8.8	ASHP SEER 16, HSPF 8.8	ASHP SEER 13, HSPF 7.7	Per installation	Existing	506	20	$1,233	100%	N/A	$0.25	3,133

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Heat Pump	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	714	11	$575	75%	50%	$0.10	6,912
Single Family	Heat Pump	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	673	15	$5	95%	65%	$-0.03	8,732
Single Family	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	192	30	$1,101	50%	90%	$0.55	1,865
Single Family	Heat Pump	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	485	11	$1,271	75%	95%	$0.39	7,820
Single Family	Heat Pump	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	962	30	$2,128	85%	25%	$0.19	3,781
Single Family	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	Existing	149	20	$1,621	50%	95%	$1.22	1,088
Single Family	Heat Pump	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	Existing	139	30	$204	50%	50%	$0.12	867
Single Family	Heat Pump	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	6	30	$440	65%	75%	$6.39	70
Single Family	Heat Pump	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	73	30	$4,539	65%	25%	$6.16	251
Single Family	Heat Pump	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	115	30	$4,539	65%	25%	$3.92	396
Single Family	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	549	5	$576	50%	95%	$0.27	3,626
Single Family	Heat Pump	Ceiling Fan	Ceiling Fan (no lighting kit)	No Ceiling Fan	Per installation	New	20	10	$93	85%	50%	$0.74	362
Single Family	Heat Pump	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	54	30	$659	90%	95%	$1.19	494
Single Family	Heat Pump	Check Me! O&M Tune-up	Tune-up/Maintenance	No Tune-up Maintenance	Per installation	New	69	5	$204	95%	75%	$0.80	684
Single Family	Heat Pump	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	2,326	45	$7,109	50%	95%	$0.26	699
Single Family	Heat Pump	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	659	45	$2,763	50%	95%	$0.36	184
Single Family	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Per installation	New	9	20	$538	85%	95%	$6.76	61
Single Family	Heat Pump	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	79	20	$25	95%	80%	$0.01	782
Single Family	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	53	20	$54	95%	60%	$0.09	387
Single Family	Heat Pump	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	151	30	$869	75%	85%	$0.55	1,082
Single Family	Heat Pump	Green Roof	ecoroof	Standard Roof	Per installation	New	369	40	$27,367	50%	95%	$7.00	368
Single Family	Heat Pump	Ground Source Heat Pump, EER 16.2, COP 3.6	GSHP EER 16.2, HSPF 8.8	ASHP SEER 13, HSPF 7.7	Per installation	New	2,005	20	$10,169	40%	N/A	$0.56	7,108
Single Family	Heat Pump	Heat Pump Premium Efficiency, SEER 16, HSPF 8.8	ASHP SEER 16, HSPF 8.8	ASHP SEER 13, HSPF 7.7	Per installation	New	408	20	$1,233	100%	N/A	$0.32	2,139
Single Family	Heat Pump	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	518	15	$5	95%	65%	$-0.03	3,336
Single Family	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	148	30	$1,282	75%	90%	$0.84	1,088
Single Family	Heat Pump	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	47	45	$795	75%	75%	$1.55	279
Single Family	Heat Pump	Thermal Shell - Infiltration @0.2 ACH w/HRV	0.2 ACH w/HRV	Standard New Construction Home 0.35 ACH	Per installation	New	402	30	$1,209	85%	95%	$0.27	4,076
Single Family	Heat Pump	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	373	11	$1,271	75%	95%	$0.51	3,132
Single Family	Heat Pump	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	148	30	$1,172	50%	95%	$0.76	698
Single Family	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Per installation	New	115	20	$1,621	50%	95%	$1.59	380

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Heat Pump	Window Overhang	Overhangs over windows for shading	No window overhangs	Per installation	New	107	30	$204	75%	50%	$0.16	514
Single Family	Heat Pump	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	9	30	$552	95%	75%	$5.56	74
Single Family	Heat Pump	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	6	30	$476	95%	75%	$6.84	52
Single Family	Heat Room	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	23	30	$25	95%	50%	$0.07	8,164
Single Family	Heat Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	133	30	$564	75%	95%	$0.39	7,455
Single Family	Heat Room	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	2,014	30	$2,602	75%	35%	$0.10	47,063
Single Family	Heat Room	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	4,034	30	$2,602	95%	1%	$0.03	3,793
Single Family	Heat Room	Conversion Baseboard Heating to DHP	Ductless Heat Pump HSPF 7.7	HSPF = 1	Per installation	Existing	3,500	20	$7,444	68%	N/A	$0.21	19,684
Single Family	Heat Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	103	20	$25	95%	80%	$-0.01	7,910
Single Family	Heat Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	69	20	$54	95%	60%	$0.06	3,782
Single Family	Heat Room	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	45	6	$46	95%	50%	$0.22	3,386
Single Family	Heat Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	192	30	$743	25%	85%	$0.35	3,223
Single Family	Heat Room	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	3,789	30	$2,802	25%	20%	$0.04	18,651
Single Family	Heat Room	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	693	11	$575	75%	50%	$0.10	21,367
Single Family	Heat Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	138	30	$1,101	50%	90%	$0.76	4,809
Single Family	Heat Room	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	2,289	30	$2,128	85%	25%	$0.06	34,737
Single Family	Heat Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	16	30	$440	65%	75%	$2.62	614
Single Family	Heat Room	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	178	30	$4,539	65%	25%	$2.52	2,198
Single Family	Heat Room	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	279	30	$4,539	65%	25%	$1.60	3,468
Single Family	Heat Room	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	114	30	$659	90%	95%	$0.54	3,364
Single Family	Heat Room	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	1,884	45	$7,109	50%	95%	$0.32	1,604
Single Family	Heat Room	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	513	45	$2,763	50%	95%	$0.47	419
Single Family	Heat Room	Conversion Baseboard Heating to DHP	Ductless Heat Pump HSPF 7.7	HSPF = 1	Per installation	New	1,841	20	$7,444	68%	N/A	$0.43	36,062
Single Family	Heat Room	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	64	20	$25	95%	80%	$0.01	2,133
Single Family	Heat Room	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	42	20	$54	95%	60%	$0.11	880
Single Family	Heat Room	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	119	30	$869	75%	85%	$0.70	2,545
Single Family	Heat Room	Green Roof	ecoroof	Standard Roof	Per installation	New	299	40	$27,367	50%	95%	$8.63	917
Single Family	Heat Room	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	85	30	$1,282	75%	90%	$1.47	1,902
Single Family	Heat Room	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	13	45	$795	75%	75%	$5.56	241
Single Family	Heat Room	Thermal Shell - Infiltration @0.2 ACH w/HRV	0.2 ACH w/HRV	Standard New Construction Home 0.35 ACH	Per installation	New	875	30	$1,209	85%	95%	$0.11	30,529
Single Family	Heat Room	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	312	30	$1,172	50%	95%	$0.34	4,733

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Heat Room	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	21	30	$552	95%	75%	$2.56	494
Single Family	Heat Room	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	14	30	$476	95%	75%	$3.31	329
Single Family	Lighting Exterior	CFL, Flood (17 W)	CFL, Flood	Standard Incandescent Flood	Per installation	Existing	56	5	$0.91	100%	N/A	$-0.01	76,701
Single Family	Lighting Exterior	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Per installation	Existing	11	10	$16	80%	85%	$0.23	7,145
Single Family	Lighting Exterior	CFL, Flood (17 W)	CFL, Flood	Standard Incandescent Flood	Per installation	New	56	5	$0.91	100%	N/A	$-0.01	10,574
Single Family	Lighting Exterior	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Per installation	New	13	10	$16	80%	85%	$0.20	3,428
Single Family	Lighting Interior Specialty	CFL (13 W, 20 W, 25 W)	CFL (3-Way)	Standard Incandescent (3-Way)	Per installation	Existing	49	5	$3	100%	N/A	$0.00	710
Single Family	Lighting Interior Specialty	CFL (13 W, 20 W, 25 W)	CFL (3-Way)	Standard Incandescent (3-Way)	Per installation	New	49	5	$3	100%	N/A	$0.00	11,798
Single Family	Lighting Interior Standard	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Per installation	Existing	10	20	$147	60%	95%	$1.56	1,494
Single Family	Lighting Interior Standard	Lighting CFL 15 W	15 W CFL	Standard 60 W Incandescent	Per installation	Existing	47	5	$2	100%	N/A	$-0.00	46,860
Single Family	Lighting Interior Standard	Lighting LED 7 W	7 W LED	Standard 60 W Incandescent	Per installation	Existing	56	20	$36	50%	N/A	$0.06	21,814
Single Family	Lighting Interior Standard	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Per installation	Existing	6	10	$32	85%	95%	$0.82	13,005
Single Family	Lighting Interior Standard	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Per installation	New	12	20	$147	60%	95%	$1.36	717
Single Family	Lighting Interior Standard	Lighting CFL 15 W	15 W CFL	Standard 60 W Incandescent	Per installation	New	47	5	$2	100%	N/A	$-0.00	39,096
Single Family	Lighting Interior Standard	Lighting LED 7 W	7 W LED	Standard 60 W Incandescent	Per installation	New	56	20	$36	50%	N/A	$0.06	46,297
Single Family	Lighting Interior Standard	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Per installation	New	7	10	$32	85%	95%	$0.71	6,242
Single Family	Microwave	Microwave, High Efficiency	High Efficiency Microwave	Standard Microwave	Per installation	Existing	9	15	$79	100%	N/A	$1.05	5,711
Single Family	Microwave	Microwave, High Efficiency	High Efficiency Microwave	Standard Microwave	Per installation	New	9	15	$79	100%	N/A	$1.05	2,320
Single Family	Monitor	Monitor, Energy Star	Energy Star Monitor	Standard Monitor	Per installation	Existing	36	5	$3	100%	N/A	$0.01	37,788
Single Family	Monitor	Monitor, Energy Star	Energy Star Monitor	Standard Monitor	Per installation	New	36	5	$3	100%	N/A	$0.01	4,386
Single Family	Plug Load Other	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Per installation	Existing	17	7	$30	50%	50%	$0.35	28,900
Single Family	Plug Load Other	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Per installation	Existing	1	7	$2	50%	80%	$0.40	4,681
Single Family	Plug Load Other	Office Copier	Office Copier	Standard Copier	Per installation	Existing	39	6	$5	20%	50%	$0.01	3,431
Single Family	Plug Load Other	Office Printer	Office Printer	Standard Copier	Per installation	Existing	5	5	$5	50%	50%	$0.26	1,099
Single Family	Plug Load Other	Smart Strip	Smart Strip	Standard PowerStrip	Per installation	Existing	102	5	$22	50%	85%	$0.04	37,797
Single Family	Plug Load Other	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Per installation	New	17	7	$30	50%	50%	$0.35	12,612

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Plug Load Other	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Per installation	New	1	7	$2	50%	80%	$0.40	2,042
Single Family	Plug Load Other	Office Copier	Office Copier	Standard Copier	Per installation	New	39	6	$5	20%	50%	$0.01	1,497
Single Family	Plug Load Other	Office Printer	Office Printer	Standard Copier	Per installation	New	5	5	$5	50%	50%	$0.26	479
Single Family	Plug Load Other	Smart Strip	Smart Strip	Standard PowerStrip	Per installation	New	102	5	$22	50%	85%	$0.04	16,495
Single Family	Pool Pump	Pool Pump Timers	Pool Pump Timers	Pool Pump No Timers	Per installation	Existing	292	10	$45	95%	50%	$0.01	3,172
Single Family	Pool Pump	Pool Pump, 2 Speed	2 Speed Pool Pump	Standard 1 Speed Pool Pump	Per installation	Existing	570	10	$110	75%	N/A	$0.02	2,703
Single Family	Pool Pump	Pool Pump, VSD	VSD Pool Pump	Standard 1 Speed Pool Pump	Per installation	Existing	630	10	$819	75%	N/A	$0.20	10,371
Single Family	Pool Pump	Pool Pump Timers	Pool Pump Timers	Pool Pump No Timers	Per installation	New	293	10	$45	95%	50%	$0.01	1,396
Single Family	Pool Pump	Pool Pump, 2 Speed	2 Speed Pool Pump	Standard 1 Speed Pool Pump	Per installation	New	570	10	$110	75%	N/A	$0.02	634
Single Family	Pool Pump	Pool Pump, VSD	VSD Pool Pump	Standard 1 Speed Pool Pump	Per installation	New	630	10	$819	75%	N/A	$0.20	2,258
Single Family	Refrigerator	Refrigerator, Energy Star	Energy Star Refrigerator	Standard Refrigerator	Per installation	Existing	122	20	$15	74%	N/A	$0.00	21,433
Single Family	Refrigerator	Refrigerator/Freezer - Removal of Secondary	Proper Disposal of Refrigerator/Freezer	Existing Non-Efficient Refrigerator/Freezer	Per installation	Existing	474	9	$102	26%	**%	$0.03	11,494
Single Family	Refrigerator	Refrigerator, Energy Star	Energy Star Refrigerator	Standard Refrigerator	Per installation	New	122	20	$15	100%	N/A	$0.00	27,382
Single Family	Set Top Box	Set Top Box, Energy Star	Energy Star Set Top Box	Standard Set Top Box	Per installation	Existing	164	5	$12	100%	N/A	$0.01	21,251
Single Family	Set Top Box	Set Top Box, Energy Star	Energy Star Set Top Box	Standard Set Top Box	Per installation	New	164	5	$12	100%	N/A	$0.01	23,768
Single Family	Tv	TV CRT, Energy Star	Energy Star CRT TV	Standard CRT TV	Per installation	Existing	112	10	$19	100%	N/A	$0.01	65,046
Single Family	Tv	TV CRT, Energy Star	Energy Star CRT TV	Standard CRT TV	Per installation	New	112	10	$19	100%	N/A	$0.01	39,861
Single Family	Tv Bigscreen	TV LCD, Energy Star	Energy Star LCD TV	Standard LCD TV	Per installation	Existing	223	10	$19	100%	N/A	$0.00	70,403
Single Family	Tv Bigscreen	TV LCD, Energy Star	Energy Star LCD TV	Standard LCD TV	Per installation	New	223	10	$19	100%	N/A	$0.00	17,003
Single Family	Ventilation And Circulation	Motor, ECM	ECM Motor	Standard Motor	Per installation	Existing	139	20	$172	50%	N/A	$0.12	30,539
Single Family	Ventilation And Circulation	Motor, ECM - VFD	ECM/VFD Motor	Standard Motor	Per installation	Existing	417	20	$194	50%	N/A	$0.03	91,619
Single Family	Ventilation And Circulation	Motor, ECM	ECM Motor	Standard Motor	Per installation	New	120	20	$172	50%	N/A	$0.14	16,008
Single Family	Ventilation And Circulation	Motor, ECM - VFD	ECM/VFD Motor	Standard Motor	Per installation	New	362	20	$194	50%	N/A	$0.04	48,024
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	111	14	$227	99%	88%	$-0.25	10,082
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	148	14	$296	99%	90%	$-0.23	13,786
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	Existing	169	14	$317	99%	95%	$-0.21	16,581
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	32	12	$42	71%	50%	$0.16	3,641
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	32	12	$42	71%	50%	$3.49	69,707

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	370	40	$540	29%	90%	$0.13	27,433
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	370	40	$540	29%	90%	$2.77	7,749
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	39	5	$23	95%	75%	$0.15	7,686
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	39	5	$23	95%	75%	$3.32	65,761
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	111	10	$16	95%	65%	$-0.06	42,907
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	111	10	$16	95%	65%	$-1.21	36,331
Single Family	Water Heat	Water Heater, Heat Pump EF 2.2	Heat Pump Water Heater EF = 2.2	Standard Storage Water Heater EF = 0.92	Per installation	Existing	1,941	15	$1,365	59%	N/A	$0.08	22,484
Single Family	Water Heat	Water Heater, Storage EF 0.95	Standard Storage Water Heater EF = 0.95	Standard Storage Water Heater EF = 0.92	Per installation	Existing	109	15	$47	100%	N/A	$0.04	4,074
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	205	5	$8	95%	45%	$-0.00	25,196
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	205	5	$8	95%	45%	$0.18	23,977
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	112	14	$227	99%	88%	$-0.24	4,628
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	149	14	$296	99%	90%	$-0.22	6,328
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Electric DHW & Dryer	MEF = 1.66 - Electric DHW & Dryer	Per installation	New	170	14	$317	99%	95%	$-0.21	7,611
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	32	12	$42	71%	50%	$0.16	1,671
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	32	12	$42	71%	50%	$3.46	86,547
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	373	40	$526	59%	90%	$0.12	24,760
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	373	40	$526	59%	90%	$2.67	66,255
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	39	5	$23	95%	75%	$0.15	3,327
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	39	5	$23	95%	75%	$3.29	76,325
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	111	10	$9	95%	65%	$-0.07	19,697
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	111	10	$9	95%	65%	$-1.48	59,835
Single Family	Water Heat	Water Heater, Heat Pump EF 2.2	Heat Pump Water Heater EF = 2.2	Standard Storage Water Heater EF = 0.92	Per installation	New	1,682	15	$1,365	59%	N/A	$0.10	74,675
Single Family	Water Heat	Water Heater, Storage EF 0.95	Standard Storage Water Heater EF = 0.95	Standard Storage Water Heater EF = 0.92	Per installation	New	94	15	$47	100%	N/A	$0.05	1,078
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	173	5	$8	95%	45%	$0.00	9,545
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	173	5	$8	95%	45%	$0.15	52,116

Table B.3.2. Commercial Electric Measure Details

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Dry Goods Retail	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$28	100%	N/A	$0.06	1,610
Dry Goods Retail	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$28	100%	N/A	$0.06	154
Dry Goods Retail	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	620	15	$747	25%	94%	$0.15	2,672
Dry Goods Retail	Cooling Dx	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.62	15	$2	15%	67%	$0.63	2,437
Dry Goods Retail	Cooling Dx	DX Package 240 to 760 kBTU/hr - Premium Efficiency	DX Package 240 to 760 kBTU/hr - Premium Efficiency 10.8 EER	DX Package 240 to 760 kBTU/hr - Standard Efficiency 10.0 EER	Per installation	Existing	2,771	15	$8,231	100%	N/A	$0.39	7,193
Dry Goods Retail	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	62	10	$169	10%	80%	$0.45	1,131
Dry Goods Retail	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	310	4	$335	95%	72%	$0.41	6,951
Dry Goods Retail	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.51	15	$2	50%	94%	$0.51	10,956
Dry Goods Retail	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	100	5	$193	75%	59%	$0.53	1,359
Dry Goods Retail	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	67	15	$171	75%	76%	$0.33	6,099
Dry Goods Retail	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	100	5	$78	50%	80%	$0.21	1,665
Dry Goods Retail	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.05	18	$0.22	45%	65%	$0.52	603
Dry Goods Retail	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.20	40	$9	4%	98%	$4.50	212
Dry Goods Retail	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.31	10%	39%	$0.03	238
Dry Goods Retail	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.01	25	$1	75%	85%	$16.17	219
Dry Goods Retail	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.23	2,024
Dry Goods Retail	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	584	10	$137	95%	26%	$0.03	463
Dry Goods Retail	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.25	7	$0.18	90%	85%	$0.15	12,065
Dry Goods Retail	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.31	39
Dry Goods Retail	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	3	25	$30	15%	80%	$1.01	1,178
Dry Goods Retail	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.68 (Average Existing Conditions)	per window sqft	Existing	2	25	$64	15%	80%	$2.53	987
Dry Goods Retail	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	326	15	$399	25%	94%	$0.16	777
Dry Goods Retail	Cooling Dx	DX Package 240 to 760 kBTU/hr - Premium Efficiency	DX Package 240 to 760 kBTU/hr - Premium Efficiency 10.8 EER	DX Package 240 to 760 kBTU/hr - Standard Efficiency 10.0 EER	Per installation	New	1,507	15	$6,585	100%	N/A	$0.57	2,148
Dry Goods Retail	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.27	15	$2	50%	94%	$0.98	3,583
Dry Goods Retail	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	35	15	$171	75%	76%	$0.63	1,835
Dry Goods Retail	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.02	18	$0.22	45%	65%	$1.00	197

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Dry Goods Retail	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.10	40	$9	4%	98%	$8.56	68
Dry Goods Retail	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	6	30	$5	50%	95%	$0.08	2,588
Dry Goods Retail	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	307	10	$137	95%	13%	$0.07	131
Dry Goods Retail	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	1	25	$30	80%	80%	$1.92	2,156
Dry Goods Retail	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	Existing	5,607	15	$9,908	100%	N/A	$0.22	3,485
Dry Goods Retail	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	629	15	$747	25%	94%	$0.14	543
Dry Goods Retail	Heat Pump	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.49	15	$2	15%	67%	$0.78	470
Dry Goods Retail	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	149	5	$193	75%	59%	$0.35	101
Dry Goods Retail	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	99	15	$171	75%	76%	$0.21	1,857
Dry Goods Retail	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	149	5	$78	50%	80%	$0.13	101
Dry Goods Retail	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.07	18	$0.22	45%	65%	$0.34	226
Dry Goods Retail	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.14	14	$0.93	5%	94%	$0.86	63
Dry Goods Retail	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.20	40	$9	4%	98%	$4.42	53
Dry Goods Retail	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	Existing	12,155	30	$18,825	5%	N/A	$2.56	354
Dry Goods Retail	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.31	10%	39%	$0.01	67
Dry Goods Retail	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.01	25	$0.49	25%	98%	$5.08	18
Dry Goods Retail	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.28	25	$1	75%	85%	$0.64	1,474
Dry Goods Retail	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.14	616
Dry Goods Retail	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.09	25	$0.93	35%	90%	$0.97	238
Dry Goods Retail	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.01	25	$0.29	35%	90%	$1.58	46
Dry Goods Retail	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	0.26	25	$2	10%	35%	$0.87	45
Dry Goods Retail	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	868	10	$137	95%	26%	$0.01	250
Dry Goods Retail	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.38	7	$0.18	90%	85%	$0.09	3,603
Dry Goods Retail	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.34	9
Dry Goods Retail	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	2	25	$30	15%	80%	$1.14	251
Dry Goods Retail	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.68 (Average Existing Conditions)	per window sqft	Existing	2	25	$64	15%	80%	$2.31	264
Dry Goods Retail	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	New	3,461	15	$7,926	100%	N/A	$0.29	1,143

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Dry Goods Retail	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	324	15	$399	25%	94%	$0.15	162
Dry Goods Retail	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	51	15	$171	75%	76%	$0.42	564
Dry Goods Retail	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.03	18	$0.22	45%	65%	$0.68	68
Dry Goods Retail	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.07	14	$0.93	5%	94%	$1.68	20
Dry Goods Retail	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.10	40	$9	4%	98%	$8.59	16
Dry Goods Retail	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	New	7,147	30	$65,046	5%	N/A	$2.22	110
Dry Goods Retail	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	98%	$9.91	17
Dry Goods Retail	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.01	25	$0.29	35%	90%	$3.11	14
Dry Goods Retail	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	6	30	$5	50%	95%	$0.08	503
Dry Goods Retail	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	447	10	$137	95%	13%	$0.04	39
Dry Goods Retail	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	1	25	$30	80%	80%	$2.23	441
Dry Goods Retail	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	2,556	10	$581	1%	85%	$0.03	68
Dry Goods Retail	Hvac Aux	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.33	15	$2	15%	67%	$1.17	3,490
Dry Goods Retail	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,909	18	$4,526	95%	65%	$0.28	2,970
Dry Goods Retail	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	27	15	$6	95%	76%	$0.03	1,698
Dry Goods Retail	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	680	20	$110	65%	75%	$0.01	29,741
Dry Goods Retail	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	Existing	69	15	$178	5%	77%	$0.33	72
Dry Goods Retail	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	17	8	$4	65%	25%	$0.05	61
Dry Goods Retail	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	2,081	10	$581	1%	75%	$0.04	25
Dry Goods Retail	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,909	18	$4,526	95%	65%	$0.28	1,559
Dry Goods Retail	Hvac Aux	Low Pressure Distribution Complex HVAC	Low Pressure Distribution Complex HVAC	VAV/CV	per building sqft	New	0.85	50	$2	8%	98%	$0.26	2,920
Dry Goods Retail	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	22	15	$6	95%	76%	$0.03	905
Dry Goods Retail	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	554	20	$110	65%	75%	$0.02	12,690
Dry Goods Retail	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	New	56	15	$178	5%	77%	$0.41	30
Dry Goods Retail	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.04	9,601
Dry Goods Retail	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	72	8	$28	75%	70%	$0.06	1,551
Dry Goods Retail	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	247	15	$336	62%	90%	$0.17	13,487
Dry Goods Retail	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	7	14	$35	75%	95%	$0.60	253

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Dry Goods Retail	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	4,020
Dry Goods Retail	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.04	5,043
Dry Goods Retail	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	72	8	$28	75%	70%	$0.06	814
Dry Goods Retail	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	247	15	$336	62%	90%	$0.17	7,084
Dry Goods Retail	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	7	14	$35	75%	95%	$0.60	133
Dry Goods Retail	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	2,111
Dry Goods Retail	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	215	9	$110	10%	75%	$0.08	1,003
Dry Goods Retail	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	107	5	$12	70%	94%	$0.02	3,670
Dry Goods Retail	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.33	8	$0.98	30%	84%	$0.55	755
Dry Goods Retail	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.25	8	$0.73	30%	84%	$0.55	565
Dry Goods Retail	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	97	16	$16	95%	50%	$0.01	4,308
Dry Goods Retail	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	1,023
Dry Goods Retail	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	1	13	$0.84	90%	32%	$0.08	48,085
Dry Goods Retail	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.47	13	$0.05	90%	47%	$0.00	17,521
Dry Goods Retail	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.63	13	$0.18	90%	52%	$0.03	7,365
Dry Goods Retail	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.79	13	$0.36	75%	57%	$0.05	4,195
Dry Goods Retail	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.18	13	$0.16	70%	83%	$0.12	13,038
Dry Goods Retail	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	774	8	$70	45%	56%	$0.00	1,948
Dry Goods Retail	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	757	8	$201	85%	86%	$0.04	3,589
Dry Goods Retail	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	168	9	$110	10%	75%	$0.10	413
Dry Goods Retail	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	107	5	$12	70%	94%	$0.02	1,511
Dry Goods Retail	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.26	8	$0.98	30%	84%	$0.71	331
Dry Goods Retail	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.19	8	$0.73	30%	84%	$0.71	247
Dry Goods Retail	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	2,150
Dry Goods Retail	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.47	15	$0.03	90%	47%	$-0.00	9,203
Dry Goods Retail	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.63	15	$0.08	90%	52%	$0.01	3,868
Dry Goods Retail	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.79	15	$0.15	75%	57%	$0.01	2,203

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Dry Goods Retail	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.18	15	$0.04	70%	83%	$0.02	6,848
Dry Goods Retail	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	607	8	$70	45%	56%	$0.01	854
Dry Goods Retail	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	757	8	$200	85%	86%	$0.04	1,573
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$164	95%	45%	$0.52	89
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$0.00	95%	45%	$-0.01	95
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	46
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	140	5	$15	95%	40%	$0.02	559
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$0.00	95%	45%	$-0.01	87
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$164	95%	45%	$0.52	46
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$0.00	95%	45%	$-0.01	50
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	24
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	140	5	$15	95%	40%	$0.02	293
Dry Goods Retail	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$0.00	95%	45%	$-0.01	45
Dry Goods Retail	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.05	16
Dry Goods Retail	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	369	10	$0.00	95%	75%	$-0.01	553
Dry Goods Retail	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	4	4	$0.41	95%	86%	$0.02	262
Dry Goods Retail	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$123	3%	65%	$0.21	16
Dry Goods Retail	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,525	9	$566	25%	35%	$0.05	1,529
Dry Goods Retail	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	338	7	$566	25%	35%	$0.37	338
Dry Goods Retail	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	Existing	102	5	$22	60%	90%	$0.05	1,456
Dry Goods Retail	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	244	14	$165	5%	80%	$0.08	5
Dry Goods Retail	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	640	3	$175	5%	25%	$0.11	91
Dry Goods Retail	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.05	8
Dry Goods Retail	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	369	10	$0.00	95%	75%	$-0.01	290
Dry Goods Retail	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	4	4	$0.41	95%	86%	$0.02	138
Dry Goods Retail	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$123	3%	65%	$0.21	8
Dry Goods Retail	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	New	102	5	$22	60%	90%	$0.05	765

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Dry Goods Retail	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines-Standard 13 kWh/day	per installation	New	244	14	$165	5%	80%	$0.08	2
Dry Goods Retail	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	620	15	$747	25%	94%	$0.12	1,062
Dry Goods Retail	Space Heat	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.26	15	$2	15%	67%	$1.42	360
Dry Goods Retail	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	100	5	$193	75%	59%	$0.50	907
Dry Goods Retail	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	67	15	$171	75%	76%	$0.29	1,849
Dry Goods Retail	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	100	5	$78	50%	80%	$0.18	1,093
Dry Goods Retail	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.05	18	$0.22	45%	65%	$0.49	223
Dry Goods Retail	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.31	14	$0.93	5%	94%	$0.37	216
Dry Goods Retail	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	2	13	$0.31	10%	39%	$-0.02	189
Dry Goods Retail	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.05	25	$0.49	25%	98%	$0.96	138
Dry Goods Retail	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.58	25	$1	75%	85%	$0.28	5,593
Dry Goods Retail	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.19	729
Dry Goods Retail	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.57	25	$0.93	35%	90%	$0.13	3,128
Dry Goods Retail	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.10	25	$0.29	35%	90%	$0.25	516
Dry Goods Retail	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	1	25	$2	10%	35%	$0.13	544
Dry Goods Retail	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	583	10	$137	95%	26%	$-0.00	36
Dry Goods Retail	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.25	7	$0.18	90%	85%	$0.11	4,798
Dry Goods Retail	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.51	10	$2	25%	98%	$0.65	1,798
Dry Goods Retail	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.68 (Average Existing Conditions)	per window sqft	Existing	0.39	25	$64	15%	80%	$17.38	50
Dry Goods Retail	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	137	15	$399	25%	94%	$0.34	130
Dry Goods Retail	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	14	15	$171	75%	76%	$1.47	304
Dry Goods Retail	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$2.34	36
Dry Goods Retail	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.06	14	$0.93	5%	94%	$1.81	35
Dry Goods Retail	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.01	25	$0.49	75%	98%	$4.49	65
Dry Goods Retail	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.02	25	$0.29	35%	90%	$1.29	72
Dry Goods Retail	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.28	277
Dry Goods Retail	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	129	10	$137	95%	13%	$0.14	21

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Dry Goods Retail	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.11	10	$2	50%	98%	$3.08	609
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	491	10	$8,170	5%	95%	$2.77	17
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	491	10	$8,170	5%	95%	$32.31	98,547
Dry Goods Retail	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	Existing	553	11	$243	95%	80%	$-0.22	112
Dry Goods Retail	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.01	10	$0.27	75%	94%	$3.22	808
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	24%	25%	$0.14	4
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	24%	25%	$3.50	6,784
Dry Goods Retail	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,164	10	$2,520	95%	95%	$0.01	139
Dry Goods Retail	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	20,007	10	$3,570	95%	94%	$-0.04	192
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	433	25	$817	5%	92%	$0.19	218
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	433	25	$817	5%	92%	$2.23	66,147
Dry Goods Retail	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	101	15	$131	100%	N/A	$0.16	151
Dry Goods Retail	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	1,863	15	$2,541	75%	N/A	$0.17	5,618
Dry Goods Retail	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	4	12	$2	80%	90%	$0.10	172
Dry Goods Retail	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	4	12	$2	80%	90%	$1.21	34,852
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$0.00	95%	83%	$-0.10	16
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$0.00	95%	83%	$0.79	11,162
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	35	10	$142	75%	95%	$10.34	87,136
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	35	10	$142	75%	95%	$0.66	442
Dry Goods Retail	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	124	5	$95	75%	45%	$0.20	610
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	492	10	$8,170	5%	95%	$2.77	9
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	492	10	$8,170	5%	95%	$32.38	44,707
Dry Goods Retail	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	New	555	11	$243	95%	80%	$-0.22	60
Dry Goods Retail	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.01	10	$0.27	75%	94%	$3.22	419
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	24%	55%	$0.14	5
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	24%	55%	$3.58	82,282

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Dry Goods Retail	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,197	10	$2,527	95%	95%	$0.01	74
Dry Goods Retail	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	20,101	10	$3,580	95%	94%	$-0.04	103
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	433	25	$654	25%	92%	$1.79	28,267
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	433	25	$654	25%	92%	$0.15	589
Dry Goods Retail	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	104	15	$131	100%	N/A	$0.15	101
Dry Goods Retail	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	1,921	15	$2,168	75%	N/A	$0.14	3,628
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$0.00	95%	83%	$-0.10	8
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$0.00	95%	83%	$0.81	65,379
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	35	10	$142	75%	95%	$0.66	237
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	35	10	$142	75%	95%	$10.36	35,711
Dry Goods Retail	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	125	5	$95	75%	45%	$0.20	317
Grocery	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$29	100%	N/A	$0.06	1,067
Grocery	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$29	100%	N/A	$0.06	102
Grocery	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	Existing	11,890	12	$1,931	90%	90%	$0.01	28
Grocery	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	Existing	1,021	12	$1,308	35%	90%	$0.18	4
Grocery	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	Existing	2,295	12	$814	95%	85%	$0.04	74
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,900	12	$2,035	19%	55%	$0.15	12
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,900	12	$2,035	19%	55%	$0.27	3,151
Grocery	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	Existing	3,986	12	$1,768	55%	21%	$0.05	37
Grocery	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,266	12	$2,564	14%	75%	$0.08	37
Grocery	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	New	11,890	12	$1,931	90%	90%	$0.01	15
Grocery	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	New	1,021	12	$1,308	35%	90%	$0.18	2
Grocery	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	New	2,295	12	$814	95%	85%	$0.04	39
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,900	12	$2,035	19%	55%	$0.27	89,765
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,900	12	$2,035	19%	55%	$0.15	6
Grocery	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	New	3,986	12	$1,768	55%	21%	$0.05	19
Grocery	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	New	4,266	12	$2,564	14%	75%	$0.08	19
Grocery	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	Existing	6,436	15	$6,020	100%	N/A	$0.12	993
Grocery	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	78	10	$169	10%	90%	$0.36	169
Grocery	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	390	4	$335	95%	72%	$0.32	927
Grocery	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.43	15	$2	50%	94%	$0.61	1,376
Grocery	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	84	5	$193	75%	61%	$0.64	175
Grocery	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	56	15	$171	75%	76%	$0.40	705

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	84	5	$78	50%	80%	$0.25	209
Grocery	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.04	18	$0.22	45%	65%	$0.63	75
Grocery	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	2,499	10	$3,606	64%	85%	$0.24	350
Grocery	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.17	40	$9	4%	98%	$5.36	28
Grocery	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.32	10%	39%	$0.04	23
Grocery	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	10%	$19.95	3
Grocery	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.92	20	$2	75%	60%	$0.28	259
Grocery	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	1,412	10	$136	95%	31%	$0.01	69
Grocery	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.21	7	$0.18	90%	85%	$0.18	1,520
Grocery	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.06	4
Grocery	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	3	25	$30	15%	85%	$0.85	162
Grocery	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	3	25	$64	15%	85%	$2.08	139
Grocery	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	New	5,831	15	$4,816	100%	N/A	$0.10	451
Grocery	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.37	15	$2	50%	94%	$0.72	747
Grocery	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	48	15	$171	75%	76%	$0.46	382
Grocery	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.03	18	$0.22	45%	65%	$0.73	41
Grocery	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	2,149	10	$3,606	64%	85%	$0.28	169
Grocery	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.14	40	$9	4%	98%	$6.24	14
Grocery	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	9	30	$5	50%	95%	$0.06	540
Grocery	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	1,214	10	$136	95%	15%	$0.01	32
Grocery	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	3	25	$30	80%	85%	$0.99	477
Grocery	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	Existing	24,368	15	$22,274	100%	N/A	$0.11	886
Grocery	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	231	5	$193	75%	61%	$0.23	25
Grocery	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	154	15	$171	75%	76%	$0.14	472
Grocery	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	231	5	$78	50%	80%	$0.09	25
Grocery	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.11	18	$0.22	45%	65%	$0.22	55
Grocery	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.45	14	$0.93	5%	94%	$0.27	33

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	6,846	10	$3,606	64%	85%	$0.08	213
Grocery	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.17	40	$9	4%	98%	$5.39	7
Grocery	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	Existing	46,494	30	$88,204	5%	N/A	$1.23	80
Grocery	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	5	13	$0.32	10%	39%	$-0.00	27
Grocery	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.04	25	$0.49	25%	85%	$1.06	13
Grocery	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.83	25	$1	75%	10%	$0.21	85
Grocery	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	2	20	$2	75%	60%	$0.09	159
Grocery	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.63	25	$0.93	35%	45%	$0.15	139
Grocery	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.12	25	$0.29	35%	45%	$0.24	26
Grocery	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	1	25	$2	10%	35%	$0.14	43
Grocery	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	3,867	10	$136	95%	31%	$-0.00	76
Grocery	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.59	7	$0.18	90%	85%	$0.06	924
Grocery	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.05	1
Grocery	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	1	25	$30	15%	85%	$1.81	20
Grocery	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	3	25	$64	15%	85%	$1.82	43
Grocery	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	New	10,205	15	$17,820	100%	N/A	$0.22	196
Grocery	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	57	15	$171	75%	76%	$0.38	104
Grocery	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.04	18	$0.22	45%	65%	$0.61	12
Grocery	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.04	14	$0.93	5%	94%	$2.90	1
Grocery	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	2,563	10	$3,606	64%	85%	$0.23	46
Grocery	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.14	40	$9	4%	98%	$6.25	3
Grocery	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	New	19,623	30	$4,184	5%	N/A	$1.49	17
Grocery	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	85%	$26.18	0.96
Grocery	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.00	25	$0.29	35%	45%	$19.72	0.19
Grocery	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	7	30	$5	50%	95%	$0.07	93
Grocery	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	1,448	10	$136	95%	15%	$0.01	8
Grocery	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	3	25	$30	80%	85%	$1.05	116
Grocery	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	1,993	10	$581	5%	85%	$0.04	51
Grocery	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,886	18	$4,022	95%	65%	$0.25	307

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	21	15	$6	95%	76%	$0.04	159
Grocery	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	530	20	$110	65%	75%	$0.02	2,998
Grocery	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	13	8	$4	65%	25%	$0.07	5
Grocery	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	2,389	10	$581	5%	75%	$0.04	28
Grocery	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,886	18	$4,022	95%	65%	$0.25	161
Grocery	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	25	15	$6	95%	76%	$0.03	125
Grocery	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	636	20	$110	65%	75%	$0.01	1,891
Grocery	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.04	1,161
Grocery	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	111	8	$28	75%	70%	$0.04	176
Grocery	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	244	15	$336	62%	90%	$0.17	1,535
Grocery	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	12	14	$35	75%	95%	$0.39	28
Grocery	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	486
Grocery	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.04	610
Grocery	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	111	8	$28	75%	70%	$0.04	92
Grocery	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	244	15	$336	62%	90%	$0.17	806
Grocery	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	12	14	$35	75%	95%	$0.39	15
Grocery	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	255
Grocery	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	324	9	$110	75%	75%	$0.05	1,422
Grocery	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	208	5	$12	70%	94%	$0.00	346
Grocery	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.98	8	$0.98	30%	96%	$0.18	163
Grocery	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.73	8	$0.73	30%	96%	$0.18	122
Grocery	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	96	16	$16	95%	50%	$0.01	535
Grocery	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	127
Grocery	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	Existing	277	8	$249	95%	80%	$0.16	12,972
Grocery	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	1	13	$0.89	90%	44%	$0.07	9,407
Grocery	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.75	13	$0.16	90%	58%	$0.02	4,302
Grocery	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	1	13	$0.38	90%	64%	$0.04	1,795
Grocery	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	1	13	$0.86	75%	67%	$0.09	975
Grocery	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.25	13	$0.15	70%	83%	$0.07	2,356

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	1,166	8	$70	45%	57%	$-0.00	378
Grocery	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	750	8	$201	85%	81%	$0.04	641
Grocery	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	258	9	$110	75%	75%	$0.06	595
Grocery	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	208	5	$12	70%	94%	$0.00	145
Grocery	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.78	8	$0.98	30%	96%	$0.23	71
Grocery	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	1	8	$0.73	30%	96%	$0.09	133
Grocery	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	267
Grocery	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	New	277	8	$249	95%	80%	$0.16	6,813
Grocery	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.75	15	$0.08	90%	58%	$0.00	2,259
Grocery	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	1	15	$0.15	90%	64%	$0.01	942
Grocery	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	1	15	$0.22	75%	67%	$0.01	512
Grocery	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.25	15	$0.03	70%	83%	$0.01	1,237
Grocery	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	930	8	$70	45%	57%	$0.00	164
Grocery	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	750	8	$201	85%	81%	$0.04	279
Grocery	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	73	6	$159	95%	45%	$0.51	6
Grocery	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	78	6	$0.00	95%	45%	$-0.01	7
Grocery	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.30	10
Grocery	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	138	5	$14	95%	40%	$0.02	23
Grocery	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	71	6	$0.00	95%	45%	$-0.01	6
Grocery	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	73	6	$159	95%	45%	$0.51	3
Grocery	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	78	6	$0.00	95%	45%	$-0.01	3
Grocery	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.30	5
Grocery	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	138	5	$14	95%	40%	$0.02	12
Grocery	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	71	6	$0.00	95%	45%	$-0.01	3
Grocery	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.06	2
Grocery	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	365	10	$0.00	95%	75%	$-0.01	23
Grocery	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	Existing	425	10	$142	95%	86%	$0.02	156
Grocery	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	6	4	$0.41	95%	86%	$0.01	40

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	80	12	$125	3%	65%	$0.22	0.71
Grocery	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,506	9	$567	25%	35%	$0.06	66
Grocery	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	1,639	7	$567	25%	35%	$0.07	72
Grocery	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	Existing	101	5	$22	60%	90%	$0.05	176
Grocery	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	241	14	$162	75%	80%	$0.08	54
Grocery	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	3,106	3	$174	75%	25%	$0.01	293
Grocery	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.06	1
Grocery	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	365	10	$0.00	95%	75%	$-0.01	12
Grocery	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	New	425	10	$142	95%	86%	$0.02	82
Grocery	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	6	4	$0.41	95%	86%	$0.01	21
Grocery	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	80	12	$125	3%	65%	$0.22	0.37
Grocery	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	New	101	5	$22	60%	90%	$0.05	92
Grocery	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	241	14	$162	75%	80%	$0.08	28
Grocery	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	Existing	989	12	$82	90%	45%	$0.00	5,370
Grocery	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 1,000 sqft	Existing	1,029	12	$243	100%	77%	$0.02	12,710
Grocery	Refrigeration	Case Replacement Low Temp	Case Replacement Low Temp	No replacement	per square foot	Existing	0.98	15	$0.10	100%	98%	$0.00	13,914
Grocery	Refrigeration	Case Replacement Med Temp	Case Replacement Med Temp	No replacement	per square foot	Existing	0.08	15	$0.05	100%	98%	$0.08	146
Grocery	Refrigeration	Compressor VSD Retrofit	VSD Compressor	Constant Speed Compressor	per refrigeration ton	Existing	1,385	13	$261	60%	77%	$0.02	13,152
Grocery	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	Existing	8,579	10	$115	95%	68%	$-0.01	2,774
Grocery	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	Tons of Refrigeration	Existing	89	15	$444	90%	65%	$0.64	1,401
Grocery	Refrigeration	Floating Condenser Head Pressure Controls	Floating Condenser Head Pressure Controls	No Floating Condenser Head Pressure Controls	1 unit per 1,000 sqft	Existing	1,810	15	$196	50%	81%	$0.00	9,604
Grocery	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	Existing	2,579	12	$724	95%	77%	$0.03	859
Grocery	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Per Unit. Ea. Compressor	Existing	2,598	10	$726	85%	72%	$0.04	12,519
Grocery	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	per installation	Existing	407	5	$65	95%	85%	$0.03	8,575
Grocery	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	Existing	825	3	$119	95%	85%	$0.05	12,430
Grocery	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	Existing	6,431	10	$50	75%	95%	$-0.01	2,727
Grocery	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	Existing	1,169	12	$192	95%	81%	$0.01	411
Grocery	Refrigeration	Standalone to Multiplex Compressor	Standalone to Multiplex Compressor	Standalone compressor	per building sqft	Existing	0.62	13	$0.09	80%	90%	$0.01	5,676
Grocery	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	Existing	13,199	4	$184	95%	20%	$-0.01	1,264

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	Existing	0.79	12	$0.17	95%	95%	$0.02	11,576
Grocery	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	New	989	12	$82	90%	45%	$0.00	2,968
Grocery	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 1,000 sqft	New	1,029	12	$243	100%	77%	$0.02	6,676
Grocery	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	New	8,579	10	$115	95%	68%	$-0.01	1,457
Grocery	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	Tons of Refrigeration	New	89	15	$444	90%	65%	$0.64	736
Grocery	Refrigeration	Floating Condenser Head Pressure Controls	Floating Condenser Head Pressure Controls	No Floating Condenser Head Pressure Controls	1 unit per 1,000 sqft	New	1,810	15	$196	50%	81%	$0.00	5,308
Grocery	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	New	2,579	12	$724	95%	77%	$0.03	451
Grocery	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Per Unit. Ea. Compressor	New	4,820	10	$726	85%	72%	$0.01	7,456
Grocery	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	per installation	New	407	5	$65	95%	85%	$0.03	4,292
Grocery	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	New	464	3	$46	80%	90%	$0.03	3,711
Grocery	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	New	6,431	10	$50	75%	95%	$-0.01	1,432
Grocery	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	New	1,169	12	$192	95%	81%	$0.01	216
Grocery	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	New	13,199	4	$184	95%	20%	$-0.01	664
Grocery	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	New	0.79	12	$0.17	95%	95%	$0.02	6,080
Grocery	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	105	5	$193	75%	61%	$0.50	63
Grocery	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	70	15	$171	75%	76%	$0.30	126
Grocery	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	105	5	$78	50%	80%	$0.19	64
Grocery	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.05	18	$0.22	45%	65%	$0.49	15
Grocery	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.32	14	$0.93	5%	94%	$0.37	14
Grocery	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	3,121	10	$3,606	64%	85%	$0.17	59
Grocery	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	2	13	$0.32	10%	39%	$-0.00	8
Grocery	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.05	25	$0.49	25%	85%	$0.96	8
Grocery	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.59	25	$1	75%	10%	$0.29	39
Grocery	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	60%	$0.21	43
Grocery	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.58	25	$0.93	35%	45%	$0.15	92
Grocery	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.10	25	$0.29	35%	45%	$0.27	15
Grocery	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	1	25	$2	10%	35%	$0.13	30
Grocery	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	1,763	10	$136	95%	31%	$-0.01	2
Grocery	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.27	7	$0.18	90%	85%	$0.13	272

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.54	10	$2	25%	98%	$0.64	122
Grocery	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	0.27	25	$64	15%	85%	$24.62	1
Grocery	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	6	15	$171	75%	76%	$3.68	6
Grocery	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.00	18	$0.22	45%	65%	$5.81	0.81
Grocery	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.02	14	$0.93	5%	94%	$4.51	0.79
Grocery	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	270	10	$3,606	64%	85%	$2.21	3
Grocery	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	85%	$11.27	1
Grocery	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.00	25	$0.29	35%	45%	$3.30	0.81
Grocery	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	0.75	30	$5	50%	95%	$0.76	6
Grocery	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	152	10	$136	95%	15%	$0.13	0.56
Grocery	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.04	10	$2	50%	98%	$7.59	13
Grocery	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.01	10	$0.27	75%	94%	$3.04	49
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$44	24%	25%	$0.15	0.08
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$44	24%	25%	$3.62	78,799
Grocery	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,077	10	$2,721	95%	95%	$0.02	9
Grocery	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	19,765	10	$3,809	95%	94%	$-0.03	12
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	191	25	$817	5%	92%	$1.19	30,408
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	191	25	$817	5%	92%	$0.44	13
Grocery	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	302	15	$876	100%	N/A	$0.37	9
Grocery	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	5,569	15	$16,946	75%	N/A	$0.39	329
Grocery	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	2	12	$2	80%	90%	$0.39	92,319
Grocery	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	2	12	$2	80%	90%	$0.14	10
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	66	5	$4	95%	74%	$0.70	55,746
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	66	5	$4	95%	74%	$-0.08	11
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	37	10	$142	75%	95%	$2.31	3,317
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	37	10	$142	75%	95%	$0.62	27
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.03	10	$0.88	55%	94%	$11.49	20,184

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.03	10	$0.88	55%	94%	$4.34	80
Grocery	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	73	5	$95	75%	50%	$0.35	42
Grocery	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.01	10	$0.27	75%	94%	$3.01	25
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$44	24%	55%	$3.70	93,541
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$44	24%	55%	$0.14	0.10
Grocery	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,110	10	$2,528	95%	95%	$0.01	5
Grocery	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	19,858	10	$3,612	95%	94%	$-0.04	6
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	193	25	$653	25%	92%	$0.95	66,334
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	193	25	$653	25%	92%	$0.35	36
Grocery	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	313	15	$876	100%	N/A	$0.36	5
Grocery	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	5,782	15	$14,450	75%	N/A	$0.32	213
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	66	5	$4	95%	74%	$0.72	76,662
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	66	5	$4	95%	74%	$-0.08	6
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	37	10	$142	75%	95%	$2.31	53,319
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	37	10	$142	75%	95%	$0.62	14
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.03	10	$0.88	55%	94%	$4.30	41
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.03	10	$0.88	55%	94%	$11.52	42,923
Grocery	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	74	5	$95	75%	50%	$0.35	21
Hospital	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$29	100%	N/A	$0.06	19,167
Hospital	Computers	Network PC Power Management	Network PC Power Management	No Power Management	4.2 units per 1,000 sqft	Existing	4	5	$12	95%	30%	$0.85	217
Hospital	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$29	100%	N/A	$0.06	1,836
Hospital	Computers	Network PC Power Management	Network PC Power Management	No Power Management	4.2 units per 1,000 sqft	New	4	5	$12	95%	30%	$0.85	114
Hospital	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	Existing	11,974	12	$1,745	90%	90%	$0.01	6
Hospital	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	Existing	961	12	$1,309	25%	90%	$0.19	0.73
Hospital	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	Existing	2,311	12	$794	95%	85%	$0.04	44
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,913	12	$2,016	7%	55%	$0.53	71,394
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,913	12	$2,016	7%	55%	$0.14	2
Hospital	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,014	12	$1,772	15%	21%	$0.05	6
Hospital	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,296	12	$2,566	11%	75%	$0.08	17
Hospital	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	New	11,974	12	$1,745	90%	90%	$0.01	3

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	New	961	12	$1,309	25%	90%	$0.19	0.38
Hospital	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	New	2,311	12	$794	95%	85%	$0.04	23
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,913	12	$2,016	7%	55%	$0.14	1
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,913	12	$2,016	7%	55%	$0.53	59,473
Hospital	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	New	4,014	12	$1,772	15%	21%	$0.05	3
Hospital	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	New	4,296	12	$2,566	11%	75%	$0.08	8
Hospital	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	530	15	$747	5%	94%	$0.18	67
Hospital	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	Existing	22	5	$165	95%	81%	$2.09	106
Hospital	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	Existing	36	10	$210	25%	70%	$0.97	151
Hospital	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	per chiller ton	Existing	23	15	$483	45%	90%	$2.66	223
Hospital	Cooling Chillers	Chillers <150 tons (screw) - Advanced Efficiency	0.58 kW/ton (full load)	0.790 kW/Ton (full load)	Per installation	Existing	4,688	20	$9,232	100%	N/A	$0.22	1,090
Hospital	Cooling Chillers	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.53	15	$2	15%	67%	$0.73	379
Hospital	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	Existing	38	8	$27	10%	94%	$0.14	124
Hospital	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-One-Speed Fan Motor	per chiller ton	Existing	66	15	$2	95%	35%	$-0.00	812
Hospital	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	per chiller ton	Existing	19	13	$19	95%	75%	$0.14	467
Hospital	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	86	5	$193	35%	26%	$0.62	85
Hospital	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	57	15	$171	75%	76%	$0.38	778
Hospital	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	86	5	$78	75%	80%	$0.25	645
Hospital	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	1,353	10	$3,606	62%	85%	$0.44	304
Hospital	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.17	40	$9	4%	98%	$5.26	22
Hospital	Cooling Chillers	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.32	10%	39%	$0.03	32
Hospital	Cooling Chillers	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	13%	$27.85	2
Hospital	Cooling Chillers	Pipe Insulation	1.5" of Insulation, assuming R-6 (WA State Code)	No Insulation	per linear feet of insulation	Existing	5	15	$3	65%	45%	$0.09	72
Hospital	Cooling Chillers	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.22	7	$0.18	90%	85%	$0.17	1,529
Hospital	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.44	10	$2	25%	98%	$0.80	744
Hospital	Cooling Chillers	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.34	6
Hospital	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	2	25	$30	15%	60%	$1.09	127
Hospital	Cooling Chillers	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	2	25	$64	15%	60%	$2.72	105

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	141	15	$399	5%	94%	$0.36	11
Hospital	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	New	5	5	$165	95%	81%	$7.88	17
Hospital	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	New	10	10	$210	25%	70%	$3.30	26
Hospital	Cooling Chillers	Chillers <150 tons (screw) - Advanced Efficiency	0.58 kW/ton (full load)	0.790 kW/Ton (full load)	Per installation	New	1,309	20	$7,386	100%	N/A	$0.64	259
Hospital	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	New	11	8	$27	10%	94%	$0.48	18
Hospital	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	15	15	$171	75%	76%	$1.47	141
Hospital	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	360	10	$3,606	62%	85%	$1.67	55
Hospital	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.04	40	$9	4%	98%	$19.77	3
Hospital	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.11	10	$2	50%	98%	$3.03	281
Hospital	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.78	25	$30	80%	60%	$4.11	120
Hospital	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	577	15	$747	5%	94%	$0.16	172
Hospital	Cooling Dx	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.57	15	$2	15%	67%	$0.67	791
Hospital	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	Existing	3,763	15	$3,198	100%	N/A	$0.10	2,235
Hospital	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	86	10	$169	10%	30%	$0.32	147
Hospital	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	432	4	$335	95%	72%	$0.29	2,407
Hospital	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.48	15	$2	50%	94%	$0.55	3,521
Hospital	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	93	5	$193	35%	26%	$0.57	88
Hospital	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	62	15	$171	75%	76%	$0.35	1,847
Hospital	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	93	5	$78	75%	80%	$0.23	823
Hospital	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.04	18	$0.22	45%	65%	$0.56	194
Hospital	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	1,471	10	$3,606	62%	85%	$0.40	722
Hospital	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.19	40	$9	4%	98%	$4.83	51
Hospital	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.32	10%	39%	$0.03	79
Hospital	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	13%	$25.61	5
Hospital	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	60%	$0.24	674
Hospital	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	592	10	$136	95%	24%	$0.03	137

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.24	7	$0.18	90%	85%	$0.16	3,898
Hospital	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.37	12
Hospital	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	3	25	$30	15%	60%	$1.00	287
Hospital	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	2	25	$64	15%	60%	$2.50	243
Hospital	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	154	15	$399	5%	94%	$0.33	25
Hospital	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	New	1,047	15	$2,558	100%	N/A	$0.31	366
Hospital	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.12	15	$2	50%	94%	$2.08	593
Hospital	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	16	15	$171	75%	76%	$1.34	311
Hospital	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$2.12	32
Hospital	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	393	10	$3,606	62%	85%	$1.53	121
Hospital	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.05	40	$9	4%	98%	$18.12	8
Hospital	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	3	30	$5	50%	95%	$0.18	430
Hospital	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	158	10	$136	95%	12%	$0.14	20
Hospital	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.85	25	$30	80%	60%	$3.76	267
Hospital	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	Existing	10,170	15	$11,833	100%	N/A	$0.14	1,002
Hospital	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	578	15	$747	5%	94%	$0.16	22
Hospital	Heat Pump	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.60	15	$2	15%	67%	$0.64	133
Hospital	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	183	5	$193	35%	26%	$0.29	5
Hospital	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	122	15	$171	75%	76%	$0.17	524
Hospital	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	183	5	$78	75%	80%	$0.11	42
Hospital	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.09	18	$0.22	45%	65%	$0.28	62
Hospital	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.27	14	$0.93	5%	94%	$0.45	28
Hospital	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	2,876	10	$3,606	62%	85%	$0.20	204
Hospital	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.19	40	$9	4%	98%	$4.82	8
Hospital	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	Existing	17,407	30	$12,483	5%	N/A	$1.75	80
Hospital	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	3	13	$0.32	10%	39%	$0.00	30
Hospital	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.03	25	$0.49	25%	85%	$1.46	9

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.45	25	$1	75%	13%	$0.40	60
Hospital	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	2	20	$2	75%	60%	$0.12	178
Hospital	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-19 (Average Existing Conditions)	per floor area	Existing	0.20	25	$0.93	35%	35%	$0.47	33
Hospital	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.08	25	$0.29	35%	35%	$0.37	13
Hospital	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	1	25	$2	10%	35%	$0.14	48
Hospital	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	1,158	10	$136	95%	24%	$0.01	64
Hospital	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.46	7	$0.18	90%	85%	$0.07	1,009
Hospital	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.38	2
Hospital	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	2	25	$30	15%	60%	$1.39	33
Hospital	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	3	25	$64	15%	60%	$2.20	45
Hospital	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	New	5,196	15	$9,466	100%	N/A	$0.23	280
Hospital	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	153	15	$399	5%	94%	$0.33	3
Hospital	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	54	15	$171	75%	76%	$0.40	139
Hospital	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.04	18	$0.22	45%	65%	$0.64	16
Hospital	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.17	14	$0.93	5%	94%	$0.72	10
Hospital	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	1,279	10	$3,606	62%	85%	$0.46	54
Hospital	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.05	40	$9	4%	98%	$18.18	1
Hospital	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	New	8,289	30	$61,597	5%	N/A	$1.88	20
Hospital	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.02	25	$0.49	75%	85%	$1.95	13
Hospital	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.07	25	$0.29	35%	35%	$0.44	7
Hospital	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	6	30	$5	50%	95%	$0.08	122
Hospital	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	515	10	$136	95%	12%	$0.03	8
Hospital	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.27	25	$30	80%	60%	$11.81	13
Hospital	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	5,035	10	$581	20%	85%	$0.01	973
Hospital	Hvac Aux	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.65	15	$2	15%	67%	$0.59	2,468
Hospital	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,899	18	$4,278	95%	85%	$0.26	264
Hospital	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	53	15	$6	95%	76%	$0.01	1,205
Hospital	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	1,340	20	$110	65%	75%	$0.00	21,111
Hospital	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	Existing	136	15	$178	8%	77%	$0.16	81
Hospital	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	34	8	$4	65%	25%	$0.02	43

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	Existing	1,488	13	$1,669	65%	59%	$0.15	1,412
Hospital	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	3,926	10	$581	20%	75%	$0.02	351
Hospital	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,899	18	$4,528	95%	85%	$0.28	138
Hospital	Hvac Aux	Low Pressure Distribution Complex HVAC	Low Pressure Distribution Complex HVAC	VAV/CV	per building sqft	New	0.85	50	$2	24%	98%	$0.26	3,147
Hospital	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	41	15	$6	95%	76%	$0.01	617
Hospital	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	1,045	20	$110	65%	75%	$0.00	8,647
Hospital	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	New	106	15	$178	8%	77%	$0.21	33
Hospital	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	New	1,160	15	$1,669	65%	59%	$0.18	578
Hospital	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.03	3,249
Hospital	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	53	8	$28	75%	70%	$0.09	249
Hospital	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	246	15	$336	62%	90%	$0.17	2,166
Hospital	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	5	14	$35	75%	95%	$0.83	44
Hospital	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	1,360
Hospital	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.03	1,706
Hospital	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	53	8	$28	75%	70%	$0.09	130
Hospital	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	246	15	$336	62%	90%	$0.17	1,137
Hospital	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	5	14	$35	75%	95%	$0.83	23
Hospital	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	714
Hospital	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	185	9	$110	85%	75%	$0.09	2,629
Hospital	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	194	5	$12	70%	94%	$0.00	2,262
Hospital	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.41	8	$0.98	30%	51%	$0.45	136
Hospital	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.92	8	$0.73	30%	51%	$0.14	307
Hospital	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	97	16	$16	95%	50%	$0.01	1,555
Hospital	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	369
Hospital	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	Existing	259	8	$248	15%	80%	$0.17	268
Hospital	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	0.91	13	$0.34	90%	51%	$0.04	18,539
Hospital	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.33	13	$0.03	90%	68%	$0.00	6,449
Hospital	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.44	13	$0.08	90%	70%	$0.01	2,527

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.56	13	$0.14	75%	72%	$0.02	1,352
Hospital	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.01	13	$0.01	70%	83%	$0.12	415
Hospital	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	666	8	$70	90%	42%	$0.01	873
Hospital	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	762	8	$201	85%	**%	$0.04	1,242
Hospital	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	116	9	$110	85%	75%	$0.16	865
Hospital	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	194	5	$12	70%	94%	$0.00	745
Hospital	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.25	8	$0.98	30%	51%	$0.73	48
Hospital	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.48	8	$0.73	30%	51%	$0.28	90
Hospital	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	776
Hospital	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	New	259	8	$248	15%	80%	$0.17	140
Hospital	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.33	15	$0.00	90%	68%	$-0.01	3,387
Hospital	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.44	15	$0.03	90%	70%	$-0.01	1,327
Hospital	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.56	15	$0.08	75%	72%	$0.01	710
Hospital	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.01	15	$0.00	70%	83%	$0.02	218
Hospital	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	417	8	$70	90%	42%	$0.02	307
Hospital	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	762	8	$201	85%	**%	$0.04	437
Hospital	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$161	95%	45%	$0.51	124
Hospital	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$1	95%	45%	$-0.01	133
Hospital	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	156
Hospital	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	139	5	$15	95%	40%	$0.02	173
Hospital	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$0.00	95%	45%	$-0.01	121
Hospital	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$161	95%	45%	$0.51	65
Hospital	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$1	95%	45%	$-0.01	70
Hospital	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	82
Hospital	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	139	5	$15	95%	40%	$0.02	91
Hospital	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$0.00	95%	45%	$-0.01	63
Hospital	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.07	18
Hospital	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	368	10	$2	95%	75%	$-0.01	514

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	Existing	428	10	$140	95%	86%	$0.02	45
Hospital	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	15	4	$0.41	95%	86%	$-0.00	282
Hospital	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$124	13%	65%	$0.22	18
Hospital	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,517	9	$567	25%	35%	$0.06	350
Hospital	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	635	7	$567	25%	35%	$0.19	146
Hospital	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	Existing	2,291	4	$2,090	72%	85%	$0.65	591
Hospital	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 1,500 sqft	Existing	101	5	$22	60%	90%	$0.05	1,643
Hospital	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	243	14	$157	10%	80%	$0.08	5
Hospital	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	1,204	3	$175	50%	25%	$0.05	396
Hospital	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.07	9
Hospital	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	368	10	$2	95%	75%	$-0.01	270
Hospital	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	New	428	10	$140	95%	86%	$0.02	24
Hospital	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	15	4	$0.41	95%	86%	$-0.00	148
Hospital	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$124	13%	65%	$0.22	9
Hospital	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	New	2,291	4	$2,090	72%	85%	$0.65	310
Hospital	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 1,500 sqft	New	101	5	$22	60%	90%	$0.05	863
Hospital	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	243	14	$157	10%	80%	$0.08	2
Hospital	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	Existing	996	12	$79	15%	45%	$0.00	71
Hospital	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	Existing	1,036	12	$243	5%	77%	$0.02	177
Hospital	Refrigeration	Case Replacement Low Temp	Case Replacement Low Temp	No replacement	per square foot	Existing	0.01	15	$0.10	5%	98%	$0.71	38
Hospital	Refrigeration	Case Replacement Med Temp	Case Replacement Med Temp	No replacement	per square foot	Existing	0.00	15	$0.05	5%	98%	$4.37	0.41
Hospital	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	Existing	112	10	$61	5%	68%	$0.08	10
Hospital	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	Existing	2,597	12	$706	95%	77%	$0.03	110
Hospital	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	Existing	831	3	$118	10%	85%	$0.05	125
Hospital	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	Existing	60	10	$50	75%	95%	$0.13	186
Hospital	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	Existing	1,177	12	$157	95%	81%	$0.01	53
Hospital	Refrigeration	Standalone to Multiplex Compressor	Standalone to Multiplex Compressor	Standalone compressor	per building sqft	Existing	0.01	13	$0.00	5%	90%	$0.01	27

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	Existing	173	4	$185	15%	20%	$0.35	13
Hospital	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	Existing	0.01	12	$0.17	5%	95%	$1.34	41
Hospital	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	New	996	12	$79	15%	45%	$0.00	37
Hospital	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	New	1,036	12	$243	5%	77%	$0.02	93
Hospital	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	New	112	10	$61	5%	68%	$0.08	5
Hospital	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	New	2,597	12	$706	95%	77%	$0.03	58
Hospital	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	New	467	3	$45	5%	90%	$0.03	19
Hospital	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	New	60	10	$50	75%	95%	$0.13	98
Hospital	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	New	1,177	12	$157	95%	81%	$0.01	27
Hospital	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	New	173	4	$185	15%	20%	$0.35	7
Hospital	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	New	0.01	12	$0.17	5%	95%	$1.34	21
Hospital	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	385	15	$747	5%	94%	$0.24	99
Hospital	Space Heat	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.16	15	$2	15%	67%	$2.33	211
Hospital	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	62	5	$193	35%	26%	$0.85	106
Hospital	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	41	15	$171	75%	76%	$0.53	1,104
Hospital	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	62	5	$78	75%	80%	$0.34	849
Hospital	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.03	18	$0.22	45%	65%	$0.84	128
Hospital	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.19	14	$0.93	5%	94%	$0.65	124
Hospital	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	983	10	$3,606	62%	85%	$0.60	425
Hospital	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.32	10%	39%	$0.01	92
Hospital	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.03	25	$0.49	25%	85%	$1.35	61
Hospital	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.31	25	$1	75%	13%	$0.58	263
Hospital	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.68	20	$2	75%	60%	$0.36	380
Hospital	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-19 (Average Existing Conditions)	per floor area	Existing	0.19	25	$0.93	35%	35%	$0.50	218
Hospital	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.08	25	$0.29	35%	35%	$0.38	91
Hospital	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	1	25	$2	10%	35%	$0.14	350
Hospital	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	396	10	$136	95%	24%	$0.04	15
Hospital	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.16	7	$0.18	90%	85%	$0.23	2,236

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.32	10	$2	25%	98%	$1.10	1,059
Hospital	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.21	25	$64	15%	60%	$31.35	18
Hospital	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	211	15	$399	5%	94%	$0.23	30
Hospital	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	22	15	$171	75%	76%	$0.97	365
Hospital	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$1.54	43
Hospital	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.10	14	$0.93	5%	94%	$1.19	41
Hospital	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	539	10	$3,606	62%	85%	$1.11	143
Hospital	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.02	25	$0.49	75%	85%	$2.48	58
Hospital	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.04	25	$0.29	35%	35%	$0.70	30
Hospital	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	2	30	$5	50%	95%	$0.19	324
Hospital	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	217	10	$136	95%	12%	$0.09	23
Hospital	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.17	10	$2	50%	98%	$2.01	716
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	3,538	10	$8,170	15%	95%	$0.37	62
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	3,538	10	$8,170	15%	95%	$1.46	73,547
Hospital	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	Existing	550	11	$255	95%	80%	$-0.22	54
Hospital	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.06	10	$0.27	55%	94%	$0.65	674
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	11%	25%	$0.14	0.43
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	11%	25%	$3.48	20,615
Hospital	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,127	10	$2,599	95%	95%	$0.01	109
Hospital	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	19,904	10	$3,740	95%	94%	$-0.04	151
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	322	25	$817	5%	92%	$0.25	242
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	322	25	$817	5%	92%	$0.97	51,889
Hospital	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	732	15	$1,273	100%	N/A	$0.21	178
Hospital	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	13,490	15	$24,570	75%	N/A	$0.23	6,537
Hospital	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	5	12	$2	80%	70%	$0.07	155
Hospital	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	5	12	$2	80%	70%	$0.31	8,739

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	66	5	$5	95%	83%	$0.70	48,666
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	66	5	$5	95%	83%	$-0.08	19
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	126	10	$30	95%	73%	$-0.05	73
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	126	10	$30	95%	73%	$0.28	20,893
Hospital	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	506	10	$15	95%	35%	$-0.08	141
Hospital	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	506	10	$15	95%	35%	$0.09	82,535
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	68	10	$142	75%	90%	$0.33	486
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	68	10	$142	75%	90%	$1.72	24,124
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.15	10	$0.88	3%	94%	$0.93	1
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.15	10	$0.88	3%	94%	$139.93	5,550
Hospital	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	119	5	$95	75%	80%	$0.21	1,273
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	3,597	10	$8,170	15%	95%	$0.37	33
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	3,597	10	$8,170	15%	95%	$1.46	32,817
Hospital	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	New	553	11	$255	95%	80%	$-0.22	29
Hospital	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.06	10	$0.27	55%	94%	$0.64	356
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	11%	55%	$3.56	20,053
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	11%	55%	$0.14	0.51
Hospital	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,160	10	$2,568	95%	95%	$0.01	59
Hospital	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	19,997	10	$3,696	95%	94%	$-0.04	82
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	328	25	$653	25%	92%	$0.20	697
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	328	25	$653	25%	92%	$0.78	42,237
Hospital	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	766	15	$1,273	100%	N/A	$0.20	120
Hospital	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	14,116	15	$20,955	75%	N/A	$0.18	4,296
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$5	95%	83%	$-0.08	10
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$5	95%	83%	$0.72	3,954
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	127	10	$30	95%	73%	$-0.05	39
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	127	10	$30	95%	73%	$0.28	91,972
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	69	10	$142	75%	90%	$0.33	264
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	69	10	$142	75%	90%	$1.72	61,251

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.15	10	$0.88	3%	94%	$0.92	0.88
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.15	10	$0.88	3%	94%	$140.25	62,522
Hospital	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	121	5	$95	75%	80%	$0.21	667
Hotel Motel	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$28	100%	N/A	$0.06	1,145
Hotel Motel	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$28	100%	N/A	$0.06	109
Hotel Motel	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	Existing	12,036	12	$1,959	90%	90%	$0.01	3
Hotel Motel	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	Existing	1,041	12	$1,259	55%	90%	$0.17	0.82
Hotel Motel	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	Existing	2,324	12	$836	95%	85%	$0.04	8
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,923	12	$2,012	19%	55%	$0.14	1
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,923	12	$2,012	19%	55%	$0.28	19,147
Hotel Motel	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,035	12	$1,750	55%	21%	$0.05	4
Hotel Motel	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,319	12	$2,569	11%	75%	$0.08	3
Hotel Motel	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	New	12,036	12	$1,959	90%	90%	$0.01	1
Hotel Motel	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	New	1,041	12	$1,259	55%	90%	$0.17	0.43
Hotel Motel	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	New	2,324	12	$836	95%	85%	$0.04	4
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,923	12	$2,012	19%	55%	$0.14	0.71
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,923	12	$2,012	19%	55%	$0.28	37,467
Hotel Motel	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	New	4,035	12	$1,750	55%	21%	$0.05	2
Hotel Motel	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	New	4,319	12	$2,569	11%	75%	$0.08	1
Hotel Motel	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	96	15	$747	50%	94%	$1.02	73
Hotel Motel	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	Existing	20	5	$165	95%	81%	$2.31	73
Hotel Motel	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	Existing	32	10	$210	25%	70%	$1.07	103
Hotel Motel	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	per chiller ton	Existing	21	15	$483	45%	30%	$2.93	50
Hotel Motel	Cooling Chillers	Chillers <150 tons (screw) - Advanced Efficiency	0.58 kW/ton (full load)	0.790 kW/Ton (full load)	Per installation	Existing	4,177	20	$9,503	100%	N/A	$0.26	747
Hotel Motel	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	Existing	34	8	$27	10%	94%	$0.15	80
Hotel Motel	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-One-Speed Fan Motor	per chiller ton	Existing	60	15	$2	95%	35%	$-0.00	528
Hotel Motel	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	per chiller ton	Existing	17	13	$19	95%	75%	$0.16	304
Hotel Motel	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	78	5	$193	5%	52%	$0.69	16
Hotel Motel	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	52	15	$171	75%	76%	$0.43	517
Hotel Motel	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	78	5	$78	50%	80%	$0.28	281

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	1,263	10	$3,606	58%	85%	$0.47	189
Hotel Motel	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.16	40	$9	4%	98%	$5.80	9
Hotel Motel	Cooling Chillers	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.51	13	$0.31	10%	39%	$0.09	20
Hotel Motel	Cooling Chillers	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.01	25	$1	75%	25%	$18.52	3
Hotel Motel	Cooling Chillers	Pipe Insulation	1.5" of Insulation, assuming R-6 (WA State Code)	No Insulation	per linear feet of insulation	Existing	4	15	$3	65%	45%	$0.10	47
Hotel Motel	Cooling Chillers	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.20	7	$0.18	90%	85%	$0.19	995
Hotel Motel	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.40	10	$2	25%	98%	$0.89	513
Hotel Motel	Cooling Chillers	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.01	9
Hotel Motel	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	1	25	$30	15%	50%	$2.48	72
Hotel Motel	Cooling Chillers	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	1	25	$64	15%	50%	$6.06	61
Hotel Motel	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	30	15	$399	50%	94%	$1.71	17
Hotel Motel	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	New	6	5	$165	95%	81%	$7.28	14
Hotel Motel	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	New	11	10	$210	25%	70%	$3.05	20
Hotel Motel	Cooling Chillers	Chillers <150 tons (screw) - Advanced Efficiency	0.58 kW/ton (full load)	0.790 kW/Ton (full load)	Per installation	New	1,464	20	$7,603	100%	N/A	$0.59	191
Hotel Motel	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	New	12	8	$27	10%	94%	$0.45	15
Hotel Motel	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	16	15	$171	75%	76%	$1.36	113
Hotel Motel	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	402	10	$3,606	58%	85%	$1.50	41
Hotel Motel	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.05	40	$9	4%	98%	$18.24	1
Hotel Motel	Cooling Chillers	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.05	15	$0.98	20%	75%	$2.52	27
Hotel Motel	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.12	10	$2	50%	98%	$2.80	220
Hotel Motel	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.41	25	$30	80%	50%	$7.82	77
Hotel Motel	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	104	15	$747	50%	94%	$0.94	38
Hotel Motel	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	Existing	3,353	15	$3,292	100%	N/A	$0.12	357
Hotel Motel	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	78	10	$169	10%	30%	$0.36	22
Hotel Motel	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	391	4	$335	95%	72%	$0.32	374
Hotel Motel	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.43	15	$2	50%	94%	$0.61	549

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	84	5	$193	5%	52%	$0.64	4
Hotel Motel	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	56	15	$171	75%	76%	$0.39	287
Hotel Motel	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	84	5	$78	50%	80%	$0.25	84
Hotel Motel	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.04	18	$0.22	45%	65%	$0.62	30
Hotel Motel	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	1,371	10	$3,606	58%	85%	$0.44	105
Hotel Motel	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.17	40	$9	4%	98%	$5.35	5
Hotel Motel	Cooling Dx	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	per room	Existing	141	15	$139	60%	97%	$0.12	935
Hotel Motel	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.55	13	$0.31	10%	39%	$0.08	13
Hotel Motel	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.01	25	$1	75%	25%	$17.07	1
Hotel Motel	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.93	20	$2	75%	60%	$0.27	105
Hotel Motel	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	333	10	$137	95%	31%	$0.06	31
Hotel Motel	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.21	7	$0.18	90%	85%	$0.18	599
Hotel Motel	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.06	4
Hotel Motel	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	1	25	$30	15%	50%	$2.29	38
Hotel Motel	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	1	25	$64	15%	50%	$5.58	33
Hotel Motel	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	33	15	$399	50%	94%	$1.57	9
Hotel Motel	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	New	1,175	15	$2,634	100%	N/A	$0.29	63
Hotel Motel	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.13	15	$2	50%	94%	$1.93	112
Hotel Motel	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	18	15	$171	75%	76%	$1.24	59
Hotel Motel	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$1.96	6
Hotel Motel	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	438	10	$3,606	58%	85%	$1.37	21
Hotel Motel	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.05	40	$9	4%	98%	$16.72	0.97
Hotel Motel	Cooling Dx	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	per room	New	45	15	$139	60%	97%	$0.40	156
Hotel Motel	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	3	30	$5	50%	95%	$0.17	94
Hotel Motel	Cooling Dx	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.05	15	$0.98	20%	75%	$2.31	12
Hotel Motel	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	106	10	$137	95%	15%	$0.21	5
Hotel Motel	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.44	25	$30	80%	50%	$7.16	41

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	Existing	13,147	15	$12,181	100%	N/A	$0.11	2,810
Hotel Motel	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	100	15	$747	50%	94%	$0.97	74
Hotel Motel	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	197	5	$193	5%	52%	$0.26	3
Hotel Motel	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	131	15	$171	75%	76%	$0.16	1,214
Hotel Motel	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	197	5	$78	50%	80%	$0.10	66
Hotel Motel	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.10	18	$0.22	45%	65%	$0.26	142
Hotel Motel	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.35	14	$0.93	5%	94%	$0.35	79
Hotel Motel	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	3,184	10	$3,606	58%	85%	$0.18	443
Hotel Motel	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.16	40	$9	4%	98%	$5.55	9
Hotel Motel	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	Existing	20,503	30	$21,674	5%	N/A	$1.53	206
Hotel Motel	Heat Pump	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	per room	Existing	328	15	$139	60%	97%	$0.04	3,721
Hotel Motel	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	2	13	$0.31	10%	39%	$0.01	98
Hotel Motel	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.07	25	$0.49	25%	85%	$0.72	26
Hotel Motel	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.73	25	$1	75%	25%	$0.24	245
Hotel Motel	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	2	20	$2	75%	60%	$0.11	411
Hotel Motel	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	per floor area	Existing	1	25	$0.93	35%	45%	$0.06	453
Hotel Motel	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.18	25	$0.29	35%	45%	$0.16	52
Hotel Motel	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	2	25	$2	10%	35%	$0.10	219
Hotel Motel	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	773	10	$137	95%	31%	$0.02	229
Hotel Motel	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.50	7	$0.18	90%	85%	$0.07	2,341
Hotel Motel	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$10.97	10
Hotel Motel	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	0.77	25	$30	15%	50%	$4.12	43
Hotel Motel	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	1	25	$64	15%	50%	$5.16	73
Hotel Motel	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	New	7,753	15	$9,745	100%	N/A	$0.15	888
Hotel Motel	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	33	15	$399	50%	94%	$1.57	14
Hotel Motel	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	69	15	$171	75%	76%	$0.31	393
Hotel Motel	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.05	18	$0.22	45%	65%	$0.50	46

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.23	14	$0.93	5%	94%	$0.52	33
Hotel Motel	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	1,695	10	$3,606	58%	85%	$0.34	144
Hotel Motel	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.05	40	$9	4%	98%	$16.80	1
Hotel Motel	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	New	12,088	30	$66,350	5%	N/A	$1.32	64
Hotel Motel	Heat Pump	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	per room	New	174	15	$139	60%	97%	$0.09	1,040
Hotel Motel	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.05	25	$0.49	75%	85%	$1.01	34
Hotel Motel	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.14	25	$0.29	35%	45%	$0.21	26
Hotel Motel	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	8	30	$5	50%	95%	$0.06	398
Hotel Motel	Heat Pump	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.21	15	$0.98	20%	75%	$0.59	94
Hotel Motel	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	412	10	$137	95%	15%	$0.04	37
Hotel Motel	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.05	25	$30	80%	50%	$53.68	10
Hotel Motel	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	3,055	10	$581	20%	85%	$0.03	562
Hotel Motel	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,909	18	$8,798	95%	45%	$0.55	697
Hotel Motel	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	32	15	$6	95%	76%	$0.02	431
Hotel Motel	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	813	20	$110	65%	75%	$0.01	8,105
Hotel Motel	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	21	8	$4	65%	25%	$0.04	15
Hotel Motel	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	1,902	10	$581	20%	75%	$0.05	162
Hotel Motel	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,909	18	$8,798	95%	45%	$0.55	366
Hotel Motel	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	20	15	$6	95%	76%	$0.04	175
Hotel Motel	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	506	20	$110	65%	75%	$0.02	2,640
Hotel Motel	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.03	2,022
Hotel Motel	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	80	8	$28	75%	70%	$0.06	180
Hotel Motel	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	247	15	$337	62%	90%	$0.17	1,573
Hotel Motel	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	8	14	$36	75%	95%	$0.55	31
Hotel Motel	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	846
Hotel Motel	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.03	1,062
Hotel Motel	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	80	8	$28	75%	70%	$0.06	95
Hotel Motel	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	247	15	$337	62%	90%	$0.17	826
Hotel Motel	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	8	14	$36	75%	95%	$0.55	16
Hotel Motel	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	444

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	117	9	$110	85%	75%	$0.16	1,019
Hotel Motel	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	258	5	$13	70%	94%	$0.00	219
Hotel Motel	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.41	8	$0.98	30%	92%	$0.44	124
Hotel Motel	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.31	8	$0.73	30%	92%	$0.44	93
Hotel Motel	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	98	16	$16	95%	50%	$0.01	956
Hotel Motel	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	227
Hotel Motel	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	0.67	13	$0.01	90%	25%	$-0.01	4,204
Hotel Motel	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.25	13	$0.00	90%	28%	$-0.01	1,248
Hotel Motel	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.34	13	$0.00	90%	37%	$-0.01	618
Hotel Motel	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.42	13	$0.00	75%	42%	$-0.01	371
Hotel Motel	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.00	13	$0.01	70%	83%	$0.17	126
Hotel Motel	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	421	8	$70	90%	58%	$0.02	616
Hotel Motel	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	765	8	$201	85%	**%	$0.04	634
Hotel Motel	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	77	9	$110	85%	75%	$0.24	353
Hotel Motel	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	258	5	$13	70%	94%	$0.00	76
Hotel Motel	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.27	8	$0.98	30%	92%	$0.68	45
Hotel Motel	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.20	8	$0.73	30%	92%	$0.68	33
Hotel Motel	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	477
Hotel Motel	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.25	15	$0.00	90%	28%	$-0.01	655
Hotel Motel	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.34	15	$0.00	90%	37%	$-0.01	324
Hotel Motel	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.42	15	$0.00	75%	42%	$-0.01	195
Hotel Motel	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.00	15	$0.00	70%	83%	$0.03	66
Hotel Motel	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	278	8	$70	90%	58%	$0.04	222
Hotel Motel	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	765	8	$200	85%	**%	$0.04	228
Hotel Motel	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$161	95%	45%	$0.51	125
Hotel Motel	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$0.73	95%	45%	$-0.01	133
Hotel Motel	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.30	10

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	140	5	$14	95%	40%	$0.02	173
Hotel Motel	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$1	95%	45%	$-0.01	121
Hotel Motel	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$161	95%	45%	$0.51	65
Hotel Motel	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$0.73	95%	45%	$-0.01	70
Hotel Motel	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.30	5
Hotel Motel	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	140	5	$14	95%	40%	$0.02	91
Hotel Motel	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$1	95%	45%	$-0.01	63
Hotel Motel	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.05	5
Hotel Motel	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	369	10	$0.00	95%	75%	$-0.01	57
Hotel Motel	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	Existing	431	10	$142	95%	86%	$0.02	499
Hotel Motel	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	6	4	$0.41	95%	86%	$0.01	77
Hotel Motel	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$122	24%	65%	$0.21	20
Hotel Motel	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,525	9	$566	25%	35%	$0.05	211
Hotel Motel	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	549	7	$566	25%	35%	$0.22	76
Hotel Motel	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 4,000 sqft	Existing	102	5	$22	60%	90%	$0.05	383
Hotel Motel	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	244	14	$162	90%	80%	$0.08	251
Hotel Motel	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	1,042	3	$174	90%	25%	$0.06	371
Hotel Motel	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.05	2
Hotel Motel	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	369	10	$0.00	95%	75%	$-0.01	30
Hotel Motel	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	New	431	10	$142	95%	86%	$0.02	262
Hotel Motel	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	6	4	$0.41	95%	86%	$0.01	40
Hotel Motel	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$122	24%	65%	$0.21	10
Hotel Motel	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 4,000 sqft	New	102	5	$22	60%	90%	$0.05	201
Hotel Motel	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	244	14	$162	90%	80%	$0.08	131
Hotel Motel	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	246	15	$747	50%	94%	$0.38	186
Hotel Motel	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	200	5	$193	5%	52%	$0.25	37
Hotel Motel	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	133	15	$171	75%	76%	$0.15	1,327

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	200	5	$78	50%	80%	$0.09	675
Hotel Motel	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.10	18	$0.22	45%	65%	$0.25	157
Hotel Motel	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.61	14	$0.93	5%	94%	$0.19	152
Hotel Motel	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	3,236	10	$3,606	58%	85%	$0.17	486
Hotel Motel	Space Heat	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	per room	Existing	333	15	$139	60%	97%	$0.04	4,241
Hotel Motel	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	2	13	$0.31	10%	39%	$-0.00	131
Hotel Motel	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.15	25	$0.49	25%	85%	$0.32	61
Hotel Motel	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	1	25	$1	75%	25%	$0.13	499
Hotel Motel	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	2	20	$2	75%	60%	$0.10	459
Hotel Motel	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	per floor area	Existing	2	25	$0.93	35%	45%	$0.02	1,261
Hotel Motel	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.34	25	$0.29	35%	45%	$0.07	120
Hotel Motel	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	3	25	$2	10%	35%	$0.04	537
Hotel Motel	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	786	10	$137	95%	31%	$0.01	29
Hotel Motel	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.51	7	$0.18	90%	85%	$0.06	2,666
Hotel Motel	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	1	10	$2	25%	98%	$0.33	1,295
Hotel Motel	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	0.19	25	$64	15%	50%	$34.86	11
Hotel Motel	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	156	15	$399	50%	94%	$0.32	80
Hotel Motel	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	84	15	$171	75%	76%	$0.25	529
Hotel Motel	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.06	18	$0.22	45%	65%	$0.40	62
Hotel Motel	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.39	14	$0.93	5%	94%	$0.31	60
Hotel Motel	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	2,059	10	$3,606	58%	85%	$0.27	194
Hotel Motel	Space Heat	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	per room	New	212	15	$139	60%	97%	$0.07	1,402
Hotel Motel	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.09	25	$0.49	75%	85%	$0.52	71
Hotel Motel	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.21	25	$0.29	35%	45%	$0.13	44
Hotel Motel	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	10	30	$5	50%	95%	$0.04	537
Hotel Motel	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.26	15	$0.98	20%	75%	$0.47	126
Hotel Motel	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	500	10	$137	95%	15%	$0.03	50

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.65	10	$2	50%	98%	$0.53	1,004
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	4,584	10	$8,171	35%	95%	$0.29	91
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	4,584	10	$8,171	35%	95%	$1.86	90,093
Hotel Motel	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	Existing	553	11	$266	95%	80%	$-0.21	247
Hotel Motel	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.08	10	$0.27	55%	80%	$0.51	298
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	24%	25%	$3.46	85,907
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	24%	25%	$0.14	0.78
Hotel Motel	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,164	10	$2,606	95%	95%	$0.02	121
Hotel Motel	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	20,008	10	$3,735	95%	94%	$-0.03	167
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	440	25	$817	5%	92%	$1.18	87,156
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	440	25	$817	5%	92%	$0.18	125
Hotel Motel	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	943	15	$1,208	100%	N/A	$0.16	112
Hotel Motel	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	17,388	15	$23,298	75%	N/A	$0.16	3,416
Hotel Motel	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	6	12	$2	80%	90%	$0.38	4,105
Hotel Motel	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	6	12	$2	80%	90%	$0.05	99
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$6	95%	93%	$0.71	32,438
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$6	95%	93%	$-0.07	53
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	161	10	$31	95%	73%	$-0.06	1,175
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	161	10	$31	95%	73%	$0.16	48,037
Hotel Motel	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	644	10	$17	95%	35%	$-0.08	2,253
Hotel Motel	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	644	10	$17	95%	35%	$0.07	67,468
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	21	10	$142	75%	85%	$1.09	290
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	21	10	$142	75%	85%	$9.06	47,373
Hotel Motel	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	166	5	$95	75%	5%	$0.15	39
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	4,656	10	$8,171	35%	95%	$0.28	49
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	4,656	10	$8,171	35%	95%	$1.87	82,884
Hotel Motel	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	New	555	11	$266	95%	80%	$-0.21	133
Hotel Motel	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.08	10	$0.27	55%	80%	$0.51	182

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	24%	55%	$0.14	0.93
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	24%	55%	$3.54	6,529
Hotel Motel	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,198	10	$2,606	95%	95%	$0.02	65
Hotel Motel	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	20,102	10	$3,695	95%	94%	$-0.04	90
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	447	25	$653	25%	92%	$0.94	53,326
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	447	25	$653	25%	92%	$0.14	402
Hotel Motel	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	986	15	$1,208	100%	N/A	$0.15	71
Hotel Motel	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	18,174	15	$19,871	75%	N/A	$0.13	2,567
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$6	95%	93%	$-0.07	28
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$6	95%	93%	$0.72	16,120
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	161	10	$31	95%	73%	$0.16	52,171
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	161	10	$31	95%	73%	$-0.06	631
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	21	10	$142	75%	85%	$1.07	157
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	21	10	$142	75%	85%	$9.08	25,708
Hotel Motel	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	169	5	$95	75%	5%	$0.15	24
Office	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$28	100%	N/A	$0.06	79,012
Office	Computers	Network PC Power Management	Network PC Power Management	No Power Management	4.2 units per 1,000 sqft	Existing	2	5	$12	95%	30%	$1.55	993
Office	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$28	100%	N/A	$0.06	7,570
Office	Computers	Network PC Power Management	Network PC Power Management	No Power Management	4.2 units per 1,000 sqft	New	2	5	$12	95%	30%	$1.55	521
Office	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	467	15	$747	75%	94%	$0.21	7,521
Office	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	Existing	19	5	$165	95%	81%	$2.38	760
Office	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	Existing	31	10	$210	25%	70%	$1.11	1,082
Office	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	per chiller ton	Existing	21	15	$483	45%	45%	$3.02	794
Office	Cooling Chillers	Chillers >300 tons (centrifugal) with VSD - Advanced Efficiency	0.47 kW/ton w/VSD (full load)	0.576 kW/ton (full load)	Per installation	Existing	3,730	20	$6,161	100%	N/A	$0.19	7,835
Office	Cooling Chillers	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.46	15	$2	15%	67%	$0.83	2,729
Office	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	Existing	33	8	$27	10%	94%	$0.16	920
Office	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-One-Speed Fan Motor	per chiller ton	Existing	58	15	$2	95%	35%	$0.00	6,013
Office	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	per chiller ton	Existing	16	13	$19	95%	75%	$0.16	3,461

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	75	5	$193	45%	28%	$0.71	851
Office	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	50	15	$171	75%	76%	$0.44	5,463
Office	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	75	5	$78	50%	80%	$0.28	2,975
Office	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.15	40	$9	4%	98%	$5.97	144
Office	Cooling Chillers	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.81	13	$0.31	10%	39%	$0.05	238
Office	Cooling Chillers	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	4%	$28.76	5
Office	Cooling Chillers	Pipe Insulation	1.5" of Insulation, assuming R-6 (WA State Code)	No Insulation	per linear feet of insulation	Existing	4	15	$3	65%	45%	$0.10	539
Office	Cooling Chillers	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.19	7	$0.18	90%	85%	$0.20	11,317
Office	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.38	10	$2	25%	98%	$0.91	5,337
Office	Cooling Chillers	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$13.60	51
Office	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	2	25	$30	15%	95%	$1.55	1,451
Office	Cooling Chillers	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.6 (Average Existing Conditions)	per window sqft	Existing	1	25	$64	15%	95%	$3.64	1,274
Office	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	175	15	$399	75%	94%	$0.29	1,854
Office	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	New	7	5	$165	95%	81%	$6.36	169
Office	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	New	13	10	$210	25%	70%	$2.66	261
Office	Cooling Chillers	Chillers >300 tons (centrifugal) with VSD - Advanced Efficiency	0.47 kW/ton w/VSD (full load)	0.576 kW/ton (full load)	Per installation	New	1,475	20	$4,904	100%	N/A	$0.38	2,383
Office	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	New	14	8	$27	10%	94%	$0.39	183
Office	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	18	15	$171	75%	76%	$1.18	1,378
Office	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.05	40	$9	4%	98%	$15.95	32
Office	Cooling Chillers	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.05	15	$0.98	20%	75%	$2.20	343
Office	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.14	10	$2	50%	98%	$2.44	2,761
Office	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.77	25	$30	80%	95%	$4.16	1,871
Office	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	508	15	$747	75%	94%	$0.19	15,139
Office	Cooling Dx	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.50	15	$2	15%	67%	$0.77	4,458
Office	Cooling Dx	DX Package 240 to 760 kBTU/hr - Premium Efficiency	DX Package 240 to 760 kBTU/hr - Premium Efficiency 10.8 EER	DX Package 240 to 760 kBTU/hr - Standard Efficiency 10.0 EER	Per installation	Existing	2,994	15	$7,395	100%	N/A	$0.32	12,572
Office	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	76	10	$169	10%	20%	$0.37	535

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	381	4	$335	95%	72%	$0.33	13,144
Office	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.42	15	$2	50%	94%	$0.63	19,717
Office	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	82	5	$193	5%	28%	$0.65	76
Office	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	55	15	$171	75%	76%	$0.40	10,100
Office	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	82	5	$78	75%	80%	$0.26	4,491
Office	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.04	18	$0.22	45%	65%	$0.64	1,086
Office	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.16	40	$9	4%	98%	$5.49	259
Office	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.88	13	$0.31	10%	39%	$0.05	462
Office	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	4%	$26.45	9
Office	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.90	20	$2	75%	59%	$0.28	3,610
Office	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	433	10	$137	95%	26%	$0.05	875
Office	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.21	7	$0.18	90%	85%	$0.18	22,780
Office	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$13.64	84
Office	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	2	25	$30	15%	95%	$1.43	2,559
Office	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.6 (Average Existing Conditions)	per window sqft	Existing	2	25	$64	15%	95%	$3.35	2,293
Office	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	191	15	$399	75%	94%	$0.27	3,190
Office	Cooling Dx	DX Package 240 to 760 kBTU/hr - Premium Efficiency	DX Package 240 to 760 kBTU/hr - Premium Efficiency 10.8 EER	DX Package 240 to 760 kBTU/hr - Standard Efficiency 10.0 EER	Per installation	New	1,187	15	$5,916	100%	N/A	$0.65	2,669
Office	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.15	15	$2	50%	94%	$1.68	4,663
Office	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	20	15	$171	75%	76%	$1.09	2,389
Office	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$1.71	256
Office	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.06	40	$9	4%	98%	$14.62	58
Office	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	3	30	$5	50%	95%	$0.15	3,539
Office	Cooling Dx	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.06	15	$0.98	20%	75%	$2.02	521
Office	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	162	10	$137	95%	13%	$0.14	179
Office	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.84	25	$30	80%	95%	$3.81	3,282
Office	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	Existing	9,805	15	$8,904	100%	N/A	$0.11	35,618
Office	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	508	15	$747	75%	94%	$0.18	10,303
Office	Heat Pump	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.52	15	$2	15%	67%	$0.74	4,053

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	159	5	$193	5%	28%	$0.33	26
Office	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	106	15	$171	75%	76%	$0.20	15,420
Office	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	159	5	$78	75%	80%	$0.13	1,297
Office	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.08	18	$0.22	45%	65%	$0.32	1,862
Office	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.23	14	$0.93	5%	94%	$0.53	852
Office	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.16	40	$9	4%	98%	$5.48	237
Office	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	Existing	17,030	30	$86,481	5%	N/A	$1.64	2,972
Office	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	2	13	$0.31	10%	39%	$0.01	900
Office	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.03	25	$0.49	25%	65%	$1.56	223
Office	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.41	25	$1	75%	4%	$0.44	522
Office	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.14	5,312
Office	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.39	25	$0.93	35%	15%	$0.24	901
Office	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.07	25	$0.29	35%	15%	$0.39	173
Office	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	0.86	25	$2	10%	35%	$0.26	1,401
Office	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	836	10	$137	95%	26%	$0.02	2,122
Office	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.40	7	$0.18	90%	85%	$0.09	30,593
Office	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$13.65	77
Office	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	1	25	$30	15%	95%	$1.98	1,655
Office	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.6 (Average Existing Conditions)	per window sqft	Existing	1	25	$64	15%	95%	$3.47	1,998
Office	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	New	3,655	15	$7,122	100%	N/A	$0.25	7,175
Office	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	190	15	$399	75%	94%	$0.27	2,293
Office	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	46	15	$171	75%	76%	$0.48	4,010
Office	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.03	18	$0.22	45%	65%	$0.76	488
Office	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.11	14	$0.93	5%	94%	$1.07	253
Office	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.06	40	$9	4%	98%	$14.65	52
Office	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	New	7,774	30	$48,302	5%	N/A	$1.84	711
Office	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.01	25	$0.49	75%	65%	$2.96	214
Office	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.04	25	$0.29	35%	15%	$0.71	58

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	5	30	$5	50%	95%	$0.09	3,635
Office	Heat Pump	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.14	15	$0.98	20%	75%	$0.90	990
Office	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	364	10	$137	95%	13%	$0.05	282
Office	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.52	25	$30	80%	95%	$6.09	1,733
Office	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	1,448	10	$581	20%	85%	$0.06	2,125
Office	Hvac Aux	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.18	15	$2	15%	67%	$2.07	5,448
Office	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	15	15	$6	95%	76%	$0.05	2,651
Office	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	385	20	$110	65%	75%	$0.03	46,430
Office	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	Existing	39	15	$178	11%	77%	$0.59	247
Office	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	10	8	$4	65%	25%	$0.09	96
Office	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	1,219	10	$581	20%	75%	$0.07	828
Office	Hvac Aux	Low Pressure Distribution Complex HVAC	Low Pressure Distribution Complex HVAC	VAV/CV	per building sqft	New	0.94	50	$2	17%	98%	$0.24	18,739
Office	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	12	15	$6	95%	76%	$0.06	1,465
Office	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	324	20	$110	65%	75%	$0.03	20,529
Office	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	New	33	15	$178	11%	77%	$0.71	99
Office	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.04	27,318
Office	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	47	8	$28	75%	70%	$0.10	1,788
Office	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	248	15	$337	62%	90%	$0.16	15,551
Office	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	5	14	$35	75%	95%	$0.94	331
Office	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	11,439
Office	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.04	14,348
Office	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	47	8	$28	75%	70%	$0.10	939
Office	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	248	15	$337	62%	90%	$0.16	8,168
Office	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	5	14	$35	75%	95%	$0.94	173
Office	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	6,008
Office	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	154	9	$110	85%	75%	$0.12	17,621
Office	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	99	5	$12	70%	94%	$0.02	7,582
Office	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.96	8	$0.98	30%	78%	$0.19	3,774
Office	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.72	8	$0.73	30%	78%	$0.19	2,821

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	98	16	$16	95%	50%	$0.01	12,485
Office	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	2,966
Office	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	1	13	$0.75	90%	49%	$0.09	64,722
Office	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.30	13	$0.09	90%	59%	$0.03	41,072
Office	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.41	13	$0.14	90%	63%	$0.04	16,824
Office	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.51	13	$0.24	75%	67%	$0.05	9,200
Office	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.02	13	$0.02	70%	83%	$0.14	5,800
Office	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	557	8	$70	90%	42%	$0.01	6,253
Office	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	764	8	$201	85%	88%	$0.04	7,933
Office	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	95	9	$110	85%	75%	$0.20	5,703
Office	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	99	5	$12	70%	94%	$0.02	2,454
Office	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.59	8	$0.98	30%	78%	$0.31	1,349
Office	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.44	8	$0.73	30%	78%	$0.31	1,008
Office	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	6,231
Office	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.30	15	$0.00	90%	59%	$-0.01	21,573
Office	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.41	15	$0.05	90%	63%	$0.00	8,837
Office	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.51	15	$0.10	75%	67%	$0.01	4,832
Office	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.02	15	$0.00	70%	83%	$0.02	3,046
Office	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	343	8	$70	90%	42%	$0.03	2,236
Office	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	764	8	$201	85%	88%	$0.04	2,836
Office	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	75	6	$161	95%	45%	$0.51	1,264
Office	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	80	6	$1	95%	45%	$-0.01	1,351
Office	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	1,598
Office	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	140	5	$15	95%	40%	$0.02	1,757
Office	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	73	6	$0.97	95%	45%	$-0.01	1,230
Office	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	75	6	$161	95%	45%	$0.51	664
Office	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	80	6	$1	95%	45%	$-0.01	709
Office	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	839

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	140	5	$15	95%	40%	$0.02	923
Office	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	73	6	$0.97	95%	45%	$-0.01	646
Office	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.06	39
Office	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	371	10	$1	95%	75%	$-0.01	7,534
Office	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	4	4	$0.41	95%	86%	$0.02	607
Office	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	82	12	$124	19%	65%	$0.21	242
Office	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,531	9	$566	25%	35%	$0.05	3,227
Office	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	557	7	$566	25%	35%	$0.22	1,175
Office	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	Existing	2,313	4	$2,096	72%	85%	$0.65	5,454
Office	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 500 sqft	Existing	102	5	$22	60%	90%	$0.05	41,444
Office	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	245	14	$159	10%	80%	$0.08	47
Office	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	1,057	3	$175	10%	25%	$0.06	636
Office	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.06	20
Office	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	371	10	$1	95%	75%	$-0.01	3,957
Office	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	4	4	$0.41	95%	86%	$0.02	319
Office	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	82	12	$124	19%	65%	$0.21	127
Office	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	New	2,313	4	$2,096	72%	85%	$0.65	2,865
Office	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 500 sqft	New	102	5	$22	60%	90%	$0.05	21,768
Office	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	245	14	$159	10%	80%	$0.08	24
Office	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	990	15	$747	75%	94%	$0.08	26,169
Office	Space Heat	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.42	15	$2	15%	67%	$0.90	3,694
Office	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	160	5	$193	5%	28%	$0.32	281
Office	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	107	15	$171	75%	76%	$0.19	18,421
Office	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	160	5	$78	75%	80%	$0.12	13,973
Office	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.08	18	$0.22	45%	65%	$0.32	2,220

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.49	14	$0.93	5%	94%	$0.24	2,147
Office	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	3	13	$0.31	10%	39%	$-0.00	1,640
Office	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.10	25	$0.49	25%	65%	$0.49	782
Office	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.84	25	$1	75%	4%	$0.20	1,289
Office	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.13	6,113
Office	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	1	25	$0.93	35%	15%	$0.07	4,331
Office	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.21	25	$0.29	35%	15%	$0.13	633
Office	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	2	25	$2	10%	35%	$0.08	6,499
Office	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	844	10	$137	95%	26%	$0.01	309
Office	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.41	7	$0.18	90%	85%	$0.08	39,376
Office	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.82	10	$2	25%	98%	$0.42	18,371
Office	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	204	15	$399	75%	94%	$0.24	3,065
Office	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	22	15	$171	75%	76%	$1.01	2,291
Office	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$1.59	277
Office	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.10	14	$0.93	5%	94%	$1.23	268
Office	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.02	25	$0.49	75%	65%	$2.45	270
Office	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.04	25	$0.29	35%	15%	$0.68	77
Office	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	2	30	$5	50%	95%	$0.20	2,168
Office	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.06	15	$0.98	20%	75%	$1.88	562
Office	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	173	10	$137	95%	13%	$0.12	168
Office	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.17	10	$2	50%	98%	$2.09	4,525
Office	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.02	10	$0.27	55%	80%	$1.93	2,945
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	8%	25%	$0.14	22
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	8%	25%	$3.56	75,152
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	583	25	$817	5%	92%	$0.13	1,243
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	583	25	$817	5%	92%	$2.17	20,757
Office	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	226	15	$220	100%	N/A	$0.11	877
Office	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	4,168	15	$4,236	75%	N/A	$0.12	33,265

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Office	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	9	12	$2	80%	30%	$0.04	332
Office	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	9	12	$2	80%	30%	$0.72	60,043
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$-0.03	176
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$0.47	65,450
Office	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	339	10	$20	95%	35%	$-0.08	339
Office	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	339	10	$20	95%	35%	$0.12	96,753
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	58	10	$142	75%	85%	$0.39	2,254
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	58	10	$142	75%	85%	$8.16	8,049
Office	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	187	5	$95	75%	40%	$0.13	3,192
Office	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.02	10	$0.27	55%	80%	$1.91	1,540
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	8%	55%	$3.64	77,252
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	8%	55%	$0.14	26
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	590	25	$654	25%	92%	$0.10	3,457
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	590	25	$654	25%	92%	$1.74	59,369
Office	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	235	15	$220	100%	N/A	$0.11	605
Office	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	4,339	15	$3,612	75%	N/A	$0.10	21,638
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	85	10	$30	95%	73%	$-0.03	95
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	85	10	$30	95%	73%	$0.48	43,278
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	59	10	$142	75%	85%	$0.39	1,219
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	59	10	$142	75%	85%	$8.17	56,256
Office	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	189	5	$95	75%	40%	$0.13	1,654
Other	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$29	100%	N/A	$0.06	14,212
Other	Computers	Network PC Power Management	Network PC Power Management	No Power Management	0.7 units per 1,000 sqft	Existing	5	5	$12	95%	30%	$0.68	211
Other	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$29	100%	N/A	$0.06	1,361
Other	Computers	Network PC Power Management	Network PC Power Management	No Power Management	0.7 units per 1,000 sqft	New	5	5	$12	95%	30%	$0.68	110
Other	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	83	5	$193	5%	66%	$0.64	56
Other	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	83	5	$78	50%	80%	$0.26	709
Other	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	929	10	$3,606	100%	85%	$0.64	874
Other	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.43	10	$2	25%	98%	$0.83	1,347
Other	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	424	10	$3,606	100%	85%	$1.42	223

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.19	10	$2	50%	98%	$1.81	687
Other	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	561	15	$747	50%	94%	$0.17	4,659
Other	Cooling Dx	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.56	15	$2	15%	67%	$0.69	2,048
Other	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	Existing	2,605	15	$2,540	100%	N/A	$0.12	6,116
Other	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	74	10	$169	10%	70%	$0.37	842
Other	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	374	4	$335	95%	72%	$0.33	6,268
Other	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.46	15	$2	50%	94%	$0.57	9,209
Other	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	91	5	$193	45%	66%	$0.59	758
Other	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	60	15	$171	75%	76%	$0.37	4,831
Other	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	91	5	$78	50%	80%	$0.24	1,417
Other	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.04	18	$0.22	45%	65%	$0.58	507
Other	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	1,011	10	$3,606	5%	85%	$0.59	129
Other	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.18	40	$9	4%	98%	$4.97	182
Other	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.32	10%	39%	$0.03	139
Other	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	30%	$35.66	33
Other	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.25	1,724
Other	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	552	10	$137	95%	28%	$0.04	446
Other	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.23	7	$0.18	90%	85%	$0.16	10,515
Other	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.86	18
Other	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	5	25	$30	15%	70%	$0.57	1,051
Other	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	4	25	$64	15%	70%	$1.39	761
Other	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	257	15	$399	50%	94%	$0.20	1,188
Other	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	New	1,246	15	$2,032	100%	N/A	$0.21	1,624
Other	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.21	15	$2	50%	94%	$1.25	2,482
Other	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	27	15	$171	75%	76%	$0.80	1,368
Other	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.02	18	$0.22	45%	65%	$1.27	136

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	463	10	$3,606	5%	85%	$1.30	35
Other	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.08	40	$9	4%	98%	$10.85	51
Other	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	5	30	$5	50%	95%	$0.11	1,977
Other	Cooling Dx	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.08	15	$0.98	20%	75%	$1.50	276
Other	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	253	10	$137	95%	14%	$0.09	110
Other	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	2	25	$30	80%	70%	$1.24	1,605
Other	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	Existing	6,721	15	$9,397	100%	N/A	$0.17	5,833
Other	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	566	15	$747	50%	94%	$0.16	1,405
Other	Heat Pump	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.50	15	$2	15%	67%	$0.76	703
Other	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	153	5	$193	45%	66%	$0.34	100
Other	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	102	15	$171	75%	76%	$0.20	2,759
Other	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	153	5	$78	50%	80%	$0.13	153
Other	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.07	18	$0.22	45%	65%	$0.33	336
Other	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.19	14	$0.93	5%	94%	$0.66	126
Other	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	1,704	10	$3,606	5%	85%	$0.34	86
Other	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.18	40	$9	4%	98%	$4.92	71
Other	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	Existing	11,368	30	$48,148	5%	N/A	$2.13	469
Other	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	2	13	$0.32	10%	39%	$0.00	87
Other	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.01	25	$0.49	25%	85%	$3.38	35
Other	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.26	25	$1	75%	30%	$0.68	695
Other	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.14	943
Other	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	per floor area	Existing	0.23	25	$0.93	35%	50%	$0.41	476
Other	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.03	25	$0.29	35%	50%	$0.93	65
Other	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	0.54	25	$2	10%	35%	$0.41	110
Other	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	930	10	$137	95%	28%	$0.01	415
Other	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.39	7	$0.18	90%	85%	$0.08	5,418
Other	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	2	10	$150	90%	66%	$11.89	7
Other	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	4	25	$30	15%	70%	$0.70	277

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	5	25	$64	15%	70%	$1.29	314
Other	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	New	3,221	15	$7,518	100%	N/A	$0.29	1,521
Other	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	256	15	$399	50%	94%	$0.19	376
Other	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	48	15	$171	75%	76%	$0.45	774
Other	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.03	18	$0.22	45%	65%	$0.72	94
Other	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.09	14	$0.93	5%	94%	$1.31	37
Other	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	808	10	$3,606	5%	85%	$0.73	24
Other	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.08	40	$9	4%	98%	$10.87	19
Other	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	New	5,834	30	$28,325	5%	N/A	$2.11	128
Other	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	85%	$6.41	34
Other	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.01	25	$0.29	35%	50%	$1.72	21
Other	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	5	30	$5	50%	95%	$0.08	698
Other	Heat Pump	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.14	15	$0.98	20%	75%	$0.85	191
Other	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	441	10	$137	95%	14%	$0.04	59
Other	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	1	25	$30	80%	70%	$1.60	391
Other	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	1,993	10	$581	5%	85%	$0.04	397
Other	Hvac Aux	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.26	15	$2	15%	67%	$1.50	4,059
Other	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,903	18	$4,005	95%	65%	$0.25	845
Other	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	21	15	$6	95%	76%	$0.04	1,983
Other	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	530	20	$110	65%	75%	$0.02	34,733
Other	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	Existing	54	15	$178	13%	77%	$0.43	219
Other	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	13	8	$4	65%	25%	$0.07	72
Other	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	Existing	416	13	$1,669	5%	59%	$0.57	177
Other	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	1,642	10	$581	5%	75%	$0.05	151
Other	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,903	18	$4,022	95%	50%	$0.25	2,048
Other	Hvac Aux	Low Pressure Distribution Complex HVAC	Low Pressure Distribution Complex HVAC	VAV/CV	per building sqft	New	0.85	50	$2	16%	98%	$0.26	8,650
Other	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	17	15	$6	95%	76%	$0.04	1,061
Other	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	437	20	$110	65%	75%	$0.02	14,876
Other	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	New	44	15	$178	13%	77%	$0.52	88
Other	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	New	342	15	$1,669	5%	59%	$0.64	76

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.04	15,163
Other	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	82	8	$28	75%	70%	$0.05	2,740
Other	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	247	15	$336	62%	90%	$0.17	23,833
Other	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	9	14	$35	75%	95%	$0.54	443
Other	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	6,349
Other	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.04	7,964
Other	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	82	8	$28	75%	70%	$0.05	1,439
Other	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	247	15	$336	62%	90%	$0.17	12,518
Other	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	9	14	$35	75%	95%	$0.54	232
Other	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	3,335
Other	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	111	9	$110	25%	75%	$0.17	2,080
Other	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	112	5	$12	70%	94%	$0.02	6,086
Other	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.47	8	$0.98	30%	84%	$0.39	1,666
Other	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.35	8	$0.73	30%	84%	$0.39	1,245
Other	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	97	16	$16	95%	50%	$0.01	6,924
Other	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	1,644
Other	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	Existing	150	8	$249	10%	80%	$0.31	185
Other	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	0.43	13	$0.31	90%	33%	$0.09	25,382
Other	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.18	13	$0.04	90%	44%	$0.02	10,498
Other	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.25	13	$0.10	90%	51%	$0.05	4,630
Other	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.31	13	$0.21	75%	55%	$0.09	2,594
Other	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.14	13	$0.21	70%	83%	$0.20	16,872
Other	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	400	8	$70	90%	52%	$0.02	3,230
Other	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	758	8	$201	85%	**%	$0.04	3,687
Other	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	79	9	$110	25%	75%	$0.24	776
Other	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	112	5	$13	70%	94%	$0.02	2,271
Other	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.33	8	$0.98	30%	84%	$0.56	635

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.25	8	$0.73	30%	84%	$0.56	475
Other	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	3,456
Other	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	New	150	8	$249	10%	80%	$0.31	97
Other	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.18	15	$0.02	90%	44%	$0.00	5,514
Other	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.25	15	$0.05	90%	51%	$0.02	2,432
Other	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.31	15	$0.10	75%	55%	$0.03	1,362
Other	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.14	15	$0.05	70%	83%	$0.04	8,862
Other	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	284	8	$70	90%	52%	$0.04	1,232
Other	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	758	8	$201	85%	**%	$0.04	1,406
Other	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$162	95%	45%	$0.52	67
Other	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$0.00	95%	45%	$-0.01	72
Other	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	168
Other	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	139	5	$14	95%	40%	$0.02	846
Other	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$0.00	95%	45%	$-0.01	65
Other	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$162	95%	45%	$0.52	35
Other	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$0.00	95%	45%	$-0.01	37
Other	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	88
Other	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	139	5	$14	95%	40%	$0.02	444
Other	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$0.00	95%	45%	$-0.01	34
Other	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.06	36
Other	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	368	10	$0.00	95%	75%	$-0.01	557
Other	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	6	4	$0.41	95%	86%	$0.01	560
Other	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$123	10%	65%	$0.21	92
Other	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,520	9	$566	25%	35%	$0.05	2,314
Other	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	931	7	$566	25%	35%	$0.13	1,417
Other	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualized servers	Existing	2,296	4	$2,094	72%	85%	$0.65	3,910
Other	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	Existing	102	5	$22	60%	90%	$0.05	2,300

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	243	14	$160	10%	80%	$0.08	33
Other	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	1,765	3	$175	10%	25%	$0.03	767
Other	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.06	19
Other	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	368	10	$0.00	95%	75%	$-0.01	293
Other	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	6	4	$0.41	95%	86%	$0.01	294
Other	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$123	10%	65%	$0.21	48
Other	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	New	2,296	4	$2,094	72%	85%	$0.65	2,054
Other	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	New	102	5	$22	60%	90%	$0.05	1,208
Other	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	243	14	$160	10%	80%	$0.08	17
Other	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	Existing	1,039	12	$243	3%	77%	$0.02	414
Other	Refrigeration	Case Replacement Low Temp	Case Replacement Low Temp	No replacement	per square foot	Existing	0.01	15	$0.10	3%	98%	$0.71	90
Other	Refrigeration	Case Replacement Med Temp	Case Replacement Med Temp	No replacement	per square foot	Existing	0.00	15	$0.05	3%	98%	$4.36	0.95
Other	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	per installation	Existing	411	5	$71	5%	85%	$0.04	57
Other	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	Existing	23	10	$50	75%	95%	$0.36	349
Other	Refrigeration	Standalone to Multiplex Compressor	Standalone to Multiplex Compressor	Standalone compressor	per building sqft	Existing	0.00	13	$0.00	3%	90%	$0.01	25
Other	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	Existing	0.00	12	$0.17	3%	95%	$3.37	38
Other	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	New	1,039	12	$243	3%	77%	$0.02	217
Other	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	per installation	New	411	5	$69	5%	85%	$0.04	37
Other	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	New	23	10	$50	75%	95%	$0.36	183
Other	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	New	0.00	12	$0.17	3%	95%	$3.37	20
Other	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	800	15	$747	50%	94%	$0.08	7,012
Other	Space Heat	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.34	15	$2	15%	67%	$1.09	1,444
Other	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	130	5	$193	45%	66%	$0.38	2,399
Other	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	86	15	$171	75%	76%	$0.22	7,655
Other	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	130	5	$78	50%	80%	$0.13	3,839
Other	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.06	18	$0.22	45%	65%	$0.37	891
Other	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.40	14	$0.93	5%	94%	$0.28	896
Other	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	1,441	10	$3,606	5%	85%	$0.38	225

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	4	13	$0.32	10%	39%	$-0.03	450
Other	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.06	25	$0.49	25%	85%	$0.74	482
Other	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.54	25	$1	75%	30%	$0.30	4,789
Other	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	59%	$0.14	2,564
Other	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	per floor area	Existing	1	25	$0.93	35%	50%	$0.05	10,269
Other	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.13	25	$0.29	35%	50%	$0.19	1,007
Other	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	2	25	$2	10%	35%	$0.06	2,058
Other	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	787	10	$137	95%	28%	$-0.01	143
Other	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.33	7	$0.18	90%	85%	$0.08	15,827
Other	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.66	10	$2	25%	98%	$0.49	7,222
Other	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	0.47	25	$64	15%	70%	$14.37	85
Other	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	169	15	$399	50%	94%	$0.27	884
Other	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	18	15	$171	75%	76%	$1.18	1,010
Other	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$1.89	122
Other	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.08	14	$0.93	5%	94%	$1.46	118
Other	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	305	10	$3,606	5%	85%	$1.93	31
Other	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.01	25	$0.49	75%	85%	$3.63	186
Other	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.02	25	$0.29	35%	50%	$1.04	132
Other	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	2	30	$5	50%	95%	$0.22	937
Other	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.05	15	$0.98	20%	75%	$2.24	247
Other	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	166	10	$137	95%	14%	$0.10	80
Other	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.14	10	$2	50%	98%	$2.48	1,992
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	679	10	$8,169	5%	95%	$2.00	33
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	679	10	$8,169	5%	95%	$27.15	38,746
Other	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	Existing	551	11	$254	95%	80%	$-0.22	150
Other	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.01	10	$0.27	55%	94%	$2.43	1,089
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	5%	25%	$3.49	94,967

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	5%	25%	$0.14	1
Other	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,142	10	$2,307	95%	95%	$0.01	35
Other	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	19,948	10	$3,461	95%	94%	$-0.04	49
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	326	25	$817	5%	92%	$3.43	24,880
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	326	25	$817	5%	92%	$0.25	391
Other	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	140	15	$242	100%	N/A	$0.21	284
Other	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	2,586	15	$4,659	75%	N/A	$0.22	10,552
Other	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	5	12	$2	80%	90%	$1.12	94,144
Other	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	5	12	$2	80%	90%	$0.07	318
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$4	95%	93%	$0.66	29,317
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$4	95%	93%	$-0.08	605
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$-0.03	72
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$0.46	53,091
Other	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	337	10	$20	95%	35%	$-0.08	138
Other	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	337	10	$20	95%	35%	$0.12	60,724
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	46	10	$142	75%	95%	$9.06	5,296
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	46	10	$142	75%	95%	$0.50	822
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.04	10	$0.88	3%	94%	$3.45	1
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.04	10	$0.88	3%	94%	$4,603.40	10,150
Other	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	115	5	$95	75%	55%	$0.22	1,393
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	685	10	$8,169	5%	95%	$27.21	17,847
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	685	10	$8,169	5%	95%	$1.99	17
Other	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	New	554	11	$254	95%	80%	$-0.22	80
Other	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.01	10	$0.27	55%	94%	$2.41	571
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	5%	55%	$0.14	1
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	5%	55%	$3.57	72,861
Other	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,176	10	$2,300	95%	95%	$0.01	19
Other	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	20,042	10	$3,450	95%	94%	$-0.04	26

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	329	25	$654	25%	92%	$0.20	1,100
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	329	25	$654	25%	92%	$2.75	31,546
Other	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	145	15	$242	100%	N/A	$0.21	192
Other	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	2,682	15	$3,974	75%	N/A	$0.18	6,877
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$4	95%	93%	$-0.08	325
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$4	95%	93%	$0.68	29,373
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$30	95%	73%	$-0.03	38
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$30	95%	73%	$0.47	4,507
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	47	10	$142	75%	95%	$0.49	442
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	47	10	$142	75%	95%	$9.08	16,890
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.04	10	$0.88	3%	94%	$3.42	0.56
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.04	10	$0.88	3%	94%	$4,613.63	89,303
Other	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	116	5	$95	75%	55%	$0.22	723
Restaurant	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$28	100%	N/A	$0.06	1,067
Restaurant	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$28	100%	N/A	$0.06	102
Restaurant	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	Existing	11,989	12	$1,908	90%	90%	$0.01	897
Restaurant	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	Existing	1,037	12	$1,309	70%	86%	$0.17	286
Restaurant	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	Existing	2,314	12	$824	95%	85%	$0.04	1,088
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,915	12	$2,035	40%	45%	$1.01	30,362
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,915	12	$2,035	40%	45%	$0.14	318
Restaurant	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,019	12	$1,765	35%	21%	$0.05	348
Restaurant	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,302	12	$2,565	39%	75%	$0.07	1,516
Restaurant	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	New	11,989	12	$1,908	90%	90%	$0.01	471
Restaurant	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	New	1,037	12	$1,309	70%	86%	$0.17	150
Restaurant	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	New	2,314	12	$824	95%	85%	$0.04	571
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,915	12	$2,035	40%	45%	$0.14	167
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,915	12	$2,035	40%	45%	$1.01	21,902
Restaurant	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	New	4,019	12	$1,765	35%	21%	$0.05	182
Restaurant	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	New	4,302	12	$2,565	39%	75%	$0.07	796
Restaurant	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	Existing	1,686	15	$1,316	100%	N/A	$0.10	2,861
Restaurant	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	94	10	$169	10%	50%	$0.29	252
Restaurant	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	471	4	$335	95%	72%	$0.26	2,479
Restaurant	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	1	15	$2	50%	94%	$0.25	4,857

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	204	5	$193	5%	**%	$0.26	67
Restaurant	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	204	5	$78	50%	**%	$0.10	803
Restaurant	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.10	18	$0.22	45%	65%	$0.25	267
Restaurant	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	660	10	$3,606	100%	85%	$0.91	1,258
Restaurant	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.41	40	$9	4%	98%	$2.21	84
Restaurant	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.31	10%	39%	$0.02	92
Restaurant	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.01	25	$1	75%	85%	$15.36	45
Restaurant	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	2	20	$2	75%	56%	$0.11	739
Restaurant	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	347	10	$137	95%	25%	$0.06	172
Restaurant	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.52	7	$0.18	90%	85%	$0.07	4,547
Restaurant	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.32	9
Restaurant	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	4	25	$30	15%	80%	$0.72	505
Restaurant	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	3	25	$64	15%	80%	$1.77	419
Restaurant	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	New	682	15	$1,053	100%	N/A	$0.20	615
Restaurant	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.40	15	$2	50%	94%	$0.66	1,084
Restaurant	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.04	18	$0.22	45%	65%	$0.67	59
Restaurant	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	253	10	$3,606	100%	85%	$2.38	279
Restaurant	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.16	40	$9	4%	98%	$5.78	19
Restaurant	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	9	30	$5	50%	95%	$0.05	723
Restaurant	Cooling Dx	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.16	15	$0.98	20%	75%	$0.79	121
Restaurant	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	133	10	$137	95%	13%	$0.16	33
Restaurant	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	1	25	$30	80%	80%	$1.89	642
Restaurant	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	Existing	2,978	15	$4,873	100%	N/A	$0.21	1,654
Restaurant	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	248	5	$193	5%	**%	$0.21	4
Restaurant	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	248	5	$78	50%	**%	$0.08	51
Restaurant	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.12	18	$0.22	45%	65%	$0.21	98
Restaurant	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.12	14	$1	5%	94%	$1.90	14

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	802	10	$3,606	100%	85%	$0.75	508
Restaurant	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.42	40	$9	4%	98%	$2.19	27
Restaurant	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	Existing	5,551	30	$28,670	5%	N/A	$2.27	143
Restaurant	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.31	10%	39%	$0.04	14
Restaurant	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.00	25	$0.49	25%	98%	$7.42	3
Restaurant	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.19	25	$1	75%	85%	$0.97	238
Restaurant	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	2	20	$2	75%	56%	$0.09	239
Restaurant	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.02	25	$0.93	35%	90%	$3.86	15
Restaurant	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.00	25	$0.29	35%	90%	$5.73	3
Restaurant	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	0.09	25	$2	10%	35%	$2.37	5
Restaurant	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	422	10	$137	95%	25%	$0.05	99
Restaurant	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.63	7	$0.18	90%	85%	$0.05	1,453
Restaurant	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.37	2
Restaurant	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	4	25	$30	15%	80%	$0.76	151
Restaurant	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	3	25	$64	15%	80%	$1.71	139
Restaurant	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	New	2,227	15	$3,898	100%	N/A	$0.22	594
Restaurant	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.05	18	$0.22	45%	65%	$0.48	25
Restaurant	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.09	14	$1	5%	94%	$2.46	6
Restaurant	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	354	10	$3,606	100%	85%	$1.70	134
Restaurant	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.15	40	$9	4%	98%	$5.84	6
Restaurant	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	New	3,356	30	$66,539	5%	N/A	$1.91	41
Restaurant	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	98%	$7.45	5
Restaurant	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.01	25	$0.29	35%	90%	$2.50	4
Restaurant	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	8	30	$5	50%	95%	$0.06	176
Restaurant	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	186	10	$137	95%	13%	$0.12	12
Restaurant	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	1	25	$30	80%	80%	$2.18	169
Restaurant	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	3,348	10	$581	1%	85%	$0.02	25
Restaurant	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,901	18	$6,284	95%	25%	$0.39	2,669
Restaurant	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	35	15	$6	95%	76%	$0.02	383

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	891	20	$110	65%	75%	$0.01	7,219
Restaurant	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	23	8	$4	65%	25%	$0.03	13
Restaurant	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	2,668	10	$581	1%	75%	$0.03	9
Restaurant	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,901	18	$6,284	95%	25%	$0.39	1,402
Restaurant	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	28	15	$6	95%	76%	$0.02	199
Restaurant	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	710	20	$110	65%	75%	$0.01	2,994
Restaurant	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.03	1,679
Restaurant	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	86	8	$28	75%	70%	$0.05	607
Restaurant	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	246	15	$336	62%	90%	$0.17	5,283
Restaurant	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	9	14	$35	75%	95%	$0.50	94
Restaurant	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	703
Restaurant	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.03	882
Restaurant	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	86	8	$28	75%	70%	$0.05	319
Restaurant	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	246	15	$336	62%	90%	$0.17	2,775
Restaurant	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	9	14	$35	75%	95%	$0.50	49
Restaurant	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	369
Restaurant	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	229	9	$110	10%	75%	$0.07	190
Restaurant	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	147	5	$12	70%	94%	$0.01	1,394
Restaurant	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.29	8	$0.98	30%	98%	$0.63	216
Restaurant	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.11	8	$0.73	30%	98%	$1.28	81
Restaurant	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	96	16	$16	95%	50%	$0.01	764
Restaurant	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	181
Restaurant	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	Existing	197	8	$249	25%	80%	$0.23	464
Restaurant	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	0.83	13	$0.01	90%	27%	$-0.01	4,440
Restaurant	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.39	13	$0.00	90%	38%	$-0.01	2,093
Restaurant	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.52	13	$0.01	90%	38%	$-0.01	797
Restaurant	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.65	13	$0.01	75%	38%	$-0.01	415
Restaurant	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.04	13	$0.04	70%	83%	$0.15	543
Restaurant	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	826	8	$70	45%	64%	$0.00	548

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	753	8	$201	85%	**%	$0.04	1,027
Restaurant	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	130	9	$110	10%	75%	$0.14	56
Restaurant	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	147	5	$13	70%	94%	$0.01	414
Restaurant	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.16	8	$0.98	30%	98%	$1.13	65
Restaurant	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.06	8	$0.73	30%	98%	$2.27	24
Restaurant	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	381
Restaurant	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	New	197	8	$249	25%	80%	$0.23	243
Restaurant	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.35	15	$0.00	90%	38%	$-0.01	989
Restaurant	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.47	15	$0.00	90%	38%	$-0.01	377
Restaurant	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.59	15	$0.01	75%	38%	$-0.01	196
Restaurant	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.04	15	$0.01	70%	83%	$0.02	285
Restaurant	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	468	8	$70	45%	64%	$0.01	165
Restaurant	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	753	8	$200	85%	**%	$0.04	309
Restaurant	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$165	95%	45%	$0.53	13
Restaurant	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$5	95%	45%	$0.01	14
Restaurant	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	11
Restaurant	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	139	5	$15	95%	40%	$0.02	333
Restaurant	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$0.00	95%	45%	$-0.01	12
Restaurant	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$165	95%	45%	$0.53	6
Restaurant	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$5	95%	45%	$0.01	7
Restaurant	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	6
Restaurant	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	139	5	$15	95%	40%	$0.02	175
Restaurant	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$0.00	95%	45%	$-0.01	6
Restaurant	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.06	5
Restaurant	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	368	10	$0.81	95%	75%	$-0.01	769
Restaurant	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	Existing	429	10	$142	95%	86%	$0.02	1,959
Restaurant	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	8	4	$0.41	95%	86%	$0.00	79
Restaurant	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$123	19%	65%	$0.21	66

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,519	9	$566	25%	35%	$0.06	879
Restaurant	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	443	7	$566	25%	35%	$0.28	256
Restaurant	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	Existing	101	5	$22	60%	90%	$0.05	254
Restaurant	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	840	3	$175	5%	25%	$0.08	69
Restaurant	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.06	2
Restaurant	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	368	10	$0.81	95%	75%	$-0.01	403
Restaurant	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	New	429	10	$142	95%	86%	$0.02	1,029
Restaurant	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	8	4	$0.41	95%	86%	$0.00	41
Restaurant	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$123	19%	65%	$0.21	34
Restaurant	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 5,000 sqft	New	101	5	$22	60%	90%	$0.05	133
Restaurant	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	Existing	997	12	$82	25%	45%	$0.00	642
Restaurant	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 5,000 sqft	Existing	1,038	12	$243	10%	77%	$0.02	367
Restaurant	Refrigeration	Case Replacement Low Temp	Case Replacement Low Temp	No replacement	per square foot	Existing	0.04	15	$0.10	10%	98%	$0.28	100
Restaurant	Refrigeration	Case Replacement Med Temp	Case Replacement Med Temp	No replacement	per square foot	Existing	0.00	15	$0.05	10%	98%	$1.74	1
Restaurant	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	Existing	255	10	$12	5%	68%	$-0.00	56
Restaurant	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	Existing	2,600	12	$726	95%	77%	$0.03	3,065
Restaurant	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Per Unit. Ea. Compressor	Existing	179	10	$726	85%	72%	$0.67	6,057
Restaurant	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	per installation	Existing	411	5	$65	30%	85%	$0.03	1,056
Restaurant	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	Existing	832	3	$119	10%	85%	$0.05	671
Restaurant	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	Existing	178	10	$50	75%	95%	$0.04	1,063
Restaurant	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	Existing	1,179	12	$191	95%	81%	$0.01	1,467
Restaurant	Refrigeration	Standalone to Multiplex Compressor	Standalone to Multiplex Compressor	Standalone compressor	per building sqft	Existing	0.15	13	$0.02	10%	90%	$0.01	292
Restaurant	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	Existing	392	4	$185	5%	20%	$0.15	25
Restaurant	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	Existing	0.21	12	$0.17	75%	95%	$0.11	3,563
Restaurant	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	New	997	12	$82	25%	45%	$0.00	336
Restaurant	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 5,000 sqft	New	1,038	12	$243	10%	77%	$0.02	193
Restaurant	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	New	255	10	$12	5%	68%	$-0.00	29
Restaurant	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	New	2,600	12	$726	95%	77%	$0.03	1,610
Restaurant	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Per Unit. Ea. Compressor	New	77	10	$726	85%	72%	$1.56	3,198
Restaurant	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	per installation	New	411	5	$65	30%	85%	$0.03	677

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	New	467	3	$46	5%	90%	$0.03	105
Restaurant	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	New	178	10	$50	75%	95%	$0.04	558
Restaurant	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	New	1,179	12	$191	95%	81%	$0.01	770
Restaurant	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	New	392	4	$185	5%	20%	$0.15	13
Restaurant	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	New	0.21	12	$0.17	75%	95%	$0.11	1,871
Restaurant	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	67	5	$193	5%	**%	$0.80	6
Restaurant	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	67	5	$78	50%	**%	$0.32	80
Restaurant	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.03	18	$0.22	45%	65%	$0.79	14
Restaurant	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.20	14	$1	5%	94%	$1.16	12
Restaurant	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	217	10	$3,606	100%	85%	$2.78	69
Restaurant	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.31	10%	39%	$0.03	11
Restaurant	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.03	25	$0.49	25%	98%	$1.47	9
Restaurant	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	per roof sqft	Existing	0.29	25	$1	75%	85%	$0.64	234
Restaurant	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.73	20	$2	75%	56%	$0.35	40
Restaurant	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.39	25	$0.93	35%	90%	$0.25	182
Restaurant	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.07	25	$0.29	35%	90%	$0.43	29
Restaurant	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	0.68	25	$2	10%	35%	$0.33	29
Restaurant	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	114	10	$137	95%	25%	$0.20	2
Restaurant	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.17	7	$0.18	90%	85%	$0.22	273
Restaurant	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.34	10	$2	25%	98%	$1.03	120
Restaurant	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	0.08	25	$64	15%	80%	$79.42	1
Restaurant	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.00	18	$0.22	45%	65%	$3.46	2
Restaurant	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.04	14	$1	5%	94%	$5.09	1
Restaurant	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	49	10	$3,606	100%	85%	$12.13	10
Restaurant	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	98%	$6.43	4
Restaurant	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.01	25	$0.29	35%	90%	$1.88	4
Restaurant	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.46	16
Restaurant	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	26	10	$137	95%	13%	$0.87	1

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.07	10	$2	50%	98%	$4.52	39
Restaurant	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.43	10	$0.27	75%	94%	$0.09	1,969
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	46%	25%	$0.14	2
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	46%	25%	$3.50	68,412
Restaurant	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,136	10	$2,601	95%	95%	$0.01	5,579
Restaurant	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	19,929	10	$3,709	95%	94%	$-0.04	7,713
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	2,723	25	$817	5%	92%	$0.70	72,498
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	2,723	25	$817	5%	92%	$0.02	542
Restaurant	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	957	15	$197	100%	N/A	$0.01	406
Restaurant	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	17,648	15	$3,812	75%	N/A	$0.01	13,589
Restaurant	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	38	12	$2	80%	90%	$-0.00	427
Restaurant	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	38	12	$2	80%	90%	$0.25	57,219
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	911	5	$5	95%	46%	$-0.10	1,878
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	911	5	$5	95%	46%	$0.05	95,179
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	383	10	$142	75%	75%	$1.89	79,780
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	383	10	$142	75%	75%	$0.05	1,063
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.70	10	$0.88	45%	94%	$0.20	492
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.70	10	$0.88	45%	94%	$17.43	58,320
Restaurant	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	785	5	$95	75%	75%	$0.02	2,527
Restaurant	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.43	10	$0.27	75%	94%	$0.09	1,014
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	46%	55%	$0.13	3
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	46%	55%	$3.57	34,458
Restaurant	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,169	10	$2,601	95%	95%	$0.01	2,963
Restaurant	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	20,023	10	$3,709	95%	94%	$-0.04	4,097
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	2,706	25	$653	25%	92%	$0.01	1,450
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	2,706	25	$653	25%	92%	$0.56	32,551
Restaurant	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	979	15	$197	100%	N/A	$0.01	242

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Restaurant	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	18,043	15	$3,251	75%	N/A	$0.01	8,662
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	915	5	$5	95%	46%	$-0.10	1,008
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	915	5	$5	95%	46%	$0.05	6,314
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	380	10	$142	75%	75%	$0.05	564
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	380	10	$142	75%	75%	$1.90	19,925
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.69	10	$0.88	45%	94%	$0.20	253
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.69	10	$0.88	45%	94%	$17.47	16,629
Restaurant	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	780	5	$95	75%	75%	$0.02	1,301
School	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$27	100%	N/A	$0.06	16,186
School	Computers	Network PC Power Management	Network PC Power Management	No Power Management	0.7 units per 1,000 sqft	Existing	11	5	$12	95%	30%	$0.28	203
School	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$27	100%	N/A	$0.06	1,550
School	Computers	Network PC Power Management	Network PC Power Management	No Power Management	0.7 units per 1,000 sqft	New	11	5	$12	95%	30%	$0.28	106
School	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	Existing	11,989	12	$1,839	90%	90%	$0.00	10
School	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	Existing	447	12	$1,839	35%	90%	$0.59	0.73
School	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	Existing	2,314	12	$944	95%	85%	$0.04	19
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,915	12	$2,124	26%	40%	$0.15	3
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,915	12	$2,124	26%	40%	$0.07	51,314
School	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,019	12	$1,888	75%	21%	$0.05	13
School	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,302	12	$2,478	14%	75%	$0.07	9
School	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	New	11,989	12	$1,839	90%	90%	$0.00	5
School	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	New	447	12	$1,839	35%	90%	$0.59	0.38
School	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	New	2,314	12	$944	95%	85%	$0.04	9
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,915	12	$2,124	26%	40%	$0.15	1
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,915	12	$2,124	26%	40%	$0.07	54,200
School	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	New	4,019	12	$1,888	75%	21%	$0.05	6
School	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	New	4,302	12	$2,478	14%	75%	$0.07	5
School	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	98	15	$747	25%	94%	$1.00	129
School	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	Existing	4	5	$165	95%	81%	$11.35	40
School	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	Existing	5	10	$210	25%	70%	$7.05	56
School	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	per chiller ton	Existing	3	15	$483	45%	90%	$19.19	83
School	Cooling Chillers	Chillers 150-300 tons (screw) - Advanced Efficiency	0.50 kW/ton (full load)	0.680 kW/Ton (full load)	Per installation	Existing	2,596	20	$21,436	100%	N/A	$0.94	409
School	Cooling Chillers	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.09	15	$2	15%	67%	$3.99	143

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	Existing	5	8	$27	10%	94%	$1.04	40
School	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-One-Speed Fan Motor	per chiller ton	Existing	9	15	$2	95%	35%	$0.03	307
School	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	per chiller ton	Existing	2	13	$19	95%	75%	$1.05	152
School	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	15	5	$193	5%	34%	$3.40	6
School	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	10	15	$171	75%	76%	$2.12	285
School	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	15	5	$78	50%	80%	$1.37	155
School	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	788	10	$3,604	73%	85%	$0.76	174
School	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.03	40	$9	4%	98%	$28.45	12
School	Cooling Chillers	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.21	13	$0.31	10%	39%	$0.21	12
School	Cooling Chillers	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	15%	$108.84	2
School	Cooling Chillers	Pipe Insulation	1.5" of Insulation, assuming R-6 (WA State Code)	No Insulation	per linear feet of insulation	Existing	0.98	15	$3	65%	45%	$0.52	27
School	Cooling Chillers	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.04	7	$0.18	90%	85%	$0.96	583
School	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.08	10	$2	25%	98%	$4.36	281
School	Cooling Chillers	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.30	10
School	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	0.53	25	$30	15%	60%	$6.02	48
School	Cooling Chillers	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.45	25	$64	15%	60%	$14.99	40
School	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	47	15	$399	25%	94%	$1.11	41
School	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	New	1	5	$165	95%	81%	$23.68	12
School	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	New	2	10	$210	25%	70%	$13.24	16
School	Cooling Chillers	Chillers 150-300 tons (screw) - Advanced Efficiency	0.50 kW/ton (full load)	0.680 kW/Ton (full load)	Per installation	New	1,263	20	$17,148	100%	N/A	$1.55	150
School	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	New	2	8	$27	10%	94%	$1.96	12
School	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	5	15	$171	75%	76%	$4.42	94
School	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	377	10	$3,604	73%	85%	$1.59	48
School	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.01	40	$9	4%	98%	$59.37	3
School	Cooling Chillers	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.01	15	$0.98	20%	75%	$8.22	23

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.03	10	$2	50%	98%	$9.11	190
School	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.25	25	$30	80%	60%	$12.57	82
School	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	106	15	$747	25%	94%	$0.92	123
School	Cooling Dx	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.10	15	$2	15%	67%	$3.68	114
School	Cooling Dx	DX Package 135 to 240 kBTU/hr - Premium Efficiency	DX Package 135 to 240 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 135 to 240 kBTU/hr - Standard Efficiency 11.0 EER	Per installation	Existing	2,084	15	$9,949	100%	N/A	$0.62	327
School	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	11	10	$169	10%	60%	$2.37	39
School	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	59	4	$335	95%	72%	$2.12	321
School	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.08	15	$2	50%	94%	$3.02	508
School	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	17	5	$193	5%	34%	$3.14	2
School	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	11	15	$171	75%	76%	$1.95	282
School	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	17	5	$78	50%	80%	$1.26	77
School	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.00	18	$0.22	45%	65%	$3.08	28
School	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	855	10	$3,604	73%	85%	$0.70	166
School	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.03	40	$9	4%	98%	$26.22	10
School	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.22	13	$0.31	10%	39%	$0.20	11
School	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	15%	$100.30	1
School	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.19	20	$2	75%	55%	$1.37	88
School	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	497	10	$134	95%	21%	$0.04	17
School	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.04	7	$0.18	90%	85%	$0.89	557
School	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.37	8
School	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	0.57	25	$30	15%	60%	$5.55	41
School	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.49	25	$64	15%	60%	$13.81	35
School	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	51	15	$399	25%	94%	$1.02	35
School	Cooling Dx	DX Package 135 to 240 kBTU/hr - Premium Efficiency	DX Package 135 to 240 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 135 to 240 kBTU/hr - Standard Efficiency 11.0 EER	Per installation	New	956	15	$7,964	100%	N/A	$1.09	78
School	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.04	15	$2	50%	94%	$6.28	159
School	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	5	15	$171	75%	76%	$4.05	81
School	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.00	18	$0.22	45%	65%	$6.39	8

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	412	10	$3,604	73%	85%	$1.46	41
School	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.01	40	$9	4%	98%	$54.43	3
School	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.56	118
School	Cooling Dx	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.01	15	$0.98	20%	75%	$7.54	17
School	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	239	10	$134	95%	10%	$0.09	4
School	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.27	25	$30	80%	60%	$11.52	70
School	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	Existing	22,843	15	$40,977	100%	N/A	$0.22	4,885
School	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	103	15	$747	25%	94%	$0.94	118
School	Heat Pump	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.45	15	$2	15%	67%	$0.85	677
School	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	137	5	$193	5%	34%	$0.38	5
School	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	91	15	$171	75%	76%	$0.23	2,623
School	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	137	5	$78	50%	80%	$0.14	142
School	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.07	18	$0.22	45%	65%	$0.37	310
School	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.37	14	$0.93	5%	94%	$0.33	263
School	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	6,805	10	$3,604	73%	85%	$0.07	1,541
School	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.03	40	$9	4%	98%	$26.98	14
School	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	Existing	31,775	30	$18,430	5%	N/A	$4.06	326
School	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	4	13	$0.31	10%	39%	$-0.01	287
School	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.05	25	$0.49	25%	85%	$1.01	137
School	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.67	25	$1	75%	15%	$0.26	1,013
School	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	55%	$0.16	823
School	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	0.70	25	$0.93	35%	35%	$0.12	1,300
School	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.13	25	$0.29	35%	35%	$0.21	241
School	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	3	25	$2	10%	35%	$0.04	576
School	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	3,956	10	$134	95%	21%	$-0.01	299
School	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.35	7	$0.18	90%	85%	$0.10	5,165
School	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.28	11

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.95	25	$64	15%	60%	$7.15	96
School	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	New	11,243	15	$32,780	100%	N/A	$0.37	1,357
School	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	51	15	$399	25%	94%	$1.01	37
School	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	40	15	$171	75%	76%	$0.54	716
School	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.03	18	$0.22	45%	65%	$0.87	86
School	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.16	14	$0.93	5%	94%	$0.78	72
School	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	2,988	10	$3,604	73%	85%	$0.19	363
School	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.01	40	$9	4%	98%	$54.61	4
School	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	New	16,434	30	$82,509	5%	N/A	$4.01	92
School	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.02	25	$0.49	75%	85%	$2.40	111
School	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.05	25	$0.29	35%	35%	$0.53	63
School	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	4	30	$5	50%	95%	$0.10	650
School	Heat Pump	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.12	15	$0.98	20%	75%	$1.02	175
School	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	1,737	10	$134	95%	10%	$-0.00	40
School	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	1,243	10	$581	1%	85%	$0.07	24
School	Hvac Aux	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.16	15	$2	15%	67%	$2.41	1,222
School	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,901	18	$4,529	95%	85%	$0.28	1,457
School	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	13	15	$6	95%	76%	$0.06	597
School	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	330	20	$110	65%	75%	$0.03	10,455
School	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	Existing	33	15	$178	11%	77%	$0.69	55
School	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	8	8	$4	65%	25%	$0.11	21
School	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	Existing	1,156	13	$1,664	65%	59%	$0.20	705
School	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	837	10	$581	1%	75%	$0.11	7
School	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,901	18	$4,529	95%	85%	$0.28	765
School	Hvac Aux	Low Pressure Distribution Complex HVAC	Low Pressure Distribution Complex HVAC	VAV/CV	per building sqft	New	0.40	50	$2	15%	98%	$0.55	1,817
School	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	8	15	$6	95%	76%	$0.09	262
School	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	222	20	$110	65%	75%	$0.05	3,677
School	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	New	22	15	$178	11%	77%	$1.03	18
School	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	New	779	15	$1,664	63%	59%	$0.28	239

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.04	6,199
School	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	104	8	$28	75%	70%	$0.04	654
School	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	246	15	$336	62%	90%	$0.17	5,687
School	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	11	14	$35	75%	95%	$0.42	112
School	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	2,596
School	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.04	3,256
School	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	104	8	$28	75%	70%	$0.04	343
School	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	246	15	$336	62%	90%	$0.17	2,987
School	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	11	14	$35	75%	95%	$0.42	58
School	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	1,363
School	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	111	9	$110	50%	75%	$0.17	1,743
School	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	62	5	$12	70%	94%	$0.05	637
School	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	1	8	$0.98	30%	81%	$0.17	765
School	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.81	8	$0.73	30%	81%	$0.17	575
School	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	98	16	$16	95%	50%	$0.01	2,922
School	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	694
School	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	Existing	83	8	$248	10%	80%	$0.57	107
School	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	0.42	13	$0.24	90%	31%	$0.07	10,032
School	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.24	13	$0.12	90%	50%	$0.06	6,368
School	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.32	13	$0.18	90%	58%	$0.07	2,830
School	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.40	13	$0.25	75%	62%	$0.08	1,579
School	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.06	13	$0.09	70%	83%	$0.21	3,052
School	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	399	8	$70	90%	35%	$0.02	1,025
School	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	762	8	$201	85%	95%	$0.04	1,665
School	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	79	9	$110	50%	75%	$0.24	657
School	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	62	5	$12	70%	94%	$0.05	240
School	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.77	8	$0.98	30%	81%	$0.24	294

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.70	8	$0.73	30%	81%	$0.20	266
School	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	1,458
School	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	New	83	8	$248	10%	80%	$0.57	56
School	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.24	15	$0.01	90%	50%	$-0.00	3,345
School	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.32	15	$0.06	90%	58%	$0.02	1,486
School	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.40	15	$0.12	75%	62%	$0.03	829
School	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.06	15	$0.02	70%	83%	$0.04	1,603
School	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	287	8	$70	90%	35%	$0.04	395
School	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	762	8	$201	85%	95%	$0.04	641
School	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$160	95%	45%	$0.51	52
School	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$5	95%	45%	$0.00	56
School	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	153
School	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	139	5	$12	95%	40%	$0.01	72
School	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$0.00	95%	45%	$-0.01	51
School	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$160	95%	45%	$0.51	27
School	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$5	95%	45%	$0.00	29
School	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	80
School	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	139	5	$12	95%	40%	$0.01	38
School	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$0.00	95%	45%	$-0.01	26
School	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$0.00	20%	90%	$-0.01	3
School	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	368	10	$0.00	95%	75%	$-0.01	48
School	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	Existing	429	10	$139	95%	86%	$0.02	417
School	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	1	4	$0.41	95%	86%	$0.08	55
School	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$126	40%	65%	$0.22	34
School	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,519	9	$567	25%	35%	$0.06	212
School	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	160	7	$567	25%	35%	$0.80	22
School	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	Existing	2,294	4	$2,101	72%	85%	$0.65	358
School	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 3,000 sqft	Existing	101	5	$22	60%	90%	$0.05	1,567

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School	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	243	14	$161	75%	80%	$0.08	174
School	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	303	3	$176	75%	25%	$0.24	90
School	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$0.00	20%	90%	$-0.01	1
School	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	368	10	$0.00	95%	75%	$-0.01	25
School	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	New	429	10	$139	95%	86%	$0.02	219
School	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	1	4	$0.41	95%	86%	$0.08	28
School	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$126	40%	65%	$0.22	17
School	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	New	2,294	4	$2,101	72%	85%	$0.65	188
School	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 3,000 sqft	New	101	5	$22	60%	90%	$0.05	823
School	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	243	14	$161	75%	80%	$0.08	91
School	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	Existing	997	12	$79	15%	45%	$0.00	136
School	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	Existing	1,038	12	$243	5%	77%	$0.02	339
School	Refrigeration	Case Replacement Low Temp	Case Replacement Low Temp	No replacement	per square foot	Existing	0.04	15	$0.10	5%	98%	$0.28	185
School	Refrigeration	Case Replacement Med Temp	Case Replacement Med Temp	No replacement	per square foot	Existing	0.00	15	$0.05	5%	98%	$1.74	1
School	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	Existing	354	10	$192	5%	68%	$0.08	19
School	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	Existing	2,600	12	$741	95%	77%	$0.03	67
School	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	Existing	832	3	$118	10%	85%	$0.05	237
School	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	Existing	273	10	$52	75%	95%	$0.02	356
School	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	Existing	1,179	12	$247	95%	81%	$0.02	32
School	Refrigeration	Standalone to Multiplex Compressor	Standalone to Multiplex Compressor	Standalone compressor	per building sqft	Existing	0.01	13	$0.00	25%	90%	$0.01	259
School	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	Existing	545	4	$187	95%	20%	$0.10	165
School	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	Existing	0.01	12	$0.17	10%	95%	$1.34	159
School	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	New	997	12	$79	15%	45%	$0.00	72
School	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	New	1,038	12	$243	5%	77%	$0.02	178
School	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	New	354	10	$192	5%	68%	$0.08	10
School	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	New	2,600	12	$741	95%	77%	$0.03	35
School	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	New	467	3	$45	5%	90%	$0.03	37
School	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	New	273	10	$52	75%	95%	$0.02	187
School	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	New	1,179	12	$247	95%	81%	$0.02	16

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	New	545	4	$187	95%	20%	$0.10	86
School	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	New	0.01	12	$0.17	10%	95%	$1.34	83
School	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	1,735	15	$747	25%	94%	$0.04	693
School	Space Heat	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.75	15	$2	15%	67%	$0.50	294
School	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	281	5	$193	5%	34%	$0.17	27
School	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	187	15	$171	75%	76%	$0.10	1,472
School	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	281	5	$78	50%	80%	$0.06	756
School	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.14	18	$0.22	45%	65%	$0.17	178
School	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.86	14	$0.93	5%	94%	$0.13	172
School	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	13,925	10	$3,604	73%	85%	$0.03	934
School	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	7	13	$0.31	10%	39%	$-0.01	132
School	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.13	25	$0.49	25%	85%	$0.35	101
School	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	1	25	$1	75%	15%	$0.10	707
School	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	3	20	$2	75%	55%	$0.07	474
School	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	1	25	$0.93	35%	35%	$0.05	821
School	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.28	25	$0.29	35%	35%	$0.09	142
School	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	9	25	$2	10%	35%	$0.01	401
School	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	8,095	10	$134	95%	21%	$-0.02	20
School	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.72	7	$0.18	90%	85%	$0.04	3,131
School	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	1	10	$2	25%	98%	$0.23	1,474
School	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.96	25	$64	15%	60%	$7.07	25
School	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	562	15	$399	25%	94%	$0.08	129
School	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	60	15	$171	75%	76%	$0.35	296
School	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.04	18	$0.22	45%	65%	$0.57	35
School	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.28	14	$0.93	5%	94%	$0.44	34
School	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	4,513	10	$3,604	73%	85%	$0.12	149
School	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.04	25	$0.49	75%	85%	$1.13	56

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.09	25	$0.29	35%	35%	$0.32	27
School	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	7	30	$5	50%	95%	$0.06	275
School	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.18	15	$0.98	20%	75%	$0.67	72
School	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	2,623	10	$134	95%	10%	$-0.01	17
School	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.46	10	$2	50%	98%	$0.74	584
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	11,734	10	$8,168	35%	95%	$0.11	209
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	11,734	10	$8,168	35%	95%	$3.33	5,269
School	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	Existing	553	11	$264	95%	80%	$-0.21	59
School	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.07	10	$0.27	55%	94%	$0.62	1,014
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	35%	25%	$0.14	0.42
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	35%	25%	$3.50	621
School	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,168	10	$2,576	95%	95%	$0.02	170
School	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	20,018	10	$3,696	95%	94%	$-0.03	236
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	1,633	25	$817	5%	92%	$0.05	364
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	1,633	25	$817	5%	92%	$1.45	42,871
School	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	2,492	15	$832	100%	N/A	$0.04	251
School	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	45,908	15	$16,095	75%	N/A	$0.04	9,775
School	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	25	12	$2	80%	8%	$0.01	25
School	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	25	12	$2	80%	8%	$0.47	74,926
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$6	95%	65%	$-0.07	39
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$6	95%	65%	$0.78	75,189
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$-0.02	120
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$0.26	29,618
School	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	338	10	$17	95%	35%	$-0.07	230
School	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	338	10	$17	95%	35%	$0.13	92,418
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	181	10	$142	75%	75%	$0.12	585
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	181	10	$142	75%	75%	$4.95	7,799
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.16	10	$0.88	25%	94%	$0.89	25

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.16	10	$0.88	25%	94%	$1,005.84	71,696
School	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	596	5	$95	75%	15%	$0.04	345
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	11,711	10	$8,168	35%	95%	$0.11	109
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	11,711	10	$8,168	35%	95%	$3.33	29,675
School	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	New	553	11	$264	95%	80%	$-0.21	31
School	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.07	10	$0.27	55%	94%	$0.62	515
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	35%	55%	$0.14	0.49
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	35%	55%	$3.57	66,541
School	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,169	10	$2,638	95%	95%	$0.02	89
School	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	20,023	10	$3,761	95%	94%	$-0.03	123
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	1,630	25	$653	25%	92%	$0.04	970
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	1,630	25	$653	25%	92%	$1.16	14,407
School	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	2,490	15	$832	100%	N/A	$0.04	171
School	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	45,889	15	$13,730	75%	N/A	$0.03	6,136
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$6	95%	65%	$-0.07	21
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$6	95%	65%	$0.80	39,550
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$30	95%	73%	$-0.02	63
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$30	95%	73%	$0.27	44,150
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	180	10	$142	75%	75%	$0.13	307
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	180	10	$142	75%	75%	$4.96	12,491
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.16	10	$0.88	25%	94%	$1,008.10	29,436
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.16	10	$0.88	25%	94%	$0.89	12
School	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	595	5	$95	75%	15%	$0.04	174
University	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$28	100%	N/A	$0.06	5,293
University	Computers	Network PC Power Management	Network PC Power Management	No Power Management	0.7 units per 1,000 sqft	Existing	11	5	$12	95%	30%	$0.28	66
University	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$28	100%	N/A	$0.06	507
University	Computers	Network PC Power Management	Network PC Power Management	No Power Management	0.7 units per 1,000 sqft	New	11	5	$12	95%	30%	$0.28	34
University	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	Existing	11,949	12	$2,016	90%	90%	$0.01	6

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	Existing	445	12	$1,008	35%	90%	$0.32	0.43
University	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	Existing	2,307	12	$776	95%	85%	$0.03	11
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,909	12	$2,070	26%	40%	$0.14	1
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	1,909	12	$2,070	26%	40%	$0.09	79,757
University	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,006	12	$1,811	75%	21%	$0.05	7
University	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	Existing	4,288	12	$2,593	14%	75%	$0.07	5
University	Cooking	Combination Oven	60% cooking efficiency	Non ENERGY STAR	per installation	New	11,949	12	$2,016	90%	90%	$0.01	3
University	Cooking	Fryers - New CEE Efficient Electric Deep Fat Fryers	15 inch width Deep Fryer CEE 2006 rating: 80% under heavy load, Less than 1000 watt at idle	15 inch width standard electric deep fat fryers	per installation	New	445	12	$1,008	35%	90%	$0.32	0.23
University	Cooking	Griddle	70% cooking efficiency	Non ENERGY STAR	per installation	New	2,307	12	$776	95%	85%	$0.03	5
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,909	12	$2,070	26%	40%	$0.09	94,559
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	1,909	12	$2,070	26%	40%	$0.14	1
University	Cooking	Hot Food Holding Cabinet	ENERGY STAR	Non ENERGY STAR	per installation	New	4,006	12	$1,811	75%	21%	$0.05	4
University	Cooking	Steam Cooker	ENERGY STAR	Non ENERGY STAR	per installation	New	4,288	12	$2,593	14%	75%	$0.07	3
University	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	97	15	$747	25%	94%	$1.00	5
University	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	Existing	4	5	$165	95%	81%	$11.38	1
University	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	Existing	4	10	$210	25%	70%	$7.07	2
University	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	per chiller ton	Existing	3	15	$483	45%	90%	$19.25	3
University	Cooling Chillers	Chillers 150-300 tons (screw) - Advanced Efficiency	0.50 kW/ton (full load)	0.680 kW/Ton (full load)	Per installation	Existing	2,717	20	$22,438	100%	N/A	$0.94	18
University	Cooling Chillers	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.09	15	$2	15%	67%	$4.00	6
University	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	Existing	5	8	$27	10%	94%	$1.04	1
University	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-One-Speed Fan Motor	per chiller ton	Existing	9	15	$2	95%	35%	$0.03	14
University	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	per chiller ton	Existing	2	13	$19	95%	75%	$1.05	6
University	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	15	5	$193	5%	34%	$3.41	0.27
University	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	10	15	$171	75%	76%	$2.12	13
University	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	15	5	$78	50%	80%	$1.38	7
University	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	822	10	$3,606	73%	85%	$0.73	7
University	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.03	40	$9	4%	98%	$28.55	0.24
University	Cooling Chillers	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.21	13	$0.31	10%	39%	$0.22	0.55
University	Cooling Chillers	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	13%	$48.67	0.08
University	Cooling Chillers	Pipe Insulation	1.5" of Insulation, assuming R-6 (WA State Code)	No Insulation	per linear feet of insulation	Existing	0.97	15	$3	65%	45%	$0.52	1
University	Cooling Chillers	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.04	7	$0.18	90%	85%	$0.97	26

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.08	10	$2	25%	98%	$4.38	12
University	Cooling Chillers	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.35	0.47
University	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	0.53	25	$30	15%	60%	$6.04	2
University	Cooling Chillers	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.45	25	$64	15%	60%	$15.04	1
University	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	46	15	$399	25%	94%	$1.12	1
University	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	New	1	5	$165	95%	81%	$23.76	0.55
University	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	New	2	10	$210	25%	70%	$13.29	0.77
University	Cooling Chillers	Chillers 150-300 tons (screw) - Advanced Efficiency	0.50 kW/ton (full load)	0.680 kW/Ton (full load)	Per installation	New	1,322	20	$17,949	100%	N/A	$1.55	6
University	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	New	2	8	$27	10%	94%	$1.96	0.57
University	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	5	15	$171	75%	76%	$4.44	4
University	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	394	10	$3,606	73%	85%	$1.53	2
University	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.01	40	$9	4%	98%	$59.56	0.07
University	Cooling Chillers	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.01	15	$0.98	20%	75%	$8.25	1
University	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.03	10	$2	50%	98%	$9.14	8
University	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.25	25	$30	80%	60%	$12.61	3
University	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	106	15	$747	25%	94%	$0.92	8
University	Cooling Dx	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.10	15	$2	15%	67%	$3.69	8
University	Cooling Dx	DX Package 135 to 240 kBTU/hr - Premium Efficiency	DX Package 135 to 240 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 135 to 240 kBTU/hr - Standard Efficiency 11.0 EER	Per installation	Existing	2,182	15	$10,414	100%	N/A	$0.62	23
University	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	11	10	$169	10%	60%	$2.38	2
University	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	59	4	$335	95%	72%	$2.13	22
University	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.08	15	$2	50%	94%	$3.03	36
University	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	17	5	$193	5%	34%	$3.15	0.17
University	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	11	15	$171	75%	76%	$1.96	20
University	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	17	5	$78	50%	80%	$1.27	5
University	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.00	18	$0.22	45%	65%	$3.09	1

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	892	10	$3,606	73%	85%	$0.67	11
University	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.03	40	$9	4%	98%	$26.30	0.34
University	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.22	13	$0.31	10%	39%	$0.20	0.82
University	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	13%	$44.85	0.11
University	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.18	20	$2	75%	55%	$1.37	6
University	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	231	10	$139	95%	21%	$0.10	1
University	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.04	7	$0.18	90%	85%	$0.89	39
University	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.42	0.58
University	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	0.57	25	$30	15%	60%	$5.57	2
University	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.49	25	$64	15%	60%	$13.86	2
University	Cooling Dx	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	51	15	$399	25%	94%	$1.02	2
University	Cooling Dx	DX Package 135 to 240 kBTU/hr - Premium Efficiency	DX Package 135 to 240 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 135 to 240 kBTU/hr - Standard Efficiency 11.0 EER	Per installation	New	1,001	15	$8,337	100%	N/A	$1.09	5
University	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.04	15	$2	50%	94%	$6.30	11
University	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	5	15	$171	75%	76%	$4.07	5
University	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.00	18	$0.22	45%	65%	$6.41	0.62
University	Cooling Dx	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	429	10	$3,606	73%	85%	$1.40	2
University	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.01	40	$9	4%	98%	$54.61	0.10
University	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.56	8
University	Cooling Dx	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.01	15	$0.98	20%	75%	$7.56	1
University	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	111	10	$139	95%	10%	$0.20	0.34
University	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.27	25	$30	80%	60%	$11.56	5
University	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	Existing	23,910	15	$42,891	100%	N/A	$0.22	89
University	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	103	15	$747	25%	94%	$0.94	2
University	Heat Pump	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.45	15	$2	15%	67%	$0.85	12
University	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	137	5	$193	5%	34%	$0.38	0.09
University	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	91	15	$171	75%	76%	$0.23	46
University	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	137	5	$78	50%	80%	$0.14	2

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.07	18	$0.22	45%	65%	$0.37	5
University	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.37	14	$0.93	5%	94%	$0.33	4
University	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	7,100	10	$3,606	73%	85%	$0.07	27
University	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.03	40	$9	4%	98%	$27.07	0.12
University	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	Existing	33,260	30	$80,039	5%	N/A	$4.06	5
University	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	4	13	$0.31	10%	39%	$-0.01	5
University	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.08	25	$0.49	25%	85%	$0.63	1
University	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	1	25	$1	75%	13%	$0.17	11
University	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	1	20	$2	75%	55%	$0.16	14
University	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	1	25	$0.93	35%	35%	$0.07	20
University	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.23	25	$0.29	35%	35%	$0.12	3
University	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	6	25	$2	10%	35%	$0.02	17
University	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	1,839	10	$139	95%	21%	$-0.00	5
University	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.35	7	$0.18	90%	85%	$0.10	91
University	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	1	10	$150	90%	66%	$14.33	0.21
University	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.95	25	$64	15%	60%	$7.18	1
University	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	10.6 EER, 3.2 COP	Per installation	New	11,768	15	$34,312	100%	N/A	$0.37	24
University	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	51	15	$399	25%	94%	$1.02	0.68
University	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	40	15	$171	75%	76%	$0.55	13
University	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.03	18	$0.22	45%	65%	$0.87	1
University	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.16	14	$0.93	5%	94%	$0.78	1
University	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	3,117	10	$3,606	73%	85%	$0.18	6
University	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.01	40	$9	4%	98%	$54.79	0.03
University	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	10.6 EER, 3.2 COP	Per installation	New	17,202	30	$14,402	5%	N/A	$4.01	1
University	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.03	25	$0.49	75%	85%	$1.48	1
University	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.10	25	$0.29	35%	35%	$0.30	0.88
University	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	4	30	$5	50%	95%	$0.10	11

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Heat Pump	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.12	15	$0.98	20%	75%	$1.03	3
University	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	807	10	$139	95%	10%	$0.01	0.73
University	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	1,238	10	$581	20%	85%	$0.07	154
University	Hvac Aux	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.16	15	$2	15%	67%	$2.42	386
University	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	Existing	1,895	18	$4,529	95%	85%	$0.28	441
University	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	13	15	$6	95%	76%	$0.06	188
University	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	329	20	$110	65%	75%	$0.03	3,302
University	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	Existing	33	15	$178	11%	77%	$0.70	17
University	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	8	8	$4	65%	25%	$0.11	6
University	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	Existing	1,206	13	$1,667	65%	59%	$0.19	223
University	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	834	10	$581	20%	75%	$0.11	48
University	Hvac Aux	Cooking Hood Controls	Demand-Ventilation Control	No Controls	per installation	New	1,895	18	$4,529	95%	85%	$0.28	231
University	Hvac Aux	Low Pressure Distribution Complex HVAC	Low Pressure Distribution Complex HVAC	VAV/CV	per building sqft	New	0.40	50	$2	15%	98%	$0.55	574
University	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	8	15	$6	95%	76%	$0.09	82
University	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	222	20	$110	65%	75%	$0.05	1,162
University	Hvac Aux	Motor - VAV Box High Efficiency (ECM)	ECM Motor	Standard Efficiency Motor	per installation	New	22	15	$178	11%	77%	$1.03	5
University	Hvac Aux	Optimized Variable Volume Lab Hood Design	Optimized Variable Volume Lab Hood Design	Constant Volume Lab Hood Design	per installation	New	812	15	$1,667	63%	59%	$0.26	76
University	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.04	2,027
University	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	158	8	$28	75%	70%	$0.03	213
University	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	245	15	$336	62%	90%	$0.17	1,860
University	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	17	14	$36	75%	95%	$0.28	36
University	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.15	849
University	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.04	1,064
University	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	158	8	$28	75%	70%	$0.03	112
University	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	245	15	$336	62%	90%	$0.17	976
University	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	17	14	$36	75%	95%	$0.28	19
University	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.15	445
University	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	154	9	$110	50%	75%	$0.12	808
University	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	62	5	$12	70%	94%	$0.05	295
University	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	2	8	$0.98	30%	81%	$0.07	364

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	1	8	$0.73	30%	81%	$0.07	274
University	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	97	16	$16	95%	50%	$0.01	976
University	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	232
University	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	Existing	83	8	$248	10%	80%	$0.57	36
University	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	0.30	13	$0.00	90%	30%	$-0.01	2,296
University	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.34	13	$0.02	90%	52%	$0.00	3,159
University	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.45	15	$0.08	90%	67%	$0.02	1,547
University	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.57	13	$0.16	75%	74%	$0.03	895
University	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.06	13	$0.07	70%	83%	$0.15	1,069
University	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	554	8	$70	90%	35%	$0.02	488
University	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	762	8	$201	85%	95%	$0.04	793
University	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	110	9	$110	50%	75%	$0.17	305
University	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	62	5	$12	70%	94%	$0.05	111
University	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	1	8	$0.98	30%	81%	$0.11	136
University	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	1	8	$0.73	30%	81%	$0.09	123
University	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	487
University	Lighting Interior	LED Refrigeration Case Lights	LED Refrigeration Case Lights	Fluorescent Refrigeration Case	per installation	New	83	8	$248	10%	80%	$0.57	18
University	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.34	15	$0.00	90%	52%	$-0.01	1,659
University	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.45	15	$0.07	90%	67%	$0.01	812
University	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.57	15	$0.13	75%	74%	$0.02	470
University	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.06	15	$0.01	70%	83%	$0.03	561
University	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	398	8	$70	90%	35%	$0.02	183
University	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	762	8	$200	85%	95%	$0.04	298
University	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$161	95%	45%	$0.52	36
University	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$0.00	95%	45%	$-0.01	39
University	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	50
University	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	139	5	$14	95%	40%	$0.02	51

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$0.00	95%	45%	$-0.01	35
University	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$161	95%	45%	$0.52	19
University	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$0.00	95%	45%	$-0.01	20
University	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	26
University	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	139	5	$14	95%	40%	$0.02	26
University	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$0.00	95%	45%	$-0.01	18
University	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$0.00	20%	90%	$-0.01	1
University	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	367	10	$0.00	95%	75%	$-0.01	33
University	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	Existing	427	10	$138	95%	86%	$-0.03	130
University	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	1	4	$0.41	95%	86%	$0.08	18
University	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$121	40%	65%	$0.21	10
University	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,514	9	$565	25%	35%	$0.06	66
University	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	202	7	$565	25%	35%	$0.63	8
University	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	Existing	2,286	4	$2,091	72%	85%	$0.65	112
University	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 3,000 sqft	Existing	101	5	$22	60%	90%	$0.05	512
University	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	242	14	$161	75%	80%	$0.08	54
University	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	383	3	$173	90%	25%	$0.18	43
University	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$0.00	20%	90%	$-0.01	0.61
University	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	367	10	$0.00	95%	75%	$-0.01	17
University	Other Plug Load	Ice Maker	High-Efficiency Ice Maker	Standard Ice Maker	per installation	New	427	10	$138	95%	86%	$-0.03	68
University	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	1	4	$0.41	95%	86%	$0.08	9
University	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$121	40%	65%	$0.21	5
University	Other Plug Load	Server Virtualization	Server Virtualization	No Virtualization	number of virualizated servers	New	2,286	4	$2,091	72%	85%	$0.65	58
University	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 3,000 sqft	New	101	5	$22	60%	90%	$0.05	269
University	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	242	14	$161	75%	80%	$0.08	28
University	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	Existing	994	12	$79	15%	45%	$0.00	44

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	Existing	1,034	12	$243	5%	77%	$0.02	110
University	Refrigeration	Case Replacement Low Temp	Case Replacement Low Temp	No replacement	per square foot	Existing	0.04	15	$0.10	5%	98%	$0.28	60
University	Refrigeration	Case Replacement Med Temp	Case Replacement Med Temp	No replacement	per square foot	Existing	0.00	15	$0.05	5%	98%	$1.74	0.63
University	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	Existing	369	10	$201	5%	68%	$0.08	6
University	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	Existing	2,592	12	$776	95%	77%	$0.03	21
University	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	Existing	829	3	$118	10%	85%	$0.05	77
University	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	Existing	127	10	$51	75%	95%	$0.06	116
University	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	Existing	1,175	12	$258	95%	81%	$0.02	10
University	Refrigeration	Standalone to Multiplex Compressor	Standalone to Multiplex Compressor	Standalone compressor	per building sqft	Existing	0.01	13	$0.00	25%	90%	$0.01	84
University	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	Existing	569	4	$184	95%	20%	$0.10	54
University	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	Existing	0.01	12	$0.17	10%	95%	$1.35	52
University	Refrigeration	Anti-Sweat (Humidistat) Controls	Anti-Sweat (Humidistat) Controls	No Anti-Sweat (Humidistat) Controls	1 unit per 1,000 sqft	New	994	12	$79	15%	45%	$0.00	23
University	Refrigeration	Case Electronically Commutated Motor	ECM Case Fans	Standard Efficiency Motor	1 unit per 10,000 sqft	New	1,034	12	$243	5%	77%	$0.02	58
University	Refrigeration	Demand Control Defrost - Hot Gas	Refrigerant Defrost	Defrost - Electric	per installation	New	369	10	$201	5%	68%	$0.08	3
University	Refrigeration	Glass Door ES Refrigerators/Freezers	Glass Door ES Refrigerators/Freezers	Standard Glass Doors	per installation	New	2,592	12	$776	95%	77%	$0.03	11
University	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	New	466	3	$45	5%	90%	$0.03	12
University	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	New	127	10	$51	75%	95%	$0.06	61
University	Refrigeration	Solid Door ES Refrigerators/Freezers	Solid Door ES Refrigerators/Freezers	Standard Solid Door	per installation	New	1,175	12	$258	95%	81%	$0.02	5
University	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	New	569	4	$184	95%	20%	$0.10	28
University	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	New	0.01	12	$0.17	10%	95%	$1.35	27
University	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	1,729	15	$747	25%	94%	$0.04	283
University	Space Heat	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.74	15	$2	15%	67%	$0.51	125
University	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	281	5	$193	5%	34%	$0.18	11
University	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	187	15	$171	75%	76%	$0.10	627
University	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	281	5	$78	50%	80%	$0.06	316
University	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.14	18	$0.22	45%	65%	$0.17	75
University	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.86	14	$0.93	5%	94%	$0.13	73
University	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	14,527	10	$3,606	73%	85%	$0.02	381
University	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	7	13	$0.31	10%	39%	$-0.01	55
University	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.20	25	$0.49	25%	85%	$0.23	28

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University	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	per roof sqft	Existing	2	25	$1	75%	13%	$0.06	176
University	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	3	20	$2	75%	55%	$0.07	195
University	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	per floor area	Existing	2	25	$0.93	35%	35%	$0.02	288
University	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.46	25	$0.29	35%	35%	$0.05	45
University	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	14	25	$2	10%	35%	$-0.00	262
University	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	3,764	10	$139	95%	21%	$-0.01	8
University	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.72	7	$0.18	90%	85%	$0.04	1,279
University	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	1	10	$2	25%	98%	$0.23	628
University	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	per window sqft	Existing	0.96	25	$64	15%	60%	$7.09	11
University	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	560	15	$399	25%	94%	$0.08	54
University	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	60	15	$171	75%	76%	$0.35	124
University	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.04	18	$0.22	45%	65%	$0.57	15
University	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.28	14	$0.93	5%	94%	$0.44	14
University	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	4,708	10	$3,606	73%	85%	$0.11	62
University	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.06	25	$0.49	75%	85%	$0.75	15
University	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.15	25	$0.29	35%	35%	$0.19	8
University	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	7	30	$5	50%	95%	$0.06	115
University	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.18	15	$0.98	20%	75%	$0.67	30
University	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	1,220	10	$139	95%	10%	$0.00	7
University	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.46	10	$2	50%	98%	$0.75	245
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	12,242	10	$8,169	35%	95%	$1.88	62,453
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	12,242	10	$8,169	35%	95%	$0.11	68
University	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	Existing	551	11	$264	95%	80%	$-0.65	19
University	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.07	10	$0.27	55%	94%	$0.63	331
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$42	35%	25%	$0.13	0.29
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$42	35%	25%	$3.45	55,416
University	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	7,144	10	$2,579	95%	95%	$-0.05	53

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University	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	Existing	19,952	10	$3,693	95%	94%	$-0.00	73
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	1,618	25	$817	5%	92%	$0.86	42,190
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	1,618	25	$817	5%	92%	$0.05	119
University	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	2,608	15	$876	100%	N/A	$0.04	82
University	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	48,053	15	$16,939	75%	N/A	$0.04	3,198
University	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	25	12	$2	80%	8%	$0.01	8
University	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	25	12	$2	80%	8%	$0.28	18,423
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$6	95%	65%	$-0.23	12
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	Existing	67	5	$6	95%	65%	$0.82	52,910
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$0.26	80,724
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$30	95%	73%	$-1.25	39
University	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	337	10	$17	95%	35%	$-0.72	75
University	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	337	10	$17	95%	35%	$0.13	20,567
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	180	10	$142	75%	75%	$0.13	191
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	180	10	$142	75%	75%	$2.93	3,896
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.16	10	$0.88	25%	94%	$0.90	8
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.16	10	$0.88	25%	94%	$594.52	46,434
University	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	622	5	$95	75%	15%	$0.04	113
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	12,217	10	$8,169	35%	95%	$0.11	35
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	12,217	10	$8,169	35%	95%	$1.88	33,712
University	Water Heat	Clothes Washer Commercial	ENERGY STAR Commercial Clothes Washer MEF=1.80	Standard Clothes Washers	per installation	New	551	11	$264	95%	80%	$-0.65	10
University	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.07	10	$0.27	55%	94%	$0.63	168
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$42	35%	55%	$0.13	0.34
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$42	35%	55%	$3.53	99,848
University	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	7,146	10	$2,644	95%	95%	$-0.05	27
University	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost) - (ENERGY STAR)	Standard High Temp Commercial Dishwasher	per installation	New	19,957	10	$3,760	95%	94%	$-0.00	38
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	1,615	25	$653	25%	92%	$0.69	25,066
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	1,615	25	$653	25%	92%	$0.04	317

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
University	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	2,606	15	$876	100%	N/A	$0.04	56
University	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	48,033	15	$14,447	75%	N/A	$0.03	2,007
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$6	95%	65%	$0.84	94,433
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	per installation	New	67	5	$6	95%	65%	$-0.23	6
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$30	95%	73%	$-1.25	20
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$30	95%	73%	$0.27	72,788
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	180	10	$142	75%	75%	$2.93	69,624
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	180	10	$142	75%	75%	$0.13	100
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.16	10	$0.88	25%	94%	$595.84	34,514
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.16	10	$0.88	25%	94%	$0.90	4
University	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	621	5	$95	75%	15%	$0.04	56
Warehouse	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	Existing	137	4	$31	100%	N/A	$0.07	3,562
Warehouse	Computers	Computer ENERGY STAR	Computer ENERGY STAR	Computer standard non-ENERGY STAR	Per installation	New	137	4	$31	100%	N/A	$0.07	341
Warehouse	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	Existing	2	5	$165	95%	81%	$21.02	7
Warehouse	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	Existing	4	10	$210	25%	70%	$7.34	11
Warehouse	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	per chiller ton	Existing	3	15	$483	45%	90%	$19.99	17
Warehouse	Cooling Chillers	Chillers <150 tons (screw) - Advanced Efficiency	0.58 kW/ton (full load)	0.790 kW/Ton (full load)	Per installation	Existing	1,663	20	$24,640	100%	N/A	$1.70	93
Warehouse	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	Existing	5	8	$27	10%	94%	$1.08	8
Warehouse	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-Two-Speed Fan Motor	Cooling Tower-One-Speed Fan Motor	per chiller ton	Existing	8	15	$2	95%	35%	$0.03	52
Warehouse	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	per chiller ton	Existing	2	13	$19	95%	75%	$1.09	30
Warehouse	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	5	15	$171	75%	76%	$3.93	52
Warehouse	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.01	40	$9	4%	98%	$52.69	2
Warehouse	Cooling Chillers	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.13	13	$0.32	10%	39%	$0.35	0.65
Warehouse	Cooling Chillers	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-8 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	30%	$203.44	0.84
Warehouse	Cooling Chillers	Pipe Insulation	1.5" of Insulation, assuming R-6 (WA State Code)	No Insulation	per linear feet of insulation	Existing	0.53	15	$3	65%	45%	$0.96	4
Warehouse	Cooling Chillers	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.02	7	$0.18	90%	85%	$1.79	99
Warehouse	Cooling Chillers	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	0.61	10	$150	90%	66%	$40.95	0.35
Warehouse	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	1	25	$30	15%	70%	$2.98	12

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Warehouse	Cooling Chillers	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	0.94	25	$64	15%	70%	$7.26	10
Warehouse	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	1 control point per 1000 sqft	New	2	5	$165	95%	81%	$17.01	6
Warehouse	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for secondary chilled water loop	Primary loop only w/ constant speed pump	per chiller ton	New	6	10	$210	25%	70%	$5.35	8
Warehouse	Cooling Chillers	Chillers <150 tons (screw) - Advanced Efficiency	0.58 kW/ton (full load)	0.790 kW/Ton (full load)	Per installation	New	2,173	20	$19,715	100%	N/A	$1.04	86
Warehouse	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	per chiller ton	New	6	8	$27	10%	94%	$0.79	5
Warehouse	Cooling Chillers	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	7	15	$171	75%	76%	$3.18	39
Warehouse	Cooling Chillers	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.02	40	$9	4%	98%	$42.65	1
Warehouse	Cooling Chillers	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.02	15	$0.98	20%	75%	$5.90	9
Warehouse	Cooling Chillers	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	1	25	$30	80%	70%	$2.41	53
Warehouse	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	Existing	1,335	15	$8,539	100%	N/A	$0.84	275
Warehouse	Cooling Dx	DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	per DX ton	Existing	11	10	$169	10%	40%	$2.46	19
Warehouse	Cooling Dx	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	per installation	Existing	57	4	$335	95%	72%	$2.20	247
Warehouse	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	Existing	0.04	15	$2	50%	94%	$5.59	350
Warehouse	Cooling Dx	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	9	5	$193	5%	93%	$5.80	4
Warehouse	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	6	15	$171	75%	76%	$3.61	179
Warehouse	Cooling Dx	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	9	5	$78	50%	98%	$2.34	61
Warehouse	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.00	18	$0.22	45%	65%	$5.69	19
Warehouse	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.01	40	$9	4%	98%	$48.45	7
Warehouse	Cooling Dx	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.14	13	$0.32	10%	39%	$0.32	2
Warehouse	Cooling Dx	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-8 (Average Existing Conditions)	per roof sqft	Existing	0.00	25	$1	75%	10%	$187.08	0.87
Warehouse	Cooling Dx	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.10	20	$2	75%	58%	$2.53	60
Warehouse	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	307	10	$137	95%	24%	$0.07	13
Warehouse	Cooling Dx	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.02	7	$0.18	90%	85%	$1.64	383
Warehouse	Cooling Dx	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	0.61	10	$150	90%	66%	$41.06	1
Warehouse	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	1	25	$30	15%	98%	$2.74	59
Warehouse	Cooling Dx	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	1	25	$64	15%	98%	$6.68	42
Warehouse	Cooling Dx	DX Package 65 to 135 kBTU/hr - Premium Efficiency	DX Package 65 to 135 kBTU/hr - Premium Efficiency - 12.0 EER	DX Package 65 to 135 kBTU/hr - Standard Efficiency - 11.2 EER	Per installation	New	1,744	15	$6,825	100%	N/A	$0.51	157
Warehouse	Cooling Dx	Direct / Indirect Evaporative Cooling, Pre-Cooling	Evaporative Cooler	Standard DX cooling	per building CFM	New	0.05	15	$2	50%	94%	$4.51	250
Warehouse	Cooling Dx	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	7	15	$171	75%	76%	$2.91	128

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Warehouse	Cooling Dx	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.00	18	$0.22	45%	65%	$4.59	13
Warehouse	Cooling Dx	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.02	40	$9	4%	98%	$39.09	5
Warehouse	Cooling Dx	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.40	196
Warehouse	Cooling Dx	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.02	15	$0.98	20%	75%	$5.41	28
Warehouse	Cooling Dx	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	380	10	$137	95%	12%	$0.06	9
Warehouse	Cooling Dx	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	1	25	$30	80%	98%	$2.21	248
Warehouse	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	Existing	7,115	15	$31,584	100%	N/A	$0.55	603
Warehouse	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	37	5	$193	5%	93%	$1.42	1
Warehouse	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	24	15	$171	75%	76%	$0.87	296
Warehouse	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	37	5	$78	50%	98%	$0.55	19
Warehouse	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.01	18	$0.22	45%	65%	$1.39	35
Warehouse	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.08	14	$0.93	5%	94%	$1.45	25
Warehouse	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	Existing	0.01	40	$9	4%	98%	$48.05	3
Warehouse	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	Existing	12,294	30	$34,055	5%	N/A	$6.62	48
Warehouse	Heat Pump	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.32	10%	39%	$0.00	8
Warehouse	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.01	25	$0.49	25%	85%	$5.09	11
Warehouse	Heat Pump	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-8 (Average Existing Conditions)	per roof sqft	Existing	0.15	25	$1	75%	10%	$1.17	65
Warehouse	Heat Pump	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.41	20	$2	75%	58%	$0.60	97
Warehouse	Heat Pump	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-8 (Average Existing Conditions)	per floor area	Existing	0.19	25	$0.93	35%	45%	$0.48	192
Warehouse	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.02	25	$0.29	35%	45%	$1.15	23
Warehouse	Heat Pump	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	0.38	25	$2	10%	35%	$0.57	38
Warehouse	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	1,225	10	$137	95%	24%	$-0.02	37
Warehouse	Heat Pump	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.09	7	$0.18	90%	85%	$0.38	590
Warehouse	Heat Pump	Window Film	Window Film	No Film	per 100 sqft of window glazing	Existing	0.61	10	$150	90%	66%	$41.12	0.46
Warehouse	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	Existing	0.13	25	$30	15%	98%	$24.35	2
Warehouse	Heat Pump	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	1	25	$64	15%	98%	$5.25	24
Warehouse	Heat Pump	Air Source Heat Pump 65 to 135 kBTU/hr - Premium Efficiency	12.0 EER, 3.8 COP	11.0 EER, 3.3 COP	Per installation	New	5,747	15	$25,269	100%	N/A	$0.54	251
Warehouse	Heat Pump	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	18	15	$171	75%	76%	$1.18	136
Warehouse	Heat Pump	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.01	18	$0.22	45%	65%	$1.88	16

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Warehouse	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.04	14	$0.93	5%	94%	$2.52	9
Warehouse	Heat Pump	Green Roof	Vegetation on Roof	Standard Dark Colored Roof	per roof sqft	New	0.02	40	$9	4%	98%	$39.14	2
Warehouse	Heat Pump	Ground Source Heat Pump Replacing Air Source Heat Pump 65 to 135 kBTU/hr - Advanced Efficiency	16.2 EER 4.0 COP	11.0 EER, 3.3 COP	Per installation	New	9,510	30	$31,314	5%	N/A	$4.36	19
Warehouse	Heat Pump	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	85%	$10.82	10
Warehouse	Heat Pump	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.01	25	$0.29	35%	45%	$2.62	6
Warehouse	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	2	30	$5	50%	95%	$0.22	120
Warehouse	Heat Pump	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.05	15	$0.98	20%	75%	$2.23	33
Warehouse	Heat Pump	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	911	10	$137	95%	12%	$-0.01	8
Warehouse	Heat Pump	Windows-High Efficiency	U-0.32	U-0.40 (WA State Code)	per window sqft	New	0.84	25	$30	80%	98%	$3.79	52
Warehouse	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	Existing	545	10	$581	1%	85%	$0.17	16
Warehouse	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	Existing	5	15	$6	95%	76%	$0.14	250
Warehouse	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	Existing	145	20	$110	65%	75%	$0.08	4,711
Warehouse	Hvac Aux	Motor Rewind	>15, <500 HP	No Rewind	per HP	Existing	3	8	$4	65%	25%	$0.25	9
Warehouse	Hvac Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Per Total Fan HP	New	530	10	$581	1%	75%	$0.18	7
Warehouse	Hvac Aux	Motor - CEE Premium-Efficiency Plus	CEE PE+ Motor for HVAC Applications	NEMA Efficiency Motors	per HP	New	5	15	$6	95%	76%	$0.15	159
Warehouse	Hvac Aux	Motor - Pump & Fan System - Variable Speed Control	Pump And Fan System Optimization w/ VSD	No Pump And Fan System VSD Optimization	Per HP	New	141	20	$110	65%	75%	$0.08	2,405
Warehouse	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	Existing	0.09	10	$0.02	80%	95%	$0.03	11,081
Warehouse	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	Existing	40	8	$28	75%	70%	$0.12	317
Warehouse	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	Existing	246	15	$336	62%	90%	$0.16	2,759
Warehouse	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	Existing	4	14	$35	75%	95%	$1.09	73
Warehouse	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	Existing	0.05	19	$0.07	62%	95%	$0.14	4,640
Warehouse	Lighting Exterior	Covered Parking Lighting	Covered Parking Lighting	Normal Lighting	per building sqft	New	0.09	10	$0.02	80%	95%	$0.03	5,820
Warehouse	Lighting Exterior	Daylighting Controls, Outdoors (Photocell)	Photocell	No Controls	per installation	New	40	8	$28	75%	70%	$0.12	166
Warehouse	Lighting Exterior	Exterior Building Lighting	30% savings	Normal Lighting	per installation	New	246	15	$336	62%	90%	$0.16	1,449
Warehouse	Lighting Exterior	Solid State LED White Lighting	Landscape, merchandise, signage, structure & task lighting (2.5 W)	50W 10hrs/day, 365 day/yr	per installation	New	4	14	$35	75%	95%	$1.09	38
Warehouse	Lighting Exterior	Surface Parking Lighting	Surface Parking Lighting	Normal Lighting	per building sqft	New	0.05	19	$0.07	62%	95%	$0.14	2,437
Warehouse	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	Existing	507	9	$110	10%	75%	$0.02	565
Warehouse	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	Existing	148	5	$13	70%	94%	$0.01	1,034
Warehouse	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.33	8	$0.98	30%	98%	$0.55	490

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Warehouse	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	Existing	0.12	8	$0.73	30%	98%	$1.11	183
Warehouse	Lighting Interior	Exit Sign - LED	LED Exit Sign (2 Watts)	CFL Exit Sign (9 Watts)	per installation	Existing	97	16	$16	95%	50%	$0.00	5,180
Warehouse	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	Existing	35	13	$30	95%	98%	$0.11	1,230
Warehouse	Lighting Interior	Lighting Package, Below Code	Code Required LPD And Control Strategies	Existing Lighting Design LPD	per building sqft	Existing	0.46	13	$0.47	90%	16%	$0.13	9,865
Warehouse	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.13	13	$0.00	90%	44%	$-0.01	5,513
Warehouse	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.17	13	$0.02	90%	49%	$0.01	2,315
Warehouse	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.22	13	$0.09	75%	50%	$0.04	1,234
Warehouse	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	Existing	0.22	13	$0.27	70%	79%	$0.15	18,566
Warehouse	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	Existing	365	8	$70	90%	50%	$0.02	1,940
Warehouse	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	Existing	761	8	$201	85%	**%	$0.03	2,323
Warehouse	Lighting Interior	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Unit ea.: number bi-fixtures	New	340	9	$110	10%	75%	$0.04	199
Warehouse	Lighting Interior	Cold Cathode Lighting	Cold Cathode Lighting 5 watts	30 W Incandescent Bulb	per installation	New	148	5	$12	70%	94%	$0.01	364
Warehouse	Lighting Interior	Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.22	8	$0.98	30%	98%	$0.83	170
Warehouse	Lighting Interior	Dimming-Stepped, Fluorescent Fixtures	3-stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	per sqft of dimmable perimeter	New	0.08	8	$0.73	30%	98%	$1.67	63
Warehouse	Lighting Interior	Exit Sign - Photoluminescent or Tritium	Photoluminescent or Tritium	LED Exit Sign (2 Watts)	per installation	New	35	13	$30	95%	98%	$0.11	2,585
Warehouse	Lighting Interior	Lighting Package, High Efficiency	15% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.13	15	$0.00	90%	44%	$-0.01	2,895
Warehouse	Lighting Interior	Lighting Package, Premium Efficiency	20% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.17	15	$0.01	90%	49%	$-0.00	1,216
Warehouse	Lighting Interior	Lighting Package, Super Premium Efficiency	25% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.22	15	$0.03	75%	50%	$0.00	648
Warehouse	Lighting Interior	Lighting Package, Super Premium High Bay	35% Reduction in W/sqft	Baseline Lighting Power density	per building sqft	New	0.22	15	$0.06	70%	79%	$0.02	9,752
Warehouse	Lighting Interior	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	per occupancy sensor	New	244	8	$70	90%	50%	$0.04	668
Warehouse	Lighting Interior	Time Clock	Time Clock	No Controls	per 10,000 Watts	New	761	8	$200	85%	**%	$0.03	810
Warehouse	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	Existing	74	6	$219	95%	45%	$0.70	4
Warehouse	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	Existing	79	6	$0.00	95%	45%	$-0.01	4
Warehouse	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	Existing	15	5	$16	64%	15%	$0.29	33
Warehouse	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	Existing	139	5	$14	95%	40%	$0.02	114
Warehouse	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	Existing	72	6	$0.00	95%	45%	$-0.01	4
Warehouse	Other Office Equipment	ENERGY STAR - Copiers	ENERGY STAR Copiers	Standard Copier	per installation	New	74	6	$219	95%	45%	$0.70	2

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Warehouse	Other Office Equipment	ENERGY STAR - Fax	ENERGY STAR Fax	Standard Fax	per installation	New	79	6	$0.00	95%	45%	$-0.01	2
Warehouse	Other Office Equipment	ENERGY STAR - Monitors	ENERGY STAR Features Enabled	Non-ENERGY STAR Features	per installation	New	15	5	$16	64%	15%	$0.29	17
Warehouse	Other Office Equipment	ENERGY STAR - Printers	ENERGY STAR Printers	Standard Printers	per installation	New	139	5	$14	95%	40%	$0.02	59
Warehouse	Other Office Equipment	ENERGY STAR - Scanners	ENERGY STAR Scanners	Standard Scanner	per installation	New	72	6	$0.00	95%	45%	$-0.01	2
Warehouse	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	Existing	7	7	$2	20%	90%	$0.05	10
Warehouse	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	Existing	368	10	$0.00	95%	75%	$-0.01	564
Warehouse	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	Existing	2	4	$0.41	95%	86%	$0.04	155
Warehouse	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	Existing	81	12	$124	20%	65%	$0.22	26
Warehouse	Other Plug Load	Residential Refrigerator/Freezer Recycling	Recycling Existing Refrigerator/Freezer	Existing Refrigerator/Freezer	per installation	Existing	1,520	9	$567	25%	35%	$0.06	335
Warehouse	Other Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Per unit. Ea.	Existing	1,548	7	$567	25%	35%	$0.07	341
Warehouse	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 15,000 sqft	Existing	102	5	$23	60%	90%	$0.05	560
Warehouse	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	Existing	243	14	$186	10%	80%	$0.09	4
Warehouse	Other Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Per unit. Ea.	Existing	2,933	3	$174	10%	25%	$0.01	184
Warehouse	Other Plug Load	ENERGY STAR - Battery Charging System	ENERGY STAR Battery Charging System	Non-ENERGY STAR Battery Chargers	per installation	New	7	7	$2	20%	90%	$0.05	5
Warehouse	Other Plug Load	ENERGY STAR - Water Cooler	ENERGY STAR Water Cooler (Hot/Cold Water)	Non-ENERGY STAR Water Cooler	per installation	New	368	10	$0.00	95%	75%	$-0.01	296
Warehouse	Other Plug Load	Power Supply Transformer/Converter	80 Plus	85% efficient power supply (> 51W)	1 unit per 2,000 sqft	New	2	4	$0.41	95%	86%	$0.04	81
Warehouse	Other Plug Load	Residential Refrigerator	ENERGY STAR	Federal Standard	per installation	New	81	12	$124	20%	65%	$0.22	14
Warehouse	Other Plug Load	Smart Strips	Smart Strip Power Strip	Standard surge protector	1 unit per 15,000 sqft	New	102	5	$23	60%	90%	$0.05	294
Warehouse	Other Plug Load	Vending Machines- High Efficiency	ENERGY STAR (Tier 2) Vending Machines- High Efficiency 500 can capacity Under 5.92 kWh/day	Vending Machines- Standard 13 kWh/day	per installation	New	243	14	$186	10%	80%	$0.09	2
Warehouse	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	Existing	832	3	$119	5%	85%	$0.05	23
Warehouse	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	Existing	33	10	$49	75%	95%	$0.24	67
Warehouse	Refrigeration	Standalone to Multiplex Compressor	Standalone to Multiplex Compressor	Standalone compressor	per building sqft	Existing	0.00	13	$0.00	3%	90%	$0.01	5
Warehouse	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	Existing	65	4	$186	5%	20%	$0.96	1
Warehouse	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	Existing	0.00	12	$0.17	5%	95%	$12.76	15
Warehouse	Refrigeration	Refrigeration Commissioning or Re-commissioning	Commissioning / Re-commissioning	No Commissioning / Re-commissioning	per refrigeration ton	New	468	3	$47	3%	90%	$0.03	3
Warehouse	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Per Refrigerator	New	33	10	$49	75%	95%	$0.24	35
Warehouse	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-In	per installation	New	65	4	$186	5%	20%	$0.96	0.86
Warehouse	Refrigeration	Walk-In Electronically Commutated Motor	ECM Evaporator Fans	Standard Efficiency Motor	per installation	New	0.00	12	$0.17	5%	95%	$12.76	7

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Warehouse	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Number of Points	Existing	56	5	$193	5%	93%	$0.93	51
Warehouse	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	Existing	37	15	$171	75%	76%	$0.56	993
Warehouse	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	56	5	$78	50%	98%	$0.35	624
Warehouse	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	Existing	0.02	18	$0.22	45%	65%	$0.91	120
Warehouse	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	Existing	0.17	14	$0.93	5%	94%	$0.70	116
Warehouse	Space Heat	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	1	13	$0.32	10%	39%	$-0.01	27
Warehouse	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	Existing	0.02	25	$0.49	25%	85%	$1.84	68
Warehouse	Space Heat	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-8 (Average Existing Conditions)	per roof sqft	Existing	0.31	25	$1	75%	10%	$0.56	316
Warehouse	Space Heat	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.61	20	$2	75%	58%	$0.38	334
Warehouse	Space Heat	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-8 (Average Existing Conditions)	per floor area	Existing	0.44	25	$0.93	35%	45%	$0.18	1,193
Warehouse	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	Existing	0.05	25	$0.29	35%	45%	$0.51	122
Warehouse	Space Heat	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	per wall surface area	Existing	0.93	25	$2	10%	35%	$0.21	248
Warehouse	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	Existing	1,844	10	$137	95%	24%	$-0.03	15
Warehouse	Space Heat	Re-Commissioning	Re-Commissioning	Average Existing Conditions	per building sqft	Existing	0.14	7	$0.18	90%	85%	$0.23	2,004
Warehouse	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.28	10	$2	25%	98%	$1.20	992
Warehouse	Space Heat	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	per window sqft	Existing	0.41	25	$64	15%	98%	$16.36	16
Warehouse	Space Heat	Direct Digital Control System-Optimization	Premium Efficiency EMS System	High Efficiency EMS System	Number of Points	New	12	15	$171	75%	76%	$1.78	207
Warehouse	Space Heat	Duct Repair and Sealing	Reduction In Duct Losses to 5 %	No Repair or Sealing 15% duct losses	per building sqft	New	0.00	18	$0.22	45%	65%	$2.83	25
Warehouse	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air to Ventilation Air Heat Recovery	No Heat Recovery	per building CFM	New	0.05	14	$0.93	5%	94%	$2.19	24
Warehouse	Space Heat	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	per roof sqft	New	0.00	25	$0.49	75%	85%	$5.65	39
Warehouse	Space Heat	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	per floor area	New	0.01	25	$0.29	35%	45%	$1.64	25
Warehouse	Space Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Standard Duct Fittings	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.35	183
Warehouse	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	None - Standard Ventilation	per building sqft	New	0.03	15	$0.98	20%	75%	$3.35	50
Warehouse	Space Heat	Programmable Thermostat	Programmable Thermostat	No Programmable Thermostat	per installation	New	608	10	$137	95%	12%	$-0.00	13
Warehouse	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.09	10	$2	50%	98%	$3.71	410
Warehouse	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	Existing	0.00	10	$0.27	55%	94%	$4.67	577
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	3%	25%	$0.13	0.48
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	31	12	$43	3%	25%	$3.52	19,160

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (kWh)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	1,347	25	$819	5%	92%	$0.04	207
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	Existing	1,347	25	$819	5%	92%	$0.70	60,442
Warehouse	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	Existing	368	15	$155	100%	N/A	$0.03	150
Warehouse	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	Existing	6,785	15	$2,967	75%	N/A	$0.04	5,592
Warehouse	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	14	12	$2	80%	90%	$0.26	84,595
Warehouse	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	14	12	$2	80%	90%	$0.00	167
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$20	95%	73%	$0.00	38,100
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	Existing	84	10	$20	95%	73%	$-0.06	35
Warehouse	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	337	10	$20	95%	35%	$-0.09	68
Warehouse	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	per installation	Existing	337	10	$20	95%	35%	$0.23	38,822
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	121	10	$141	75%	95%	$0.17	424
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	121	10	$141	75%	95%	$2.92	48,887
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.02	10	$0.87	3%	94%	$6.57	0.15
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	Existing	0.02	10	$0.87	3%	94%	$27,956.67	5,686
Warehouse	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	Existing	453	5	$93	75%	45%	$0.04	600
Warehouse	Water Heat	Demand Controlled Circulating Systems	Demand Controlled Circulating Systems (VFD control by demand)	Constant Circulation	per building sqft	New	0.00	10	$0.27	55%	94%	$4.59	304
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	3%	55%	$0.13	0.57
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	31	12	$43	3%	55%	$3.60	62,346
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	1,368	25	$655	25%	92%	$0.03	583
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Number of WH (40 gal per unit)	New	1,368	25	$655	25%	92%	$0.56	8,996
Warehouse	Water Heat	Electric Water Heater - High Efficiency	EF = 0.95	EF = 0.92	Per installation	New	385	15	$155	100%	N/A	$0.03	102
Warehouse	Water Heat	Heat Pump Water Heater - Advanced-Efficiency	EF = 2.2	EF = 0.92	Per installation	New	7,092	15	$2,530	75%	N/A	$0.03	3,671
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$20	95%	73%	$0.00	20,815
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	per installation	New	84	10	$20	95%	73%	$-0.05	19
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	123	10	$141	75%	95%	$0.17	230
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	123	10	$141	75%	95%	$2.93	82,861
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.02	10	$0.87	3%	94%	$28,017.75	58,082
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	per sqft of refrigerated area	New	0.02	10	$0.87	3%	94%	$6.47	0.07
Warehouse	Water Heat	Water Heater Temperature Setback	Water Heater Temperature Setback (120 F)	No Change in Water Temperature	per installation	New	460	5	$93	75%	45%	$0.04	314

Table B.3.3. Industrial Electric Measure Details

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Chemical Mfg	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	27
Chemical Mfg	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	80
Chemical Mfg	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	10%	$-0.01	0.51
Chemical Mfg	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.59
Chemical Mfg	Fans	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	0.59
Chemical Mfg	Fans	Motors: Rewind 501-5000 HP	1%	10	$0.00	8%	$-0.01	0.41
Chemical Mfg	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.33
Chemical Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	34
Chemical Mfg	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	4
Chemical Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Chemical Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Chemical Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Chemical Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Chemical Mfg	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	20%	$-0.01	78
Chemical Mfg	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	29%	$-0.01	73
Chemical Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	18
Chemical Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	0.61
Chemical Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.56
Chemical Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	10%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	10%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 101-200 HP -- Other_Motors	1%	10	$0.00	10%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	6%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	6%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	6%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Handling	1%	10	$0.00	11%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Processing	1%	10	$0.00	11%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 201-500 HP -- Other_Motors	1%	10	$0.00	11%	$-0.01	1
Chemical Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Handling	1%	10	$0.00	8%	$-0.01	0.92
Chemical Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Processing	1%	10	$0.00	8%	$-0.01	0.92
Chemical Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Other_Motors	1%	10	$0.00	8%	$-0.01	0.92
Chemical Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	6%	$-0.01	0.74
Chemical Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	6%	$-0.01	0.74
Chemical Mfg	Motors Other	Motors: Rewind 51-100 HP -- Other_Motors	1%	10	$0.00	6%	$-0.01	0.74
Chemical Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	74
Chemical Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	72
Chemical Mfg	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	70
Chemical Mfg	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	9

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Chemical Mfg	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	9
Chemical Mfg	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	9
Chemical Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	3
Chemical Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	3
Chemical Mfg	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	3
Chemical Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	3
Chemical Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	3
Chemical Mfg	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	3
Chemical Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.57
Chemical Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.52
Chemical Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	126
Chemical Mfg	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	10%	$-0.01	1
Chemical Mfg	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	1
Chemical Mfg	Process Aircomp	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	1
Chemical Mfg	Process Aircomp	Motors: Rewind 501-5000 HP	1%	10	$0.00	8%	$-0.01	0.96
Chemical Mfg	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.78
Chemical Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	75
Chemical Mfg	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	10
Chemical Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Chemical Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Chemical Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Chemical Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Chemical Mfg	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	10%	$-0.01	0.07
Chemical Mfg	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.08
Chemical Mfg	Process Other	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	0.08
Chemical Mfg	Process Other	Motors: Rewind 501-5000 HP	1%	10	$0.00	8%	$-0.01	0.05
Chemical Mfg	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.04
Chemical Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	4
Chemical Mfg	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.62
Chemical Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.22
Chemical Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.20
Chemical Mfg	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	10%	$-0.01	1
Chemical Mfg	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	1
Chemical Mfg	Pumps	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	1
Chemical Mfg	Pumps	Motors: Rewind 501-5000 HP	1%	10	$0.00	8%	$-0.01	0.83
Chemical Mfg	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.67
Chemical Mfg	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	68
Chemical Mfg	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	44
Chemical Mfg	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	137
Chemical Mfg	Pumps	Pump System Optimization	50%	12	$0.00	15%	$-0.07	178
Chemical Mfg	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	8
Chemical Mfg	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Chemical Mfg	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Computer Electronic Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	52
Computer Electronic Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Computer Electronic Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Computer Electronic Mfg	Hvac	Clean Room: Change Filter Strategy	40%	1	$0.00	10%	$-0.01	367
Computer Electronic Mfg	Hvac	Clean Room: Chiller Optimize	15%	10	$0.00	28%	$-0.01	370

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Computer Electronic Mfg	Hvac	Clean Room: Clean Room HVAC	9%	20	$0.00	30%	$-0.01	228
Computer Electronic Mfg	Hvac	Elec Chip Fab: Eliminate Exhaust	5%	10	$0.00	80%	$-0.01	329
Computer Electronic Mfg	Hvac	Elec Chip Fab: Solidstate Chiller	90%	10	$0.00	20%	$-0.13	2,017
Computer Electronic Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Computer Electronic Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Computer Electronic Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	200
Computer Electronic Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Computer Electronic Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Computer Electronic Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	103
Computer Electronic Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	100
Computer Electronic Mfg	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	96
Computer Electronic Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	4
Computer Electronic Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	4
Computer Electronic Mfg	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	4
Computer Electronic Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	4
Computer Electronic Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	4
Computer Electronic Mfg	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	4
Computer Electronic Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Computer Electronic Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Computer Electronic Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	18
Computer Electronic Mfg	Process Aircomp	Elec Chip Fab: Reduce Gas Pressure	10%	10	$0.00	50%	$-0.03	18
Computer Electronic Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	10
Computer Electronic Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	0.54
Computer Electronic Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.50
Computer Electronic Mfg	Process Heat	Elec Chip Fab: Exhaust Injector	**%	10	$0.00	35%	$-0.14	1,514
Computer Electronic Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Computer Electronic Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Computer Electronic Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	97
Computer Electronic Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Computer Electronic Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Computer Electronic Mfg	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	83
Computer Electronic Mfg	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Computer Electronic Mfg	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Electrical Equipment Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	15
Electrical Equipment Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	0.75
Electrical Equipment Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.69
Electrical Equipment Mfg	Hvac	Clean Room: Change Filter Strategy	40%	1	$0.00	10%	$-0.01	53
Electrical Equipment Mfg	Hvac	Clean Room: Chiller Optimize	15%	10	$0.00	28%	$-0.01	54
Electrical Equipment Mfg	Hvac	Clean Room: Clean Room HVAC	9%	20	$0.00	30%	$-0.01	33
Electrical Equipment Mfg	Hvac	Elec Chip Fab: Eliminate Exhaust	5%	10	$0.00	80%	$-0.01	48
Electrical Equipment Mfg	Hvac	Elec Chip Fab: Solidstate Chiller	90%	10	$0.00	20%	$-0.13	294
Electrical Equipment Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Electrical Equipment Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Electrical Equipment Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	56
Electrical Equipment Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Electrical Equipment Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Electrical Equipment Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	35
Electrical Equipment Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	34
Electrical Equipment Mfg	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	33
Electrical Equipment Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	1
Electrical Equipment Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	1
Electrical Equipment Mfg	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	1
Electrical Equipment Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	1
Electrical Equipment Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	1
Electrical Equipment Mfg	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	1
Electrical Equipment Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.62
Electrical Equipment Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.57
Electrical Equipment Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	56
Electrical Equipment Mfg	Process Aircomp	Elec Chip Fab: Reduce Gas Pressure	10%	10	$0.00	50%	$-0.03	57
Electrical Equipment Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	33
Electrical Equipment Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Electrical Equipment Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Electrical Equipment Mfg	Process Heat	Elec Chip Fab: Exhaust Injector	**%	10	$0.00	35%	$-0.14	890
Electrical Equipment Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Electrical Equipment Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Electrical Equipment Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	11
Electrical Equipment Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.55
Electrical Equipment Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.50
Electrical Equipment Mfg	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	34
Electrical Equipment Mfg	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Electrical Equipment Mfg	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Fabricated Metal Products	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	74
Fabricated Metal Products	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	13%	$-0.01	1
Fabricated Metal Products	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	20%	$-0.01	5
Fabricated Metal Products	Fans	Motors: Rewind 201-500 HP	1%	10	$0.00	4%	$-0.01	0.51
Fabricated Metal Products	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	5%	$-0.01	0.75
Fabricated Metal Products	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	91
Fabricated Metal Products	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	11
Fabricated Metal Products	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Fabricated Metal Products	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Fabricated Metal Products	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Fabricated Metal Products	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Fabricated Metal Products	Lighting	Efficient Lighting 1 Shift	70%	10	$0.00	1%	$-0.01	36
Fabricated Metal Products	Lighting	Efficient Lighting 2 Shift	70%	10	$0.00	3%	$-0.01	79
Fabricated Metal Products	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	15%	$-0.01	422
Fabricated Metal Products	Lighting	HighBay Lighting 1 Shift	51%	10	$0.00	2%	$-0.01	34
Fabricated Metal Products	Lighting	HighBay Lighting 2 Shift	51%	10	$0.00	4%	$-0.01	75
Fabricated Metal Products	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	23%	$-0.01	398
Fabricated Metal Products	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	128
Fabricated Metal Products	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Fabricated Metal Products	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Fabricated Metal Products	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	13%	$-0.01	5

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Fabricated Metal Products	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	13%	$-0.01	5
Fabricated Metal Products	Motors Other	Motors: Rewind 101-200 HP -- Other_Motors	1%	10	$0.00	13%	$-0.01	5
Fabricated Metal Products	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	20%	$-0.01	14
Fabricated Metal Products	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	20%	$-0.01	14
Fabricated Metal Products	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	20%	$-0.01	14
Fabricated Metal Products	Motors Other	Motors: Rewind 201-500 HP -- Material_Handling	1%	10	$0.00	4%	$-0.01	1
Fabricated Metal Products	Motors Other	Motors: Rewind 201-500 HP -- Material_Processing	1%	10	$0.00	4%	$-0.01	1
Fabricated Metal Products	Motors Other	Motors: Rewind 201-500 HP -- Other_Motors	1%	10	$0.00	4%	$-0.01	1
Fabricated Metal Products	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	5%	$-0.01	2
Fabricated Metal Products	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	5%	$-0.01	2
Fabricated Metal Products	Motors Other	Motors: Rewind 51-100 HP -- Other_Motors	1%	10	$0.00	5%	$-0.01	2
Fabricated Metal Products	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	255
Fabricated Metal Products	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	247
Fabricated Metal Products	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	239
Fabricated Metal Products	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	33
Fabricated Metal Products	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	33
Fabricated Metal Products	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	33
Fabricated Metal Products	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Fabricated Metal Products	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Fabricated Metal Products	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	169
Fabricated Metal Products	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	13%	$-0.01	2
Fabricated Metal Products	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	20%	$-0.01	6
Fabricated Metal Products	Process Aircomp	Motors: Rewind 201-500 HP	1%	10	$0.00	4%	$-0.01	0.58
Fabricated Metal Products	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	5%	$-0.01	0.87
Fabricated Metal Products	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	100
Fabricated Metal Products	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	13
Fabricated Metal Products	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Fabricated Metal Products	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Fabricated Metal Products	Process Electro Chemical	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Fabricated Metal Products	Process Electro Chemical	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	12
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	11
Fabricated Metal Products	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	13%	$-0.01	0.83
Fabricated Metal Products	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	20%	$-0.01	2
Fabricated Metal Products	Process Other	Motors: Rewind 201-500 HP	1%	10	$0.00	4%	$-0.01	0.22
Fabricated Metal Products	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	5%	$-0.01	0.33
Fabricated Metal Products	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	39
Fabricated Metal Products	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	5
Fabricated Metal Products	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Fabricated Metal Products	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Food Mfg	Fans	Energy Project Management	29%	11	$0.00	27%	$0.01	101
Food Mfg	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	32
Food Mfg	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	94
Food Mfg	Fans	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	167
Food Mfg	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	12%	$-0.01	0.81
Food Mfg	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	12%	$-0.01	1
Food Mfg	Fans	Motors: Rewind 201-500 HP	1%	10	$0.00	10%	$-0.01	0.65
Food Mfg	Fans	Motors: Rewind 501-5000 HP	1%	10	$0.00	11%	$-0.01	0.77
Food Mfg	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	11%	$-0.01	0.72
Food Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	43
Food Mfg	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	5
Food Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Food Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Food Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	5
Food Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	5
Food Mfg	Lighting	Efficient Lighting 1 Shift	70%	10	$0.00	4%	$-0.01	104
Food Mfg	Lighting	Efficient Lighting 2 Shift	70%	10	$0.00	3%	$-0.01	75
Food Mfg	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	12%	$-0.01	259
Food Mfg	Lighting	HighBay Lighting 1 Shift	51%	10	$0.00	7%	$-0.01	98
Food Mfg	Lighting	HighBay Lighting 2 Shift	51%	10	$0.00	5%	$-0.01	71
Food Mfg	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	18%	$-0.01	244
Food Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	107
Food Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Food Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Food Mfg	Motors Other	Energy Project Management -- Material_Handling	29%	11	$0.00	27%	$0.01	449

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Food Mfg	Motors Other	Energy Project Management -- Material_Processing	29%	11	$0.00	27%	$0.01	414
Food Mfg	Motors Other	Integrated Plant Energy Management -- Material_Handling	50%	11	$0.00	22%	$-0.04	869
Food Mfg	Motors Other	Integrated Plant Energy Management -- Material_Processing	50%	11	$0.00	22%	$-0.04	773
Food Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	12%	$-0.01	3
Food Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	12%	$-0.01	3
Food Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	12%	$-0.01	7
Food Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	12%	$-0.01	7
Food Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Handling	1%	10	$0.00	10%	$-0.01	3
Food Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Processing	1%	10	$0.00	10%	$-0.01	3
Food Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Handling	1%	10	$0.00	11%	$-0.01	3
Food Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Processing	1%	10	$0.00	11%	$-0.01	3
Food Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	11%	$-0.01	3
Food Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	11%	$-0.01	3
Food Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	198
Food Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	192
Food Mfg	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	26
Food Mfg	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	26
Food Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	9
Food Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	9
Food Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	8
Food Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	8
Food Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Food Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Food Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	71
Food Mfg	Process Aircomp	Energy Project Management	29%	11	$0.00	27%	$0.01	98
Food Mfg	Process Aircomp	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	171
Food Mfg	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	12%	$-0.01	0.84
Food Mfg	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	12%	$-0.01	1
Food Mfg	Process Aircomp	Motors: Rewind 201-500 HP	1%	10	$0.00	10%	$-0.01	0.66
Food Mfg	Process Aircomp	Motors: Rewind 501-5000 HP	1%	10	$0.00	11%	$-0.01	0.79
Food Mfg	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	11%	$-0.01	0.74
Food Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	42
Food Mfg	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	5
Food Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Food Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Food Mfg	Process Refrig	Energy Project Management	29%	11	$0.00	27%	$0.01	312
Food Mfg	Process Refrig	Food: Cooling and Storage	15%	10	$0.00	100%	$-0.01	795

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Food Mfg	Process Refrig	Food: Refrig Storage Tuneup	8%	3	$0.00	100%	$-0.01	337
Food Mfg	Process Refrig	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	655
Food Mfg	Process Refrig	Motors: Rewind 101-200 HP	1%	10	$0.00	12%	$-0.01	2
Food Mfg	Process Refrig	Motors: Rewind 20-50 HP	1%	10	$0.00	12%	$-0.01	4
Food Mfg	Process Refrig	Motors: Rewind 201-500 HP	1%	10	$0.00	10%	$-0.01	2
Food Mfg	Process Refrig	Motors: Rewind 501-5000 HP	1%	10	$0.00	11%	$-0.01	2
Food Mfg	Process Refrig	Motors: Rewind 51-100 HP	1%	10	$0.00	11%	$-0.01	2
Food Mfg	Process Refrig	Plant Energy Management	12%	10	$0.00	27%	$0.01	133
Food Mfg	Process Refrig	Synchronous Belts	2%	10	$0.00	21%	$-0.01	17
Food Mfg	Process Refrig	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Food Mfg	Process Refrig	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	5
Food Mfg	Pumps	Energy Project Management	29%	11	$0.00	27%	$0.01	221
Food Mfg	Pumps	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	365
Food Mfg	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	12%	$-0.01	1
Food Mfg	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	12%	$-0.01	3
Food Mfg	Pumps	Motors: Rewind 201-500 HP	1%	10	$0.00	10%	$-0.01	1
Food Mfg	Pumps	Motors: Rewind 501-5000 HP	1%	10	$0.00	11%	$-0.01	1
Food Mfg	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	11%	$-0.01	1
Food Mfg	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	94
Food Mfg	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	56
Food Mfg	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	175
Food Mfg	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	12
Food Mfg	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Food Mfg	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Industrial Machinery	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	87
Industrial Machinery	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	254
Industrial Machinery	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	583
Industrial Machinery	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	2
Industrial Machinery	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	3
Industrial Machinery	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.03
Industrial Machinery	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	107
Industrial Machinery	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	14
Industrial Machinery	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	5
Industrial Machinery	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Industrial Machinery	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	21
Industrial Machinery	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	20
Industrial Machinery	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	13%	$-0.01	817
Industrial Machinery	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	19%	$-0.01	814
Industrial Machinery	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	329
Industrial Machinery	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	11
Industrial Machinery	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	10
Industrial Machinery	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	17%	$-0.01	9
Industrial Machinery	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	17%	$-0.01	9
Industrial Machinery	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	11%	$-0.01	11
Industrial Machinery	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	11%	$-0.01	11
Industrial Machinery	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	0%	$-0.01	0.11
Industrial Machinery	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	0%	$-0.01	0.11

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Industrial Machinery	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	357
Industrial Machinery	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	345
Industrial Machinery	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	46
Industrial Machinery	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	46
Industrial Machinery	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	16
Industrial Machinery	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	16
Industrial Machinery	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	15
Industrial Machinery	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	15
Industrial Machinery	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Industrial Machinery	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Industrial Machinery	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	233
Industrial Machinery	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	3
Industrial Machinery	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	4
Industrial Machinery	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.04
Industrial Machinery	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	138
Industrial Machinery	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	19
Industrial Machinery	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Industrial Machinery	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Industrial Machinery	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Industrial Machinery	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	6
Industrial Machinery	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	7
Industrial Machinery	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.07
Industrial Machinery	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	229
Industrial Machinery	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	148
Industrial Machinery	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	459
Industrial Machinery	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	29
Industrial Machinery	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	10
Industrial Machinery	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	9
Miscellaneous Mfg	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	129
Miscellaneous Mfg	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	375
Miscellaneous Mfg	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	861
Miscellaneous Mfg	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	4
Miscellaneous Mfg	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	5
Miscellaneous Mfg	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.04
Miscellaneous Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	159
Miscellaneous Mfg	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	20
Miscellaneous Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	7
Miscellaneous Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	6
Miscellaneous Mfg	Hvac	Clean Room: Change Filter Strategy	40%	1	$0.00	10%	$-0.01	1,144
Miscellaneous Mfg	Hvac	Clean Room: Chiller Optimize	15%	10	$0.00	28%	$-0.01	1,153

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Miscellaneous Mfg	Hvac	Clean Room: Clean Room HVAC	9%	20	$0.00	30%	$-0.01	710
Miscellaneous Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	39
Miscellaneous Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	35
Miscellaneous Mfg	Lighting	Efficient Lighting 1 Shift	70%	10	$0.00	5%	$-0.01	708
Miscellaneous Mfg	Lighting	Efficient Lighting 2 Shift	70%	10	$0.00	2%	$-0.01	226
Miscellaneous Mfg	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	13%	$-0.01	1,630
Miscellaneous Mfg	Lighting	HighBay Lighting 1 Shift	51%	10	$0.00	8%	$-0.01	671
Miscellaneous Mfg	Lighting	HighBay Lighting 2 Shift	51%	10	$0.00	3%	$-0.01	214
Miscellaneous Mfg	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	19%	$-0.01	1,538
Miscellaneous Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	622
Miscellaneous Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	20
Miscellaneous Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	19
Miscellaneous Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	17%	$-0.01	20
Miscellaneous Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	17%	$-0.01	20
Miscellaneous Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	11%	$-0.01	23
Miscellaneous Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	11%	$-0.01	23
Miscellaneous Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	0%	$-0.01	0.22
Miscellaneous Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	0%	$-0.01	0.22
Miscellaneous Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	745
Miscellaneous Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	721
Miscellaneous Mfg	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	98
Miscellaneous Mfg	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	97
Miscellaneous Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	35
Miscellaneous Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	35
Miscellaneous Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	32
Miscellaneous Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	32
Miscellaneous Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	10
Miscellaneous Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	9
Miscellaneous Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	279
Miscellaneous Mfg	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	4
Miscellaneous Mfg	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	5
Miscellaneous Mfg	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.05
Miscellaneous Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	165
Miscellaneous Mfg	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	22
Miscellaneous Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	8
Miscellaneous Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	7
Miscellaneous Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	17
Miscellaneous Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	17
Miscellaneous Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	17
Miscellaneous Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	17
Miscellaneous Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	16
Miscellaneous Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	16

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Miscellaneous Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	16
Miscellaneous Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	16
Miscellaneous Mfg	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	0.86
Miscellaneous Mfg	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	1
Miscellaneous Mfg	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.00
Miscellaneous Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	31
Miscellaneous Mfg	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	4
Miscellaneous Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Miscellaneous Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Miscellaneous Mfg	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	2
Miscellaneous Mfg	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	3
Miscellaneous Mfg	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.03
Miscellaneous Mfg	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	98
Miscellaneous Mfg	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	68
Miscellaneous Mfg	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	191
Miscellaneous Mfg	Pumps	Pump System Optimization	50%	12	$0.00	15%	$-0.07	255
Miscellaneous Mfg	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	12
Miscellaneous Mfg	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Miscellaneous Mfg	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Nonmetallic Mineral Products	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	40
Nonmetallic Mineral Products	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	131
Nonmetallic Mineral Products	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	292
Nonmetallic Mineral Products	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	1
Nonmetallic Mineral Products	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	1
Nonmetallic Mineral Products	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.01
Nonmetallic Mineral Products	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	54
Nonmetallic Mineral Products	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	7
Nonmetallic Mineral Products	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Nonmetallic Mineral Products	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Nonmetallic Mineral Products	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Nonmetallic Mineral Products	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Nonmetallic Mineral Products	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	13%	$-0.01	118
Nonmetallic Mineral Products	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	19%	$-0.01	117
Nonmetallic Mineral Products	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	47
Nonmetallic Mineral Products	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Nonmetallic Mineral Products	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Nonmetallic Mineral Products	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	17%	$-0.01	4

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Nonmetallic Mineral Products	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	17%	$-0.01	4
Nonmetallic Mineral Products	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	11%	$-0.01	5
Nonmetallic Mineral Products	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	11%	$-0.01	5
Nonmetallic Mineral Products	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	0%	$-0.01	0.05
Nonmetallic Mineral Products	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	0%	$-0.01	0.05
Nonmetallic Mineral Products	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	178
Nonmetallic Mineral Products	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	173
Nonmetallic Mineral Products	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	23
Nonmetallic Mineral Products	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	23
Nonmetallic Mineral Products	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	8
Nonmetallic Mineral Products	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	8
Nonmetallic Mineral Products	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	7
Nonmetallic Mineral Products	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	7
Nonmetallic Mineral Products	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	117
Nonmetallic Mineral Products	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	1
Nonmetallic Mineral Products	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	2
Nonmetallic Mineral Products	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.02
Nonmetallic Mineral Products	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	69
Nonmetallic Mineral Products	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	9
Nonmetallic Mineral Products	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Nonmetallic Mineral Products	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Nonmetallic Mineral Products	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	0.71
Nonmetallic Mineral Products	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	0.84
Nonmetallic Mineral Products	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.00
Nonmetallic Mineral Products	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	26
Nonmetallic Mineral Products	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	3
Nonmetallic Mineral Products	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Nonmetallic Mineral Products	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Nonmetallic Mineral Products	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	3

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Nonmetallic Mineral Products	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	3
Nonmetallic Mineral Products	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.03
Nonmetallic Mineral Products	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	114
Nonmetallic Mineral Products	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	74
Nonmetallic Mineral Products	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	230
Nonmetallic Mineral Products	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	14
Nonmetallic Mineral Products	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	5
Nonmetallic Mineral Products	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Paper Mfg	Fans	Energy Project Management	29%	11	$0.00	27%	$0.01	58
Paper Mfg	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	18
Paper Mfg	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	54
Paper Mfg	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	141
Paper Mfg	Fans	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	118
Paper Mfg	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	9%	$-0.01	0.37
Paper Mfg	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.46
Paper Mfg	Fans	Motors: Rewind 201-500 HP	1%	10	$0.00	13%	$-0.01	0.52
Paper Mfg	Fans	Motors: Rewind 501-5000 HP	1%	10	$0.00	23%	$-0.01	0.95
Paper Mfg	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	10%	$-0.01	0.40
Paper Mfg	Fans	Paper: Premium Fan	20%	10	$0.00	25%	$-0.01	40
Paper Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	24
Paper Mfg	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	3
Paper Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Paper Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Paper Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	0.52
Paper Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.48
Paper Mfg	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	20%	$-0.01	42
Paper Mfg	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	29%	$-0.01	40
Paper Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	9
Paper Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	0.33
Paper Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.30
Paper Mfg	Motors Other	Efficient Centrifugal Fan -- Material_Handling	20%	10	$0.00	11%	$-0.01	31
Paper Mfg	Motors Other	Energy Project Management -- Material_Handling	29%	11	$0.00	27%	$0.01	78
Paper Mfg	Motors Other	Energy Project Management -- Material_Processing	29%	11	$0.00	27%	$0.01	71
Paper Mfg	Motors Other	Energy Project Management -- Other_Motors	29%	11	$0.00	27%	$0.01	66
Paper Mfg	Motors Other	Integrated Plant Energy Management -- Material_Handling	50%	11	$0.00	22%	$-0.04	234
Paper Mfg	Motors Other	Integrated Plant Energy Management -- Material_Processing	50%	11	$0.00	22%	$-0.04	208
Paper Mfg	Motors Other	Integrated Plant Energy Management -- Other_Motors	50%	11	$0.00	22%	$-0.04	185
Paper Mfg	Motors Other	Material Handling VFD2 -- Material_Handling	19%	10	$0.00	53%	$-0.01	147
Paper Mfg	Motors Other	Material Handling2 -- Material_Handling	5%	10	$0.00	53%	$-0.01	35

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Paper Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	9%	$-0.01	0.58
Paper Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	9%	$-0.01	0.58
Paper Mfg	Motors Other	Motors: Rewind 101-200 HP -- Other_Motors	1%	10	$0.00	9%	$-0.01	0.58
Paper Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	6%	$-0.01	0.73
Paper Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	6%	$-0.01	0.73
Paper Mfg	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	6%	$-0.01	0.73
Paper Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Handling	1%	10	$0.00	13%	$-0.01	0.82
Paper Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Processing	1%	10	$0.00	13%	$-0.01	0.82
Paper Mfg	Motors Other	Motors: Rewind 201-500 HP -- Other_Motors	1%	10	$0.00	13%	$-0.01	0.82
Paper Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Handling	1%	10	$0.00	23%	$-0.01	1
Paper Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Processing	1%	10	$0.00	23%	$-0.01	1
Paper Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Other_Motors	1%	10	$0.00	23%	$-0.01	1
Paper Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	10%	$-0.01	0.63
Paper Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	10%	$-0.01	0.63
Paper Mfg	Motors Other	Motors: Rewind 51-100 HP -- Other_Motors	1%	10	$0.00	10%	$-0.01	0.63
Paper Mfg	Motors Other	Paper: Efficient Pulp Screen -- Material_Processing	15%	10	$0.00	14%	$-0.01	27
Paper Mfg	Motors Other	Paper: Large Material Handling -- Material_Handling	10%	10	$0.00	25%	$-0.01	30
Paper Mfg	Motors Other	Paper: Material Handling -- Material_Handling	13%	10	$0.00	25%	$-0.01	39
Paper Mfg	Motors Other	Paper: Premium Control Large Material -- Material_Handling	19%	10	$0.00	25%	$-0.01	55
Paper Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	35
Paper Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	34
Paper Mfg	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	33
Paper Mfg	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	4
Paper Mfg	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	4
Paper Mfg	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	4
Paper Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	1
Paper Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	1
Paper Mfg	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	1
Paper Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	1
Paper Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	1
Paper Mfg	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	1
Paper Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.25

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Paper Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.23
Paper Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	8
Paper Mfg	Process Aircomp	Air Compressor Equipment2	35%	10	$0.00	17%	$0.01	10
Paper Mfg	Process Aircomp	Air Compressor Optimization	50%	10	$0.00	36%	$-0.04	39
Paper Mfg	Process Aircomp	Energy Project Management	29%	11	$0.00	27%	$0.01	12
Paper Mfg	Process Aircomp	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	27
Paper Mfg	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	9%	$-0.01	0.08
Paper Mfg	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.10
Paper Mfg	Process Aircomp	Motors: Rewind 201-500 HP	1%	10	$0.00	13%	$-0.01	0.11
Paper Mfg	Process Aircomp	Motors: Rewind 501-5000 HP	1%	10	$0.00	23%	$-0.01	0.21
Paper Mfg	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	10%	$-0.01	0.09
Paper Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	5
Paper Mfg	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.76
Paper Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	0.27
Paper Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.25
Paper Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	0.37
Paper Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.34
Paper Mfg	Process Other	Energy Project Management	29%	11	$0.00	27%	$0.01	5
Paper Mfg	Process Other	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	8
Paper Mfg	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	9%	$-0.01	0.03
Paper Mfg	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.04
Paper Mfg	Process Other	Motors: Rewind 201-500 HP	1%	10	$0.00	13%	$-0.01	0.04
Paper Mfg	Process Other	Motors: Rewind 501-5000 HP	1%	10	$0.00	23%	$-0.01	0.08
Paper Mfg	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	10%	$-0.01	0.03
Paper Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	2
Paper Mfg	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.30
Paper Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.10
Paper Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.10
Paper Mfg	Pumps	Energy Project Management	29%	11	$0.00	27%	$0.01	105
Paper Mfg	Pumps	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	173
Paper Mfg	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	9%	$-0.01	0.63
Paper Mfg	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.80
Paper Mfg	Pumps	Motors: Rewind 201-500 HP	1%	10	$0.00	13%	$-0.01	0.89
Paper Mfg	Pumps	Motors: Rewind 501-5000 HP	1%	10	$0.00	23%	$-0.01	1
Paper Mfg	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	10%	$-0.01	0.70
Paper Mfg	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	45
Paper Mfg	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	26
Paper Mfg	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	83
Paper Mfg	Pumps	Pump System Optimization	50%	12	$0.00	15%	$-0.07	131
Paper Mfg	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	5
Paper Mfg	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Paper Mfg	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Petroleum Coal Products	Fans	Energy Project Management	29%	11	$0.00	27%	$0.01	22
Petroleum Coal Products	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	6
Petroleum Coal Products	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	21
Petroleum Coal Products	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	52
Petroleum Coal Products	Fans	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	44
Petroleum Coal Products	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	12%	$-0.01	0.17
Petroleum Coal Products	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	8%	$-0.01	0.23
Petroleum Coal Products	Fans	Motors: Rewind 201-500 HP	1%	10	$0.00	12%	$-0.01	0.18
Petroleum Coal Products	Fans	Motors: Rewind 501-5000 HP	1%	10	$0.00	8%	$-0.01	0.11

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Petroleum Coal Products	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	10%	$-0.01	0.14
Petroleum Coal Products	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	9
Petroleum Coal Products	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	1
Petroleum Coal Products	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	0.46
Petroleum Coal Products	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.42
Petroleum Coal Products	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	0.17
Petroleum Coal Products	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.15
Petroleum Coal Products	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	20%	$-0.01	11
Petroleum Coal Products	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	29%	$-0.01	10
Petroleum Coal Products	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	2
Petroleum Coal Products	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	0.08
Petroleum Coal Products	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.08
Petroleum Coal Products	Motors Other	Energy Project Management -- Material_Processing	29%	11	$0.00	27%	$0.01	64
Petroleum Coal Products	Motors Other	Energy Project Management -- Other_Motors	29%	11	$0.00	27%	$0.01	59
Petroleum Coal Products	Motors Other	Integrated Plant Energy Management -- Material_Processing	50%	11	$0.00	22%	$-0.04	125
Petroleum Coal Products	Motors Other	Integrated Plant Energy Management -- Other_Motors	50%	11	$0.00	22%	$-0.04	111
Petroleum Coal Products	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	12%	$-0.01	0.52
Petroleum Coal Products	Motors Other	Motors: Rewind 101-200 HP -- Other_Motors	1%	10	$0.00	12%	$-0.01	0.52
Petroleum Coal Products	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	8%	$-0.01	0.68
Petroleum Coal Products	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	8%	$-0.01	0.68
Petroleum Coal Products	Motors Other	Motors: Rewind 201-500 HP -- Material_Processing	1%	10	$0.00	12%	$-0.01	0.55
Petroleum Coal Products	Motors Other	Motors: Rewind 201-500 HP -- Other_Motors	1%	10	$0.00	12%	$-0.01	0.55
Petroleum Coal Products	Motors Other	Motors: Rewind 501-5000 HP -- Material_Processing	1%	10	$0.00	8%	$-0.01	0.34
Petroleum Coal Products	Motors Other	Motors: Rewind 501-5000 HP -- Other_Motors	1%	10	$0.00	8%	$-0.01	0.34
Petroleum Coal Products	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	10%	$-0.01	0.44
Petroleum Coal Products	Motors Other	Motors: Rewind 51-100 HP -- Other_Motors	1%	10	$0.00	10%	$-0.01	0.44
Petroleum Coal Products	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	28
Petroleum Coal Products	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	27
Petroleum Coal Products	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	3
Petroleum Coal Products	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	3
Petroleum Coal Products	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	1
Petroleum Coal Products	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	1
Petroleum Coal Products	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	1
Petroleum Coal Products	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	1
Petroleum Coal Products	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.04
Petroleum Coal Products	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.03
Petroleum Coal Products	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	16

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Petroleum Coal Products	Process Aircomp	Air Compressor Equipment2	35%	10	$0.00	17%	$0.01	20
Petroleum Coal Products	Process Aircomp	Air Compressor Optimization	50%	10	$0.00	36%	$-0.04	73
Petroleum Coal Products	Process Aircomp	Energy Project Management	29%	11	$0.00	27%	$0.01	22
Petroleum Coal Products	Process Aircomp	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	50
Petroleum Coal Products	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	12%	$-0.01	0.19
Petroleum Coal Products	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	8%	$-0.01	0.25
Petroleum Coal Products	Process Aircomp	Motors: Rewind 201-500 HP	1%	10	$0.00	12%	$-0.01	0.20
Petroleum Coal Products	Process Aircomp	Motors: Rewind 501-5000 HP	1%	10	$0.00	8%	$-0.01	0.12
Petroleum Coal Products	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	10%	$-0.01	0.16
Petroleum Coal Products	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	9
Petroleum Coal Products	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	1
Petroleum Coal Products	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	0.51
Petroleum Coal Products	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.47
Petroleum Coal Products	Pumps	Energy Project Management	29%	11	$0.00	27%	$0.01	44
Petroleum Coal Products	Pumps	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	73
Petroleum Coal Products	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	12%	$-0.01	0.34
Petroleum Coal Products	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	8%	$-0.01	0.45
Petroleum Coal Products	Pumps	Motors: Rewind 201-500 HP	1%	10	$0.00	12%	$-0.01	0.36
Petroleum Coal Products	Pumps	Motors: Rewind 501-5000 HP	1%	10	$0.00	8%	$-0.01	0.22
Petroleum Coal Products	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	10%	$-0.01	0.29
Petroleum Coal Products	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	19
Petroleum Coal Products	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	12
Petroleum Coal Products	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	34
Petroleum Coal Products	Pumps	Pump System Optimization	50%	12	$0.00	15%	$-0.07	56
Petroleum Coal Products	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	2
Petroleum Coal Products	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	0.90
Petroleum Coal Products	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.83
Plastics Rubber Products	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	26
Plastics Rubber Products	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	87
Plastics Rubber Products	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	194
Plastics Rubber Products	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	0.97
Plastics Rubber Products	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	1
Plastics Rubber Products	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.01
Plastics Rubber Products	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	35
Plastics Rubber Products	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	4
Plastics Rubber Products	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Plastics Rubber Products	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Plastics Rubber Products	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Plastics Rubber Products	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Plastics Rubber Products	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	13%	$-0.01	144
Plastics Rubber Products	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	19%	$-0.01	144
Plastics Rubber Products	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	58
Plastics Rubber Products	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Plastics Rubber Products	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Plastics Rubber Products	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Plastics Rubber Products	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Plastics Rubber Products	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	77
Plastics Rubber Products	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	1
Plastics Rubber Products	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	1
Plastics Rubber Products	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.01
Plastics Rubber Products	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	46

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Plastics Rubber Products	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	6
Plastics Rubber Products	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Plastics Rubber Products	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Plastics Rubber Products	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Plastics Rubber Products	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Plastics Rubber Products	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	2
Plastics Rubber Products	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	2
Plastics Rubber Products	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.02
Plastics Rubber Products	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	76
Plastics Rubber Products	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	53
Plastics Rubber Products	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	149
Plastics Rubber Products	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	9
Plastics Rubber Products	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Plastics Rubber Products	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Primary Metal Mfg	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	7
Primary Metal Mfg	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	8%	$-0.01	0.12
Primary Metal Mfg	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.17
Primary Metal Mfg	Fans	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	0.17
Primary Metal Mfg	Fans	Motors: Rewind 501-5000 HP	1%	10	$0.00	21%	$-0.01	0.31
Primary Metal Mfg	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.09
Primary Metal Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	9
Primary Metal Mfg	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	1
Primary Metal Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	0.46
Primary Metal Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.42
Primary Metal Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	0.35
Primary Metal Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.32
Primary Metal Mfg	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	20%	$-0.01	31
Primary Metal Mfg	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	29%	$-0.01	29
Primary Metal Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	7
Primary Metal Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	0.24
Primary Metal Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.22
Primary Metal Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	8%	$-0.01	0.49
Primary Metal Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	8%	$-0.01	0.49
Primary Metal Mfg	Motors Other	Motors: Rewind 101-200 HP -- Other_Motors	1%	10	$0.00	8%	$-0.01	0.49
Primary Metal Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	6%	$-0.01	0.68
Primary Metal Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	6%	$-0.01	0.68
Primary Metal Mfg	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	6%	$-0.01	0.68
Primary Metal Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Handling	1%	10	$0.00	11%	$-0.01	0.70
Primary Metal Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Processing	1%	10	$0.00	11%	$-0.01	0.70
Primary Metal Mfg	Motors Other	Motors: Rewind 201-500 HP -- Other_Motors	1%	10	$0.00	11%	$-0.01	0.70
Primary Metal Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Handling	1%	10	$0.00	21%	$-0.01	1
Primary Metal Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Material_Processing	1%	10	$0.00	21%	$-0.01	1

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Primary Metal Mfg	Motors Other	Motors: Rewind 501-5000 HP -- Other_Motors	1%	10	$0.00	21%	$-0.01	1
Primary Metal Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	6%	$-0.01	0.39
Primary Metal Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	6%	$-0.01	0.39
Primary Metal Mfg	Motors Other	Motors: Rewind 51-100 HP -- Other_Motors	1%	10	$0.00	6%	$-0.01	0.39
Primary Metal Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	38
Primary Metal Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	37
Primary Metal Mfg	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	36
Primary Metal Mfg	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	5
Primary Metal Mfg	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	5
Primary Metal Mfg	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	5
Primary Metal Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	1
Primary Metal Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	1
Primary Metal Mfg	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	1
Primary Metal Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	1
Primary Metal Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	1
Primary Metal Mfg	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	1
Primary Metal Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.12
Primary Metal Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.11
Primary Metal Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	11
Primary Metal Mfg	Process Aircomp	Air Compressor Equipment2	35%	10	$0.00	17%	$0.01	13
Primary Metal Mfg	Process Aircomp	Air Compressor Optimization	50%	10	$0.00	36%	$-0.04	51
Primary Metal Mfg	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	8%	$-0.01	0.09
Primary Metal Mfg	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.13
Primary Metal Mfg	Process Aircomp	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	0.13
Primary Metal Mfg	Process Aircomp	Motors: Rewind 501-5000 HP	1%	10	$0.00	21%	$-0.01	0.24
Primary Metal Mfg	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.07
Primary Metal Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	6
Primary Metal Mfg	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.98
Primary Metal Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	0.35
Primary Metal Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.32
Primary Metal Mfg	Process Electro Chemical	Metal: New Arc Furnace	45%	10	$0.00	10%	$-1.88	98
Primary Metal Mfg	Process Electro Chemical	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Primary Metal Mfg	Process Electro Chemical	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Primary Metal Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Primary Metal Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Primary Metal Mfg	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	8%	$-0.01	0.02
Primary Metal Mfg	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.03
Primary Metal Mfg	Process Other	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	0.03
Primary Metal Mfg	Process Other	Motors: Rewind 501-5000 HP	1%	10	$0.00	21%	$-0.01	0.05
Primary Metal Mfg	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.01
Primary Metal Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	1

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Primary Metal Mfg	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.23
Primary Metal Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.08
Primary Metal Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.07
Primary Metal Mfg	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	8%	$-0.01	0.06
Primary Metal Mfg	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	6%	$-0.01	0.09
Primary Metal Mfg	Pumps	Motors: Rewind 201-500 HP	1%	10	$0.00	11%	$-0.01	0.09
Primary Metal Mfg	Pumps	Motors: Rewind 501-5000 HP	1%	10	$0.00	21%	$-0.01	0.17
Primary Metal Mfg	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	6%	$-0.01	0.05
Primary Metal Mfg	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	5
Primary Metal Mfg	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	3
Primary Metal Mfg	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.73
Primary Metal Mfg	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	0.26
Primary Metal Mfg	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.24
Printing Related Support	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	62
Printing Related Support	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	182
Printing Related Support	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	418
Printing Related Support	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	2
Printing Related Support	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	2
Printing Related Support	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.02
Printing Related Support	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	77
Printing Related Support	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	10
Printing Related Support	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Printing Related Support	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Printing Related Support	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	11
Printing Related Support	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	10
Printing Related Support	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	13%	$-0.01	425
Printing Related Support	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	19%	$-0.01	423
Printing Related Support	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	171
Printing Related Support	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	5
Printing Related Support	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	5
Printing Related Support	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Printing Related Support	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Printing Related Support	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	167
Printing Related Support	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	2
Printing Related Support	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	3
Printing Related Support	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.03
Printing Related Support	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	99
Printing Related Support	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	13
Printing Related Support	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Printing Related Support	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Printing Related Support	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Printing Related Support	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Printing Related Support	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	0.13
Printing Related Support	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	0.15
Printing Related Support	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.00
Printing Related Support	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	4
Printing Related Support	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.62
Printing Related Support	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.22
Printing Related Support	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.20
Printing Related Support	Pumps	Motors: Rewind 101-200 HP	1%	10	$0.00	17%	$-0.01	4
Printing Related Support	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	5

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Printing Related Support	Pumps	Motors: Rewind 51-100 HP	1%	10	$0.00	0%	$-0.01	0.05
Printing Related Support	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	164
Printing Related Support	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	106
Printing Related Support	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	329
Printing Related Support	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	21
Printing Related Support	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	7
Printing Related Support	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	7
Transportation Equipment Mfg	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	44
Transportation Equipment Mfg	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	130
Transportation Equipment Mfg	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	298
Transportation Equipment Mfg	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	13%	$-0.01	1
Transportation Equipment Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	55
Transportation Equipment Mfg	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	7
Transportation Equipment Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Transportation Equipment Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Transportation Equipment Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	13
Transportation Equipment Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	12
Transportation Equipment Mfg	Lighting	Efficient Lighting 1 Shift	70%	10	$0.00	1%	$-0.01	60
Transportation Equipment Mfg	Lighting	HighBay Lighting 1 Shift	51%	10	$0.00	2%	$-0.01	65
Transportation Equipment Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	283
Transportation Equipment Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	9
Transportation Equipment Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	8
Transportation Equipment Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	13%	$-0.01	5
Transportation Equipment Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	13%	$-0.01	5
Transportation Equipment Mfg	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	13%	$-0.01	5
Transportation Equipment Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	142
Transportation Equipment Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	138
Transportation Equipment Mfg	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	133
Transportation Equipment Mfg	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	18
Transportation Equipment Mfg	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	18
Transportation Equipment Mfg	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	18
Transportation Equipment Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	6

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Transportation Equipment Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	6
Transportation Equipment Mfg	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	6
Transportation Equipment Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	6
Transportation Equipment Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	6
Transportation Equipment Mfg	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	6
Transportation Equipment Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Transportation Equipment Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Transportation Equipment Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	186
Transportation Equipment Mfg	Process Aircomp	Air Compressor Equipment2	35%	10	$0.00	17%	$0.01	228
Transportation Equipment Mfg	Process Aircomp	Air Compressor Optimization	50%	10	$0.00	36%	$-0.04	834
Transportation Equipment Mfg	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	13%	$-0.01	4
Transportation Equipment Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	110
Transportation Equipment Mfg	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	16
Transportation Equipment Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	5
Transportation Equipment Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	5
Transportation Equipment Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	9
Transportation Equipment Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	8
Transportation Equipment Mfg	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	13%	$-0.01	1
Transportation Equipment Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	37
Transportation Equipment Mfg	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	4
Transportation Equipment Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Transportation Equipment Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Wastewater	Lighting	Efficient Lighting 1 Shift	70%	10	$0.00	1%	$-0.01	9
Wastewater	Lighting	HighBay Lighting 1 Shift	51%	10	$0.00	2%	$-0.01	13
Wastewater	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	56
Wastewater	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	1
Wastewater	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Wastewater	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	14
Wastewater	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	13
Wastewater	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	1,661
Wastewater	Process Aircomp	Air Compressor Equipment2	35%	10	$0.00	17%	$0.01	1,817
Wastewater	Process Aircomp	Air Compressor Optimization	50%	10	$0.00	36%	$-0.04	6,988
Wastewater	Process Aircomp	Energy Project Management	29%	11	$0.00	27%	$0.01	2,162
Wastewater	Process Aircomp	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	4,854
Wastewater	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	31

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Wastewater	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	924
Wastewater	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	135
Wastewater	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	48
Wastewater	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	45
Wastewater	Pumps	Energy Project Management	29%	11	$0.00	27%	$0.01	724
Wastewater	Pumps	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	1,190
Wastewater	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	9
Wastewater	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	309
Wastewater	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	184
Wastewater	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	572
Wastewater	Pumps	Pump System Optimization	50%	12	$0.00	15%	$-0.07	905
Wastewater	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	40
Wastewater	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	14
Wastewater	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	13
Water	Fans	Energy Project Management	29%	11	$0.00	27%	$0.01	2,221
Water	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	653
Water	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	2,123
Water	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	5,135
Water	Fans	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	4,288
Water	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	29
Water	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	950
Water	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	124
Water	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	44
Water	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	41
Water	Lighting	Efficient Lighting 1 Shift	70%	10	$0.00	1%	$-0.01	55
Water	Lighting	HighBay Lighting 1 Shift	51%	10	$0.00	2%	$-0.01	79
Water	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	335
Water	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	11
Water	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	10
Water	Motors Other	Energy Project Management -- Other_Motors	29%	11	$0.00	27%	$0.01	2,607
Water	Motors Other	Integrated Plant Energy Management -- Other_Motors	50%	11	$0.00	22%	$-0.04	4,288
Water	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	11%	$-0.01	34
Water	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	1,115
Water	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	145
Water	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	52
Water	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	48
Water	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	84
Water	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	77
Water	Pumps	Energy Project Management	29%	11	$0.00	27%	$0.01	15,555
Water	Pumps	Integrated Plant Energy Management	50%	11	$0.00	22%	$-0.04	25,583
Water	Pumps	Motors: Rewind 20-50 HP	1%	10	$0.00	11%	$-0.01	204
Water	Pumps	Plant Energy Management	12%	10	$0.00	27%	$0.01	6,652
Water	Pumps	Pump Energy Management	8%	10	$0.00	31%	$0.02	3,972
Water	Pumps	Pump Equipment Upgrade	20%	10	$0.00	34%	$0.02	12,290
Water	Pumps	Pump System Optimization	50%	12	$0.00	15%	$-0.07	19,447
Water	Pumps	Synchronous Belts	2%	10	$0.00	21%	$-0.01	868
Water	Pumps	Transformers-New	0%	32	$0.00	37%	$-0.01	313
Water	Pumps	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	289

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Wood Product Mfg	Fans	Fan Energy Mangement	10%	10	$0.00	27%	$0.02	72
Wood Product Mfg	Fans	Fan Equipment Upgrade	35%	10	$0.00	23%	$0.02	237
Wood Product Mfg	Fans	Fan System Optimization	50%	10	$0.00	30%	$-0.02	529
Wood Product Mfg	Fans	Motors: Rewind 101-200 HP	1%	10	$0.00	29%	$-0.01	4
Wood Product Mfg	Fans	Motors: Rewind 20-50 HP	1%	10	$0.00	9%	$-0.01	2
Wood Product Mfg	Fans	Motors: Rewind 201-500 HP	1%	10	$0.00	8%	$-0.01	1
Wood Product Mfg	Fans	Motors: Rewind 51-100 HP	1%	10	$0.00	12%	$-0.01	1
Wood Product Mfg	Fans	Plant Energy Management	12%	10	$0.00	27%	$0.01	97
Wood Product Mfg	Fans	Synchronous Belts	2%	10	$0.00	21%	$-0.01	12
Wood Product Mfg	Fans	Transformers-New	0%	32	$0.00	37%	$-0.01	4
Wood Product Mfg	Fans	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Wood Product Mfg	Hvac	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Wood Product Mfg	Hvac	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Wood Product Mfg	Lighting	Efficient Lighting 1 Shift	70%	10	$0.00	4%	$-0.01	74
Wood Product Mfg	Lighting	Efficient Lighting 2 Shift	70%	10	$0.00	5%	$-0.01	79
Wood Product Mfg	Lighting	Efficient Lighting 3 Shift	70%	10	$0.00	10%	$-0.01	159
Wood Product Mfg	Lighting	HighBay Lighting 1 Shift	51%	10	$0.00	7%	$-0.01	70
Wood Product Mfg	Lighting	HighBay Lighting 2 Shift	51%	10	$0.00	7%	$-0.01	75
Wood Product Mfg	Lighting	HighBay Lighting 3 Shift	51%	10	$0.00	15%	$-0.01	150
Wood Product Mfg	Lighting	Lighting Controls	28%	10	$0.00	15%	$-0.01	76
Wood Product Mfg	Lighting	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Wood Product Mfg	Lighting	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	2
Wood Product Mfg	Motors Other	Efficient Centrifugal Fan -- Material_Handling	20%	10	$0.00	11%	$-0.01	182
Wood Product Mfg	Motors Other	Material Handling VFD2 -- Material_Handling	19%	10	$0.00	53%	$-0.01	854
Wood Product Mfg	Motors Other	Material Handling2 -- Material_Handling	5%	10	$0.00	53%	$-0.01	205
Wood Product Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Handling	1%	10	$0.00	29%	$-0.01	10
Wood Product Mfg	Motors Other	Motors: Rewind 101-200 HP -- Material_Processing	1%	10	$0.00	29%	$-0.01	10
Wood Product Mfg	Motors Other	Motors: Rewind 101-200 HP -- Other_Motors	1%	10	$0.00	29%	$-0.01	10
Wood Product Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Handling	1%	10	$0.00	9%	$-0.01	6
Wood Product Mfg	Motors Other	Motors: Rewind 20-50 HP -- Material_Processing	1%	10	$0.00	9%	$-0.01	6
Wood Product Mfg	Motors Other	Motors: Rewind 20-50 HP -- Other_Motors	1%	10	$0.00	9%	$-0.01	6
Wood Product Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Handling	1%	10	$0.00	8%	$-0.01	3
Wood Product Mfg	Motors Other	Motors: Rewind 201-500 HP -- Material_Processing	1%	10	$0.00	8%	$-0.01	3
Wood Product Mfg	Motors Other	Motors: Rewind 201-500 HP -- Other_Motors	1%	10	$0.00	8%	$-0.01	3
Wood Product Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Handling	1%	10	$0.00	12%	$-0.01	4
Wood Product Mfg	Motors Other	Motors: Rewind 51-100 HP -- Material_Processing	1%	10	$0.00	12%	$-0.01	4
Wood Product Mfg	Motors Other	Motors: Rewind 51-100 HP -- Other_Motors	1%	10	$0.00	12%	$-0.01	4
Wood Product Mfg	Motors Other	Plant Energy Management -- Material_Handling	12%	10	$0.00	27%	$0.01	234
Wood Product Mfg	Motors Other	Plant Energy Management -- Material_Processing	12%	10	$0.00	27%	$0.01	226

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per kWh	Measure Applicability	Levelized Cost ($ per kWh)	2031 Achievable Technical Potential (MWh)
Wood Product Mfg	Motors Other	Plant Energy Management -- Other_Motors	12%	10	$0.00	27%	$0.01	219
Wood Product Mfg	Motors Other	Synchronous Belts -- Material_Handling	2%	10	$0.00	21%	$-0.01	31
Wood Product Mfg	Motors Other	Synchronous Belts -- Material_Processing	2%	10	$0.00	21%	$-0.01	30
Wood Product Mfg	Motors Other	Synchronous Belts -- Other_Motors	2%	10	$0.00	21%	$-0.01	30
Wood Product Mfg	Motors Other	Transformers-New -- Material_Handling	0%	32	$0.00	37%	$-0.01	11
Wood Product Mfg	Motors Other	Transformers-New -- Material_Processing	0%	32	$0.00	37%	$-0.01	11
Wood Product Mfg	Motors Other	Transformers-New -- Other_Motors	0%	32	$0.00	37%	$-0.01	11
Wood Product Mfg	Motors Other	Transformers-Retrofit -- Material_Handling	2%	10	$0.00	9%	$-0.01	10
Wood Product Mfg	Motors Other	Transformers-Retrofit -- Material_Processing	2%	10	$0.00	9%	$-0.01	10
Wood Product Mfg	Motors Other	Transformers-Retrofit -- Other_Motors	2%	10	$0.00	9%	$-0.01	10
Wood Product Mfg	Motors Other	Wood: Replace Pneumatic Conveyor -- Material_Handling	29%	10	$0.00	50%	$-0.07	1,477
Wood Product Mfg	Other	Transformers-New	0%	32	$0.00	37%	$-0.01	2
Wood Product Mfg	Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	1
Wood Product Mfg	Process Aircomp	Air Compressor Demand Reduction	20%	10	$0.00	26%	$0.01	174
Wood Product Mfg	Process Aircomp	Air Compressor Equipment2	35%	10	$0.00	17%	$0.01	190
Wood Product Mfg	Process Aircomp	Air Compressor Optimization	50%	10	$0.00	36%	$-0.04	734
Wood Product Mfg	Process Aircomp	Motors: Rewind 101-200 HP	1%	10	$0.00	29%	$-0.01	4
Wood Product Mfg	Process Aircomp	Motors: Rewind 20-50 HP	1%	10	$0.00	9%	$-0.01	2
Wood Product Mfg	Process Aircomp	Motors: Rewind 201-500 HP	1%	10	$0.00	8%	$-0.01	1
ood Product Mfg	Process Aircomp	Motors: Rewind 51-100 HP	1%	10	$0.00	12%	$-0.01	2
Wood Product Mfg	Process Aircomp	Plant Energy Management	12%	10	$0.00	27%	$0.01	97
Wood Product Mfg	Process Aircomp	Synchronous Belts	2%	10	$0.00	21%	$-0.01	14
Wood Product Mfg	Process Aircomp	Transformers-New	0%	32	$0.00	37%	$-0.01	5
Wood Product Mfg	Process Aircomp	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	4
Wood Product Mfg	Process Heat	Transformers-New	0%	32	$0.00	37%	$-0.01	3
Wood Product Mfg	Process Heat	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	3
Wood Product Mfg	Process Other	Motors: Rewind 101-200 HP	1%	10	$0.00	29%	$-0.01	0.20
Wood Product Mfg	Process Other	Motors: Rewind 20-50 HP	1%	10	$0.00	9%	$-0.01	0.12
Wood Product Mfg	Process Other	Motors: Rewind 201-500 HP	1%	10	$0.00	8%	$-0.01	0.06
Wood Product Mfg	Process Other	Motors: Rewind 51-100 HP	1%	10	$0.00	12%	$-0.01	0.08
Wood Product Mfg	Process Other	Plant Energy Management	12%	10	$0.00	27%	$0.01	4
Wood Product Mfg	Process Other	Synchronous Belts	2%	10	$0.00	21%	$-0.01	0.60
Wood Product Mfg	Process Other	Transformers-New	0%	32	$0.00	37%	$-0.01	0.21
Wood Product Mfg	Process Other	Transformers-Retrofit	2%	10	$0.00	9%	$-0.01	0.20

Table B.3.4. Residential Gas Measure Details

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Manufactured	Dryer	Dryer, Advanced Efficiency EF = 2.93	Advanced Efficiency Dryer EF = 2.93	Standard Dryer EF = 2.67	Per installation	Existing	3	14	$224	100%	N/A	$9.96	1,926
Manufactured	Dryer	Dryer, Advanced Efficiency EF = 2.93	Advanced Efficiency Dryer EF = 2.93	Standard Dryer EF = 2.67	Per installation	New	3	14	$224	100%	N/A	$9.96	933
Manufactured	Heat Central Boiler	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	61	5	$576	25%	95%	$2.81	1,245
Manufactured	Heat Central Boiler	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	3	30	$25	95%	50%	$0.81	640
Manufactured	Heat Central Boiler	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	11	25	$338	40%	95%	$3.31	286
Manufactured	Heat Central Boiler	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	173	25	$1,559	75%	35%	$1.01	3,421
Manufactured	Heat Central Boiler	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	348	25	$1,559	75%	1%	$0.50	215
Manufactured	Heat Central Boiler	Central Heat Boiler, AFUE = 94%	AFUE = 94%	AFUE = 82%	Per installation	Existing	81	20	$1,053	100%	N/A	$1.59	1,823
Manufactured	Heat Central Boiler	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	9	20	$25	95%	80%	$0.33	583
Manufactured	Heat Central Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	6	20	$54	95%	60%	$1.08	242
Manufactured	Heat Central Boiler	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	3	6	$46	95%	50%	$3.01	249
Manufactured	Heat Central Boiler	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	16	25	$445	25%	85%	$2.97	238
Manufactured	Heat Central Boiler	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	331	25	$1,680	25%	20%	$0.57	1,365
Manufactured	Heat Central Boiler	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	61	11	$449	75%	50%	$1.23	1,583
Manufactured	Heat Central Boiler	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	12	15	$5	95%	65%	$0.06	467
Manufactured	Heat Central Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	12	25	$672	25%	90%	$6.17	173
Manufactured	Heat Central Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	41	11	$1,083	50%	95%	$4.36	1,287
Manufactured	Heat Central Boiler	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	197	25	$1,647	85%	25%	$0.94	2,493
Manufactured	Heat Central Boiler	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	25	$341	65%	85%	$26.89	48
Manufactured	Heat Central Boiler	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	15	25	$3,514	65%	50%	$25.92	309
Manufactured	Heat Central Boiler	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	23	25	$3,514	65%	20%	$16.54	194
Manufactured	Heat Central Boiler	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	56	5	$576	25%	95%	$3.04	705
Manufactured	Heat Central Boiler	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	14	25	$454	60%	95%	$3.46	408
Manufactured	Heat Central Boiler	Central Heat Boiler, AFUE = 94%	AFUE = 94%	AFUE = 82%	Per installation	New	76	20	$1,053	100%	N/A	$1.69	1,931
Manufactured	Heat Central Boiler	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	8	20	$25	95%	80%	$0.36	330
Manufactured	Heat Central Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	5	20	$54	95%	60%	$1.16	163
Manufactured	Heat Central Boiler	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	15	25	$599	75%	85%	$4.31	476

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Manufactured	Heat Central Boiler	Green Roof	ecoroof	Standard Roof	Per installation	New	39	40	$19,076	20%	95%	$48.47	67
Manufactured	Heat Central Boiler	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	11	15	$5	95%	65%	$0.07	312
Manufactured	Heat Central Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	11	25	$893	50%	90%	$8.86	232
Manufactured	Heat Central Boiler	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	1	25	$795	75%	75%	$50.76	44
Manufactured	Heat Central Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	38	11	$1,083	50%	95%	$4.71	860
Manufactured	Heat Central Boiler	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	40	25	$973	50%	95%	$2.70	966
Manufactured	Heat Central Boiler	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	2	25	$458	95%	75%	$18.97	87
Manufactured	Heat Central Boiler	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	25	$395	95%	75%	$24.24	58
Manufactured	Heat Central Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	46	5	$576	25%	95%	$3.69	34,799
Manufactured	Heat Central Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	2	30	$25	95%	50%	$1.06	17,089
Manufactured	Heat Central Furnace	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	8	25	$338	40%	95%	$4.34	7,641
Manufactured	Heat Central Furnace	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	132	25	$1,559	75%	35%	$1.32	91,305
Manufactured	Heat Central Furnace	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	265	25	$1,559	75%	1%	$0.66	6,033
Manufactured	Heat Central Furnace	Central Heat Furnace, AFUE = 95%	AFUE = 95%	AFUE = 80%	Per installation	Existing	78	20	$596	100%	N/A	$0.93	60,995
Manufactured	Heat Central Furnace	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	7	20	$25	95%	80%	$0.44	16,307
Manufactured	Heat Central Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	4	20	$54	95%	60%	$1.41	6,460
Manufactured	Heat Central Furnace	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	3	6	$46	95%	50%	$3.95	6,658
Manufactured	Heat Central Furnace	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	18	20	$672	75%	75%	$4.40	23,939
Manufactured	Heat Central Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	46	18	$383	75%	60%	$1.05	61,647
Manufactured	Heat Central Furnace	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	12	25	$445	25%	85%	$3.89	6,356
Manufactured	Heat Central Furnace	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	253	25	$1,680	25%	20%	$0.75	38,158
Manufactured	Heat Central Furnace	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	46	11	$449	75%	50%	$1.61	42,258
Manufactured	Heat Central Furnace	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	9	15	$5	95%	65%	$0.08	12,195
Manufactured	Heat Central Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	9	25	$672	25%	90%	$8.10	4,529
Manufactured	Heat Central Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	31	11	$1,083	50%	95%	$5.72	33,593
Manufactured	Heat Central Furnace	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	150	25	$1,647	85%	25%	$1.23	66,540
Manufactured	Heat Central Furnace	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	25	$341	65%	85%	$35.26	1,273
Manufactured	Heat Central Furnace	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	11	25	$3,514	65%	50%	$33.99	8,071

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Manufactured	Heat Central Furnace	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	18	25	$3,514	65%	20%	$21.69	5,085
Manufactured	Heat Central Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	42	5	$576	25%	95%	$4.08	19,345
Manufactured	Heat Central Furnace	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	11	25	$454	60%	95%	$4.65	11,209
Manufactured	Heat Central Furnace	Central Heat Furnace, AFUE = 95%	AFUE = 95%	AFUE = 80%	Per installation	New	70	20	$596	100%	N/A	$1.04	65,467
Manufactured	Heat Central Furnace	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	6	20	$25	95%	80%	$0.48	9,065
Manufactured	Heat Central Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	4	20	$54	95%	60%	$1.56	4,480
Manufactured	Heat Central Furnace	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	11	25	$599	75%	85%	$5.78	13,078
Manufactured	Heat Central Furnace	Green Roof	ecoroof	Standard Roof	Per installation	New	29	40	$19,076	20%	95%	$65.08	1,853
Manufactured	Heat Central Furnace	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	8	15	$5	95%	65%	$0.09	8,568
Manufactured	Heat Central Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	8	25	$893	50%	90%	$11.90	6,365
Manufactured	Heat Central Furnace	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	1	25	$795	75%	75%	$68.17	1,214
Manufactured	Heat Central Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	28	11	$1,083	50%	95%	$6.32	23,606
Manufactured	Heat Central Furnace	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	30	25	$973	50%	95%	$3.63	26,494
Manufactured	Heat Central Furnace	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	2	25	$458	95%	75%	$25.48	2,393
Manufactured	Heat Central Furnace	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	25	$395	95%	75%	$32.55	1,609
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	4	14	$227	100%	83%	$-6.85	3,136
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	5	14	$296	100%	90%	$-6.31	4,510
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	5	14	$317	100%	95%	$-5.95	5,313
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	1	12	$42	71%	50%	$3.50	1,755
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	1	12	$42	71%	50%	$0.16	0.08
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	19	40	$540	29%	90%	$0.13	0.67
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	19	40	$540	29%	90%	$2.77	13,566
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	2	5	$23	95%	75%	$0.15	0.18
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	2	5	$23	95%	75%	$3.33	3,781
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	4	10	$16	95%	65%	$-1.21	8,711
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	4	10	$16	95%	65%	$-0.06	0.51
Manufactured	Water Heat	Water Heater, EF = 0.80	EF = 0.80	EF = 0.62	Per installation	Existing	34	11	$208	100%	N/A	$1.02	25,160
Manufactured	Water Heat	Water Heater, Tankless EF = 0.82 2.5 GPM	EF = 0.82	EF = 0.62	Per installation	Existing	44	11	$594	75%	N/A	$2.22	4,764

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	9	5	$8	95%	45%	$-0.00	0.59
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	9	5	$8	95%	45%	$0.27	10,587
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	4	14	$227	100%	83%	$-6.76	1,915
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	5	14	$296	100%	90%	$-6.23	2,754
Manufactured	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	6	14	$317	100%	95%	$-5.87	3,244
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	1	12	$42	71%	50%	$3.45	1,071
Manufactured	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	1	12	$42	71%	50%	$0.16	0.04
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	19	40	$459	59%	90%	$0.10	0.60
Manufactured	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	19	40	$459	59%	90%	$2.33	16,734
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	2	5	$23	95%	75%	$0.15	0.08
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	2	5	$23	95%	75%	$3.28	2,279
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	5	10	$9	95%	65%	$-1.48	5,319
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	5	10	$9	95%	65%	$-0.08	0.23
Manufactured	Water Heat	Water Heater, EF = 0.80	EF = 0.80	EF = 0.62	Per installation	New	41	11	$208	100%	N/A	$0.83	9,849
Manufactured	Water Heat	Water Heater, Tankless EF = 0.82 2.5 GPM	EF = 0.82	EF = 0.62	Per installation	New	55	11	$390	75%	N/A	$1.18	41,012
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	11	5	$8	95%	45%	$0.00	0.22
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	11	5	$8	95%	45%	$0.22	7,936
Multi Family	Dryer	Dryer, Advanced Efficiency EF = 2.93	Advanced Efficiency Dryer EF = 2.93	Standard Dryer EF = 2.67	Per installation	Existing	3	14	$224	100%	N/A	$9.96	4,130
Multi Family	Dryer	Dryer, Advanced Efficiency EF = 2.93	Advanced Efficiency Dryer EF = 2.93	Standard Dryer EF = 2.67	Per installation	New	3	14	$224	100%	N/A	$9.96	2,001
Multi Family	Heat Central Boiler	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	44	5	$576	25%	95%	$3.89	15,537
Multi Family	Heat Central Boiler	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	6	30	$25	95%	50%	$0.45	7,980
Multi Family	Heat Central Boiler	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	8	30	$119	75%	95%	$1.53	6,732
Multi Family	Heat Central Boiler	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	125	30	$549	75%	35%	$0.47	44,956
Multi Family	Heat Central Boiler	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	251	30	$549	95%	1%	$0.23	3,412
Multi Family	Heat Central Boiler	Central Heat Boiler, AFUE = 94%	AFUE = 94%	AFUE = 82%	Per installation	Existing	59	20	$1,053	100%	N/A	$2.18	22,409
Multi Family	Heat Central Boiler	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	13	20	$25	95%	80%	$0.23	7,281
Multi Family	Heat Central Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	8	20	$54	95%	60%	$0.75	3,016
Multi Family	Heat Central Boiler	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	5	6	$46	95%	50%	$2.08	3,067
Multi Family	Heat Central Boiler	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	12	30	$157	25%	85%	$1.37	2,968

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Multi Family	Heat Central Boiler	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	239	30	$592	25%	20%	$0.26	17,018
Multi Family	Heat Central Boiler	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	44	11	$358	75%	50%	$1.36	19,735
Multi Family	Heat Central Boiler	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	8	15	$5	95%	65%	$0.08	5,782
Multi Family	Heat Central Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	8	30	$249	50%	90%	$3.01	4,443
Multi Family	Heat Central Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	30	11	$1,083	50%	95%	$6.04	15,805
Multi Family	Heat Central Boiler	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	143	30	$978	85%	25%	$0.73	28,757
Multi Family	Heat Central Boiler	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	30	$202	51%	85%	$20.96	469
Multi Family	Heat Central Boiler	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	11	30	$2,086	51%	50%	$20.20	2,972
Multi Family	Heat Central Boiler	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	17	30	$2,086	51%	20%	$12.89	1,870
Multi Family	Heat Central Boiler	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	37	5	$576	25%	95%	$4.55	8,129
Multi Family	Heat Central Boiler	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	9	30	$166	90%	95%	$1.80	7,313
Multi Family	Heat Central Boiler	Central Heat Boiler, AFUE = 94%	AFUE = 94%	AFUE = 82%	Per installation	New	51	20	$1,053	100%	N/A	$2.52	21,927
Multi Family	Heat Central Boiler	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	166	45	$3,569	50%	95%	$2.13	3,355
Multi Family	Heat Central Boiler	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	45	45	$1,387	50%	95%	$3.04	862
Multi Family	Heat Central Boiler	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	11	20	$25	95%	80%	$0.27	3,809
Multi Family	Heat Central Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	7	20	$54	95%	60%	$0.87	1,882
Multi Family	Heat Central Boiler	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	10	30	$219	75%	85%	$2.24	5,586
Multi Family	Heat Central Boiler	Green Roof	ecoroof	Standard Roof	Per installation	New	26	40	$7,290	50%	95%	$27.76	1,905
Multi Family	Heat Central Boiler	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	7	15	$5	95%	65%	$0.10	3,511
Multi Family	Heat Central Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	7	30	$341	75%	90%	$4.81	4,074
Multi Family	Heat Central Boiler	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	1	45	$795	40%	75%	$67.24	265
Multi Family	Heat Central Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	25	11	$1,083	50%	95%	$7.05	9,616
Multi Family	Heat Central Boiler	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	27	30	$588	50%	95%	$2.33	9,524
Multi Family	Heat Central Boiler	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	1	30	$277	95%	75%	$16.32	983
Multi Family	Heat Central Boiler	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	30	$239	95%	75%	$20.85	661
Multi Family	Heat Central Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	35	5	$576	25%	95%	$4.88	36,736
Multi Family	Heat Central Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	4	30	$25	95%	50%	$0.56	70,233
Multi Family	Heat Central Furnace	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	6	30	$119	75%	95%	$1.92	56,581

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Multi Family	Heat Central Furnace	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	100	30	$549	75%	35%	$0.59	95,628
Multi Family	Heat Central Furnace	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	200	30	$549	95%	1%	$0.29	30,029
Multi Family	Heat Central Furnace	Central Heat Furnace, AFUE = 95%	AFUE = 95%	AFUE = 80%	Per installation	Existing	59	20	$596	100%	N/A	$1.23	36,957
Multi Family	Heat Central Furnace	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	10	20	$25	95%	80%	$0.29	64,074
Multi Family	Heat Central Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	7	20	$54	95%	60%	$0.93	26,549
Multi Family	Heat Central Furnace	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	4	6	$46	95%	50%	$2.61	25,783
Multi Family	Heat Central Furnace	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	14	20	$672	75%	75%	$5.82	92,527
Multi Family	Heat Central Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	35	18	$383	75%	60%	$1.39	8,405
Multi Family	Heat Central Furnace	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	9	30	$157	25%	85%	$1.72	24,946
Multi Family	Heat Central Furnace	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	191	30	$592	25%	20%	$0.33	49,763
Multi Family	Heat Central Furnace	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	35	11	$358	75%	50%	$1.70	65,856
Multi Family	Heat Central Furnace	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	7	15	$5	95%	65%	$0.11	47,501
Multi Family	Heat Central Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	7	30	$249	50%	90%	$3.77	37,347
Multi Family	Heat Central Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	24	11	$1,083	50%	95%	$7.57	29,839
Multi Family	Heat Central Furnace	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	114	30	$978	85%	25%	$0.91	53,073
Multi Family	Heat Central Furnace	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	0.82	30	$202	51%	85%	$26.27	3,858
Multi Family	Heat Central Furnace	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	8	30	$2,086	51%	50%	$25.32	24,416
Multi Family	Heat Central Furnace	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	13	30	$2,086	51%	20%	$16.16	15,367
Multi Family	Heat Central Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	31	5	$576	25%	95%	$5.44	75,329
Multi Family	Heat Central Furnace	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	8	30	$166	90%	95%	$2.15	67,771
Multi Family	Heat Central Furnace	Central Heat Furnace, AFUE = 95%	AFUE = 95%	AFUE = 80%	Per installation	New	53	20	$596	100%	N/A	$1.37	51,289
Multi Family	Heat Central Furnace	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	139	45	$3,569	50%	95%	$2.55	31,098
Multi Family	Heat Central Furnace	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	38	45	$1,387	50%	95%	$3.63	7,993
Multi Family	Heat Central Furnace	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	9	20	$25	95%	80%	$0.32	35,299
Multi Family	Heat Central Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	6	20	$54	95%	60%	$1.04	17,448
Multi Family	Heat Central Furnace	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	8	30	$219	75%	85%	$2.68	51,771
Multi Family	Heat Central Furnace	Green Roof	ecoroof	Standard Roof	Per installation	New	22	40	$7,290	50%	95%	$33.18	17,653
Multi Family	Heat Central Furnace	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	6	15	$5	95%	65%	$0.12	32,536

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Multi Family	Heat Central Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	6	30	$341	75%	90%	$5.76	37,756
Multi Family	Heat Central Furnace	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	0.98	45	$795	40%	75%	$80.38	2,457
Multi Family	Heat Central Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	21	11	$1,083	50%	95%	$8.43	89,117
Multi Family	Heat Central Furnace	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	22	30	$588	50%	95%	$2.78	88,256
Multi Family	Heat Central Furnace	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	1	30	$277	95%	75%	$19.51	9,117
Multi Family	Heat Central Furnace	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	30	$239	95%	75%	$24.92	6,132
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	4	14	$227	79%	87%	$-6.86	24,728
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	5	14	$296	79%	95%	$-6.32	35,747
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	5	14	$317	79%	99%	$-5.95	41,568
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	1	12	$42	58%	50%	$0.16	0.17
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	1	12	$42	58%	50%	$3.50	13,528
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	19	40	$540	29%	90%	$0.13	1
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	19	40	$540	29%	90%	$2.77	28,983
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	2	5	$23	95%	75%	$0.15	0.44
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	2	5	$23	95%	75%	$3.33	35,790
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	4	10	$16	95%	65%	$-0.06	1
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	4	10	$16	95%	65%	$-1.21	82,847
Multi Family	Water Heat	Water Heater, EF = 0.80	EF = 0.80	EF = 0.62	Per installation	Existing	30	11	$208	100%	N/A	$1.15	11,440
Multi Family	Water Heat	Water Heater, Tankless EF = 0.82 2.5 GPM	EF = 0.82	EF = 0.62	Per installation	Existing	39	11	$594	75%	N/A	$2.51	80,402
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	8	5	$8	95%	45%	$0.01	0.85
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	8	5	$8	95%	45%	$0.31	89,310
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	4	14	$227	79%	87%	$-6.76	15,101
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	5	14	$296	79%	95%	$-6.23	21,830
Multi Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	6	14	$317	79%	99%	$-5.87	25,385
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	1	12	$42	58%	50%	$0.16	0.08
Multi Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	1	12	$42	58%	50%	$3.45	8,261

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	19	40	$459	59%	90%	$0.10	1
Multi Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	19	40	$459	59%	90%	$2.33	59,137
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	2	5	$23	95%	75%	$0.15	0.18
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	2	5	$23	95%	75%	$3.28	21,517
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	5	10	$9	95%	65%	$-0.08	0.58
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	5	10	$9	95%	65%	$-1.48	50,594
Multi Family	Water Heat	Water Heater, EF = 0.80	EF = 0.80	EF = 0.62	Per installation	New	37	11	$208	100%	N/A	$0.94	82,659
Multi Family	Water Heat	Water Heater, Tankless EF = 0.82 2.5 GPM	EF = 0.82	EF = 0.62	Per installation	New	49	11	$390	75%	N/A	$1.33	44,181
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	10	5	$8	95%	45%	$0.01	0.32
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	10	5	$8	95%	45%	$0.25	67,025
Single Family	Dryer	Dryer, Advanced Efficiency EF = 2.93	Advanced Efficiency Dryer EF = 2.93	Standard Dryer EF = 2.67	Per installation	Existing	3	14	$224	100%	N/A	$9.96	62,352
Single Family	Dryer	Dryer, Advanced Efficiency EF = 2.93	Advanced Efficiency Dryer EF = 2.93	Standard Dryer EF = 2.67	Per installation	New	3	14	$224	100%	N/A	$9.96	75,534
Single Family	Heat Central Boiler	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	75	5	$576	50%	95%	$2.28	85,915
Single Family	Heat Central Boiler	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	2	30	$25	95%	50%	$1.05	38,454
Single Family	Heat Central Boiler	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	14	30	$564	75%	95%	$4.25	17,121
Single Family	Heat Central Boiler	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	214	30	$2,602	75%	35%	$1.29	50,674
Single Family	Heat Central Boiler	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	429	30	$2,602	95%	1%	$0.65	62,773
Single Family	Heat Central Boiler	Central Heat Boiler, AFUE = 94%	AFUE = 94%	AFUE = 82%	Per installation	Existing	101	20	$1,053	100%	N/A	$1.27	2,633
Single Family	Heat Central Boiler	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	11	20	$25	95%	80%	$0.27	33,940
Single Family	Heat Central Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	7	20	$54	95%	60%	$0.87	64,064
Single Family	Heat Central Boiler	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	4	6	$46	95%	50%	$2.44	57,538
Single Family	Heat Central Boiler	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	20	30	$743	25%	85%	$3.81	54,267
Single Family	Heat Central Boiler	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	409	30	$2,802	25%	20%	$0.73	13,060
Single Family	Heat Central Boiler	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	75	11	$575	75%	50%	$1.28	92,285
Single Family	Heat Central Boiler	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	15	15	$5	95%	65%	$0.05	4,565
Single Family	Heat Central Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	15	30	$1,101	50%	90%	$7.78	77,787
Single Family	Heat Central Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	51	11	$1,271	75%	95%	$4.15	46,039
Single Family	Heat Central Boiler	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	244	30	$2,128	85%	25%	$0.93	75,902
Single Family	Heat Central Boiler	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	30	$440	65%	75%	$26.71	9,631
Single Family	Heat Central Boiler	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	18	30	$4,539	65%	25%	$25.74	34,456

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Single Family	Heat Central Boiler	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	29	30	$4,539	65%	25%	$16.43	54,346
Single Family	Heat Central Boiler	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	60	5	$576	50%	95%	$2.86	85,236
Single Family	Heat Central Boiler	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	15	30	$659	90%	95%	$4.50	935
Single Family	Heat Central Boiler	Central Heat Boiler, AFUE = 94%	AFUE = 94%	AFUE = 82%	Per installation	New	80	20	$1,053	100%	N/A	$1.61	3,487
Single Family	Heat Central Boiler	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	264	45	$7,109	50%	95%	$2.67	49,519
Single Family	Heat Central Boiler	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	72	45	$2,763	50%	95%	$3.81	12,956
Single Family	Heat Central Boiler	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	9	20	$25	95%	80%	$0.34	65,205
Single Family	Heat Central Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	6	20	$54	95%	60%	$1.10	32,230
Single Family	Heat Central Boiler	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	16	30	$869	75%	85%	$5.60	74,145
Single Family	Heat Central Boiler	Green Roof	ecoroof	Standard Roof	Per installation	New	42	40	$27,367	50%	95%	$65.57	26,978
Single Family	Heat Central Boiler	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	12	15	$5	95%	65%	$0.06	49,769
Single Family	Heat Central Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	12	30	$1,282	75%	90%	$11.38	55,934
Single Family	Heat Central Boiler	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	1	45	$795	75%	75%	$42.32	7,102
Single Family	Heat Central Boiler	Thermal Shell - Infiltration @0.2 ACH w/HRV	0.2 ACH w/HRV	Standard New Construction Home 0.35 ACH	Per installation	New	117	30	$1,209	85%	95%	$1.10	83,647
Single Family	Heat Central Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	40	11	$1,271	75%	95%	$5.21	14,740
Single Family	Heat Central Boiler	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	42	30	$1,172	50%	95%	$2.92	43,048
Single Family	Heat Central Boiler	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	2	30	$552	95%	75%	$20.46	13,957
Single Family	Heat Central Boiler	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	30	$476	95%	75%	$26.13	9,388
Single Family	Heat Central Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	Existing	61	5	$576	50%	95%	$2.80	72,121
Single Family	Heat Central Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Per installation	Existing	2	30	$25	95%	50%	$1.29	84,985
Single Family	Heat Central Furnace	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	Existing	11	30	$564	75%	95%	$5.22	29,749
Single Family	Heat Central Furnace	Ceiling Insulation (WA) ave to code	R-49	R-10	Per installation	Existing	174	30	$2,602	75%	35%	$1.59	21,449
Single Family	Heat Central Furnace	Ceiling Insulation (WA) zero to code	R-49	R-0	Per installation	Existing	349	30	$2,602	95%	1%	$0.79	96,912
Single Family	Heat Central Furnace	Central Heat Furnace, AFUE = 95%	AFUE = 95%	AFUE = 80%	Per installation	Existing	102	20	$596	100%	N/A	$0.71	23,426
Single Family	Heat Central Furnace	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	9	20	$25	95%	80%	$0.33	34,106
Single Family	Heat Central Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	Existing	6	20	$54	95%	60%	$1.07	33,875
Single Family	Heat Central Furnace	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Per installation	Existing	3	6	$46	95%	50%	$3.00	72,952
Single Family	Heat Central Furnace	Duct Insulation Upgrade	R-8 (code)	R-4	Per installation	Existing	24	20	$672	75%	75%	$3.34	96,015

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Single Family	Heat Central Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	Per installation	Existing	61	18	$535	75%	60%	$1.11	95,443
Single Family	Heat Central Furnace	Floor Insulation (WA) above code	R-38	R-30	Per installation	Existing	16	30	$743	25%	85%	$4.68	50,162
Single Family	Heat Central Furnace	Floor Insulation (WA) zero to code	R-30	R-0	Per installation	Existing	333	30	$2,802	25%	20%	$0.90	61,522
Single Family	Heat Central Furnace	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping	Existing Infiltration Conditions	Per installation	Existing	61	11	$575	75%	50%	$1.57	24,050
Single Family	Heat Central Furnace	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	Existing	12	15	$5	95%	65%	$0.06	94,213
Single Family	Heat Central Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	Existing	12	30	$1,101	50%	90%	$9.56	78,650
Single Family	Heat Central Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	Existing	41	11	$1,271	75%	95%	$5.10	19,187
Single Family	Heat Central Furnace	Wall Insulation 2x4 (WA) zero to max feasible	R-13	R-0	Per installation	Existing	198	30	$2,128	85%	25%	$1.14	43,632
Single Family	Heat Central Furnace	Windows (Same for all Building Types)	CL25	CL30	Per installation	Existing	1	30	$440	65%	75%	$32.81	57,381
Single Family	Heat Central Furnace	Windows (Same for all Building Types)	CL30	Double Pane	Per installation	Existing	15	30	$4,539	65%	25%	$31.63	20,745
Single Family	Heat Central Furnace	Windows (Same for all Building Types)	CL30	Single Pane	Per installation	Existing	24	30	$4,539	65%	25%	$20.18	52,260
Single Family	Heat Central Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Per installation	New	45	5	$576	50%	95%	$3.74	4,291
Single Family	Heat Central Furnace	Ceiling Insulation (WA) above code	R-60	R-49	Per installation	New	11	30	$659	90%	95%	$5.88	26,271
Single Family	Heat Central Furnace	Central Heat Furnace, AFUE = 95%	AFUE = 95%	AFUE = 80%	Per installation	New	77	20	$596	100%	N/A	$0.95	73,333
Single Family	Heat Central Furnace	Construction - ICF	Concrete Framing	Standard Wood Framing	Per installation	New	202	45	$7,109	50%	95%	$3.49	37,517
Single Family	Heat Central Furnace	Construction - SIP	Specialty Framing	Standard Wood Framing	Per installation	New	55	45	$2,763	50%	95%	$4.98	49,953
Single Family	Heat Central Furnace	Doors	R-11 (Steel Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	6	20	$25	95%	80%	$0.44	61,201
Single Family	Heat Central Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2.5)	Per installation	New	4	20	$54	95%	60%	$1.43	70,561
Single Family	Heat Central Furnace	Floor Insulation (WA) above code	R-38	R-30	Per installation	New	12	30	$869	75%	85%	$7.32	2,678
Single Family	Heat Central Furnace	Green Roof	ecoroof	Standard Roof	Per installation	New	32	40	$27,367	50%	95%	$85.77	28,697
Single Family	Heat Central Furnace	Proper Sizing - HVAC Unit	Proper Sizing - HVAC Unit	Oversized HVAC Unit	Per installation	New	9	15	$5	95%	65%	$0.08	44,295
Single Family	Heat Central Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Per installation	New	9	30	$1,282	75%	90%	$14.88	10,808
Single Family	Heat Central Furnace	Smart Siting	Siting house to minimize heating/cooling costs	No smart siting	Per installation	New	1	45	$795	75%	75%	$55.35	91,839
Single Family	Heat Central Furnace	Thermal Shell - Infiltration @0.2 ACH w/HRV	0.2 ACH w/HRV	Standard New Construction Home 0.35 ACH	Per installation	New	89	30	$1,209	85%	95%	$1.44	67,467
Single Family	Heat Central Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Per installation	New	31	11	$1,271	75%	95%	$6.81	171
Single Family	Heat Central Furnace	Wall Insulation 2x6 (WA) above code	R-21+R-5 sheathing	R-21	Per installation	New	32	30	$1,172	50%	95%	$3.81	63,767
Single Family	Heat Central Furnace	Windows (Same for all Building Types)	CL22	CL30	Per installation	New	2	30	$552	95%	75%	$26.76	77,003

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Single Family	Heat Central Furnace	Windows (Same for all Building Types)	CL25	CL30	Per installation	New	1	30	$476	95%	75%	$34.18	53,585
Single Family	Pool Heat	Pool Heaters, Standard Heaters - 88% efficiency	88% efficiency	83% efficiency	Per installation	Existing	14	8	$460	100%	N/A	$6.85	31,437
Single Family	Pool Heat	Pool Heaters, Standard Heaters - 88% efficiency	88% efficiency	83% efficiency	Per installation	New	14	8	$460	100%	N/A	$6.85	52,813
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	4	14	$227	99%	88%	$-6.84	52,556
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	5	14	$296	99%	90%	$-6.30	83,089
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	Existing	5	14	$317	99%	95%	$-5.94	40,156
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	1	12	$42	71%	50%	$0.16	0.41
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	Existing	1	12	$42	71%	50%	$3.49	45,007
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	19	40	$540	29%	90%	$2.77	91,998
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	Existing	19	40	$540	29%	90%	$0.13	3
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	2	5	$23	95%	75%	$0.15	0.87
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	Existing	2	5	$23	95%	75%	$3.32	59,265
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	4	10	$16	95%	65%	$-0.06	4
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	Existing	4	10	$16	95%	65%	$-1.21	39,022
Single Family	Water Heat	Water Heater, EF = 0.80	EF = 0.80	EF = 0.62	Per installation	Existing	51	11	$208	100%	N/A	$0.67	20,518
Single Family	Water Heat	Water Heater, Tankless EF = 0.82 2.5 GPM	EF = 0.82	EF = 0.62	Per installation	Existing	68	11	$594	75%	N/A	$1.46	46,903
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	14	5	$8	95%	45%	$-0.00	2
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	Existing	14	5	$8	95%	45%	$0.18	90,836
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 1 (MEF 2.0 - 2.19) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	4	14	$227	99%	88%	$-6.77	96,850
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 2 (MEF 2.2 - 2.45) - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	5	14	$296	99%	90%	$-6.24	37,048
Single Family	Water Heat	Clothes Washer	Energy Star - Tier 3 (MEF 2.46 or higher) Top 10% of Energy Star Model - Gas DHW & Gas Dryer	MEF = 1.66 - Gas DHW & Gas Dryer	Per installation	New	6	14	$317	99%	95%	$-5.88	32,568
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	1	12	$42	71%	50%	$0.16	0.19
Single Family	Water Heat	Dishwasher	Energy Star, July 1st 2011, <= 307 kWh/year , <= 5.0 gallons/cycle	Energy Star - EF65 (6th Plan Baseline)	Per installation	New	1	12	$42	71%	50%	$3.46	9,815
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	19	40	$526	59%	90%	$0.12	2
Single Family	Water Heat	Drain Water Heat Recovery (GFX)	Gravity Film Heat Exchanger	No Heat Exchanger	Per installation	New	19	40	$526	59%	90%	$2.67	5,258
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	2	5	$23	95%	75%	$0.15	0.37
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Per installation	New	2	5	$23	95%	75%	$3.29	59,449

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	5	10	$9	95%	65%	$-0.07	2
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Per installation	New	5	10	$9	95%	65%	$-1.48	91,433
Single Family	Water Heat	Water Heater, EF = 0.80	EF = 0.80	EF = 0.62	Per installation	New	64	11	$208	100%	N/A	$0.54	53,851
Single Family	Water Heat	Water Heater, Tankless EF = 0.82 2.5 GPM	EF = 0.82	EF = 0.62	Per installation	New	84	11	$390	75%	N/A	$0.77	15,710
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	17	5	$8	95%	45%	$0.00	1
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Per installation	New	17	5	$8	95%	45%	$0.15	3,955

Table B.3.5. Commercial Gas Measure Details

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Dry Goods Retail	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	6	20	$93	10%	90%	$1.77	9,619
Dry Goods Retail	Space Heat Boiler	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.00	15	$2	15%	67%	$44.73	14,358
Dry Goods Retail	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.00	15	$0.26	75%	59%	$10.63	12,832
Dry Goods Retail	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	2	5	$169	75%	80%	$22.01	71,112
Dry Goods Retail	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	3	5	$122	50%	80%	$10.59	35,639
Dry Goods Retail	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$26.57	5,640
Dry Goods Retail	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.01	10	$0.91	5%	94%	$15.46	8,964
Dry Goods Retail	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	157	20	$1,719	100%	N/A	$1.33	39,533
Dry Goods Retail	Space Heat Boiler	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.08	10	$0.21	10%	39%	$0.47	7,357
Dry Goods Retail	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	98%	$29.89	17,222
Dry Goods Retail	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.02	25	$1	75%	85%	$9.53	34,879
Dry Goods Retail	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.01	25	$0.92	35%	90%	$5.26	21,534
Dry Goods Retail	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.04	25	$2	10%	35%	$5.46	18,457
Dry Goods Retail	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	19	15	$135	95%	26%	$0.95	1,428
Dry Goods Retail	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.01	10	$2	25%	98%	$21.19	77,330
Dry Goods Retail	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	0.91	20	$13	75%	65%	$1.83	13,605
Dry Goods Retail	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	12	3	$129	90%	45%	$5.00	25,318
Dry Goods Retail	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.68 (Average Existing Conditions)	Per Window SQFT	Existing	0.01	25	$63	10%	80%	$533.81	1,348
Dry Goods Retail	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	6	20	$93	10%	90%	$1.84	2,738
Dry Goods Retail	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	1	5	$169	75%	80%	$40.18	27,719
Dry Goods Retail	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$48.51	2,198
Dry Goods Retail	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.00	10	$0.91	5%	94%	$28.23	3,738
Dry Goods Retail	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	88	20	$977	100%	N/A	$1.35	68,433
Dry Goods Retail	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	98%	$54.58	6,713
Dry Goods Retail	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	90%	$16.51	7,173

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Dry Goods Retail	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	33	15	$2,001	50%	95%	$8.31	13,073
Dry Goods Retail	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	10	15	$135	95%	13%	$1.74	2,039
Dry Goods Retail	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.00	10	$2	50%	98%	$38.70	64,495
Dry Goods Retail	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$18.39	79,241
Dry Goods Retail	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.01	10	$0.91	5%	94%	$10.70	11,135
Dry Goods Retail	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	160	18	$1,298	28%	N/A	$1.03	56,547
Dry Goods Retail	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	224	18	$1,298	28%	N/A	$0.74	30,967
Dry Goods Retail	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	98%	$20.68	41,968
Dry Goods Retail	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.02	25	$1	75%	85%	$6.59	5,056
Dry Goods Retail	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.05	25	$2	10%	15%	$4.60	11,705
Dry Goods Retail	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.02	25	$0.92	35%	90%	$3.64	52,341
Dry Goods Retail	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.06	25	$2	10%	35%	$3.78	20,569
Dry Goods Retail	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	28	15	$135	95%	26%	$0.66	64,675
Dry Goods Retail	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.01	7	$0.18	90%	80%	$3.25	3,096
Dry Goods Retail	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.68 (Average Existing Conditions)	Per Window SQFT	Existing	0.01	25	$63	10%	80%	$369.38	19,194
Dry Goods Retail	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$32.68	30,329
Dry Goods Retail	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.00	10	$0.91	5%	94%	$19.02	42,536
Dry Goods Retail	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	90	18	$2,213	28%	N/A	$3.12	69,550
Dry Goods Retail	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	126	18	$2,213	28%	N/A	$2.24	51,556
Dry Goods Retail	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	98%	$36.76	92,612
Dry Goods Retail	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	90%	$11.12	81,623
Dry Goods Retail	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.22	30	$5	50%	95%	$2.69	4,957
Dry Goods Retail	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	16	15	$135	95%	13%	$1.17	23,663
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	46	10	$8,367	5%	95%	$2.77	0.00
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	46	10	$8,367	5%	95%	$32.31	2,362

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Dry Goods Retail	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	Existing	11	10	$240	5%	75%	$3.76	160
Dry Goods Retail	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.00	10	$0.26	75%	94%	$36.07	4,079
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	24%	25%	$3.50	388
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	24%	25%	$0.14	0.00
Dry Goods Retail	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	517	10	$2,558	95%	80%	$0.88	97,711
Dry Goods Retail	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	407	10	$3,647	95%	95%	$1.59	45,673
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	40	25	$805	5%	92%	$2.23	27,416
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	40	25	$805	5%	92%	$0.19	0.02
Dry Goods Retail	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.38	12	$2	75%	90%	$0.10	0.01
Dry Goods Retail	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.38	12	$2	75%	90%	$1.21	20,791
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	83%	$0.79	3,745
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	83%	$-0.10	0.00
Dry Goods Retail	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	36	14	$204	75%	N/A	$0.81	36,224
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	3	10	$192	75%	95%	$10.34	58,583
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	3	10	$192	75%	95%	$0.66	0.05
Dry Goods Retail	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	105	13	$594	75%	N/A	$0.85	16,926
Dry Goods Retail	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	15	5	$94	75%	45%	$1.80	79,428
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	46	10	$8,367	5%	95%	$2.77	0.00
Dry Goods Retail	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	46	10	$8,367	5%	95%	$32.38	1,260
Dry Goods Retail	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	New	11	10	$240	5%	75%	$3.84	84
Dry Goods Retail	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.00	10	$0.26	90%	94%	$36.15	63,072
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	24%	25%	$0.14	0.00
Dry Goods Retail	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	24%	25%	$3.58	203
Dry Goods Retail	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	506	10	$2,558	95%	80%	$0.90	52,138

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Dry Goods Retail	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	398	10	$3,650	95%	95%	$1.63	24,371
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	40	25	$644	25%	92%	$0.15	0.06
Dry Goods Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	40	25	$644	25%	92%	$1.79	75,608
Dry Goods Retail	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	23	15	$2,001	50%	95%	$12.16	36,274
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	83%	$0.81	1,959
Dry Goods Retail	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	83%	$-0.10	0.00
Dry Goods Retail	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	39	14	$291	75%	N/A	$1.08	15,530
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	3	10	$192	75%	95%	$0.66	0.02
Dry Goods Retail	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	3	10	$192	75%	95%	$10.36	31,259
Dry Goods Retail	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	113	13	$594	75%	N/A	$0.79	23,365
Dry Goods Retail	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	15	5	$94	75%	45%	$1.80	40,708
Grocery	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	Existing	2,168	10	$186	95%	75%	$0.02	33,772
Grocery	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	Existing	191	8	$1,121	45%	65%	$1.22	1,223
Grocery	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	Existing	17	12	$1,186	45%	75%	$10.89	341
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	250	12	$418	85%	85%	$0.15	0.00
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	250	12	$418	85%	85%	$0.27	12,728
Grocery	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	Existing	12,187	10	$2,741	5%	85%	$0.04	1,132
Grocery	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	Existing	4,379	12	$5,234	25%	90%	$0.19	6,462
Grocery	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	Existing	1,442	12	$2,142	25%	75%	$0.24	33,177
Grocery	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	New	2,168	10	$186	95%	75%	$0.02	17,140
Grocery	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	New	191	8	$1,121	45%	65%	$1.22	620
Grocery	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	New	17	12	$1,186	45%	75%	$10.89	173
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	250	12	$418	85%	85%	$0.15	0.00
Grocery	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	250	12	$418	85%	85%	$0.27	6,460
Grocery	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	New	12,187	10	$2,741	5%	85%	$0.04	574
Grocery	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	New	4,379	12	$5,234	25%	90%	$0.19	3,280
Grocery	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	New	1,442	12	$2,142	25%	75%	$0.24	16,838

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Grocery	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	21	20	$94	10%	90%	$0.54	195
Grocery	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.01	15	$0.27	75%	61%	$3.23	334
Grocery	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	7	5	$171	75%	80%	$6.69	1,800
Grocery	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	11	5	$123	50%	80%	$3.22	902
Grocery	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.37	45%	45%	$8.07	142
Grocery	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.03	10	$0.93	5%	94%	$4.70	227
Grocery	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	339	10	$5,374	64%	85%	$2.82	853
Grocery	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	1,481	20	$4,853	100%	N/A	$0.40	3,399
Grocery	Space Heat Boiler	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.30	10	$0.22	10%	39%	$0.13	124
Grocery	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.49	75%	85%	$9.69	367
Grocery	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.06	25	$1	75%	10%	$3.09	586
Grocery	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.06	25	$0.93	35%	45%	$1.64	1,313
Grocery	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.16	25	$2	10%	35%	$1.46	473
Grocery	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	192	15	$136	95%	31%	$0.10	36
Grocery	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.05	10	$2	25%	98%	$6.44	1,958
Grocery	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	5	20	$13	75%	65%	$0.33	2,467
Grocery	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	40	3	$131	90%	45%	$1.52	2,676
Grocery	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.03	25	$64	10%	85%	$240.58	17
Grocery	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	20	20	$94	10%	90%	$0.56	22
Grocery	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	1	5	$171	75%	80%	$31.92	224
Grocery	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.37	45%	45%	$38.54	17
Grocery	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.00	10	$0.93	5%	94%	$22.43	30
Grocery	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	71	10	$5,374	64%	85%	$13.45	107
Grocery	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	322	20	$1,055	100%	N/A	$0.40	556

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Grocery	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.49	75%	85%	$46.24	45
Grocery	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	45%	$13.42	29
Grocery	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	112	15	$2,033	50%	95%	$2.53	107
Grocery	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	40	15	$136	95%	15%	$0.48	19
Grocery	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.01	10	$2	50%	98%	$30.74	523
Grocery	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.37	45%	45%	$5.59	29,244
Grocery	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.05	10	$0.93	5%	94%	$3.25	41,014
Grocery	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	491	10	$5,374	64%	85%	$1.95	48,553
Grocery	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	1,506	18	$3,666	28%	N/A	$0.31	21,963
Grocery	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	2,116	18	$3,666	28%	N/A	$0.22	82,570
Grocery	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.49	75%	85%	$6.70	75,167
Grocery	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.09	25	$1	75%	10%	$2.14	2,102
Grocery	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.18	25	$2	10%	15%	$1.40	3,825
Grocery	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.09	25	$0.93	35%	45%	$1.13	28,672
Grocery	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.25	25	$2	10%	35%	$0.99	78,642
Grocery	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	277	15	$136	95%	31%	$0.07	61,519
Grocery	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.04	7	$0.18	90%	80%	$0.99	30,941
Grocery	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.04	25	$64	10%	85%	$166.46	3,613
Grocery	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.37	45%	45%	$25.96	3,591
Grocery	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.01	10	$0.93	5%	94%	$15.11	5,036
Grocery	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	105	10	$5,374	64%	85%	$9.06	17,927
Grocery	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	325	18	$2,393	28%	N/A	$0.94	19,322
Grocery	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	459	18	$2,393	28%	N/A	$0.67	29,119
Grocery	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.49	75%	85%	$31.15	9,230
Grocery	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	45%	$9.04	4,980

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Grocery	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.29	30	$5	50%	95%	$2.13	36,768
Grocery	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	59	15	$136	95%	15%	$0.32	3,381
Grocery	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.00	10	$0.27	75%	94%	$8.05	73,208
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$44	24%	25%	$3.62	20
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$44	24%	25%	$0.15	0.00
Grocery	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	520	10	$2,608	95%	80%	$0.89	24,024
Grocery	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	409	10	$3,715	95%	95%	$1.62	11,229
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	77	25	$817	5%	92%	$0.44	0.00
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	77	25	$817	5%	92%	$1.19	19,284
Grocery	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$0.39	14,668
Grocery	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$0.14	0.00
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	74%	$-0.08	0.00
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	74%	$0.70	1,718
Grocery	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	468	14	$1,381	75%	N/A	$0.43	24,537
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	15	10	$195	75%	95%	$2.31	40,080
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	15	10	$195	75%	95%	$0.62	0.00
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.01	10	$0.88	75%	55%	$11.49	93,826
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.01	10	$0.88	75%	55%	$4.34	0.00
Grocery	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	1,350	13	$4,018	75%	N/A	$0.45	50,002
Grocery	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	29	5	$95	75%	50%	$0.96	62,260
Grocery	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.00	10	$0.27	90%	94%	$8.07	44,364
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$44	24%	25%	$0.14	0.00
Grocery	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$44	24%	25%	$3.70	10
Grocery	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	508	10	$2,604	95%	80%	$0.91	12,819

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Grocery	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	400	10	$3,720	95%	95%	$1.66	5,992
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	77	25	$653	25%	92%	$0.95	53,340
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	77	25	$653	25%	92%	$0.35	0.00
Grocery	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	273	15	$2,033	50%	95%	$1.04	25,515
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	74%	$-0.08	0.00
Grocery	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	74%	$0.72	899
Grocery	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	502	14	$1,971	75%	N/A	$0.57	10,509
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	15	10	$195	75%	95%	$2.31	21,387
Grocery	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	15	10	$195	75%	95%	$0.62	0.00
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.01	10	$0.88	75%	55%	$4.30	0.00
Grocery	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.01	10	$0.88	75%	55%	$11.52	47,036
Grocery	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	1,449	13	$4,018	75%	N/A	$0.42	51,288
Grocery	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	29	5	$95	75%	50%	$0.96	31,910
Hospital	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	Existing	2,870	10	$423	95%	75%	$0.03	20,161
Hospital	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	Existing	19	8	$847	45%	65%	$9.17	55
Hospital	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	Existing	3	12	$1,126	45%	75%	$52.17	81
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	124	12	$415	85%	55%	$0.53	4,916
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	124	12	$415	85%	55%	$0.14	0.00
Hospital	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	Existing	16,137	10	$2,965	5%	85%	$0.03	675
Hospital	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	Existing	5,799	12	$5,083	25%	90%	$0.14	3,858
Hospital	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	Existing	716	12	$2,066	25%	75%	$0.46	19,806
Hospital	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	New	2,870	10	$423	95%	75%	$0.03	10,232
Hospital	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	New	19	8	$847	45%	65%	$9.17	28
Hospital	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	New	3	12	$1,126	45%	75%	$52.17	41
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	124	12	$415	85%	55%	$0.53	2,495
Hospital	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	124	12	$415	85%	55%	$0.14	0.00

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hospital	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	New	16,137	10	$2,965	5%	85%	$0.03	343
Hospital	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	New	5,799	12	$5,083	25%	90%	$0.14	1,958
Hospital	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	New	716	12	$2,066	25%	75%	$0.46	10,052
Hospital	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	96	15	$726	5%	94%	$1.05	25,388
Hospital	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	29	20	$92	10%	90%	$0.38	27,390
Hospital	Space Heat Boiler	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.04	15	$2	15%	67%	$9.68	51,322
Hospital	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.01	15	$0.26	35%	26%	$2.30	9,490
Hospital	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	10	5	$166	75%	80%	$4.76	54,567
Hospital	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	15	5	$120	75%	80%	$2.29	97,156
Hospital	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$5.75	19,922
Hospital	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.04	10	$0.90	5%	94%	$3.35	32,863
Hospital	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	246	10	$5,215	62%	85%	$3.78	8,951
Hospital	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	1,059	20	$2,502	100%	N/A	$0.29	3,389
Hospital	Space Heat Boiler	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.42	10	$0.21	10%	39%	$0.09	22,884
Hospital	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.01	25	$0.47	75%	85%	$4.85	52,917
Hospital	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.09	25	$1	75%	13%	$2.11	83,479
Hospital	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-19 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.04	25	$0.90	35%	35%	$2.11	54,675
Hospital	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.47	25	$2	10%	35%	$0.51	4,359
Hospital	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	99	15	$132	95%	24%	$0.19	3,973
Hospital	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.08	10	$2	25%	98%	$4.59	76,826
Hospital	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	5	20	$13	75%	65%	$0.33	45,376
Hospital	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	54	3	$127	90%	45%	$1.08	70,164
Hospital	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	Per Window SQFT	Existing	0.05	25	$62	10%	60%	$129.32	3,001
Hospital	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	91	15	$387	5%	94%	$0.59	13,551

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hospital	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	28	20	$91	10%	90%	$0.40	14,343
Hospital	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	9	5	$166	75%	80%	$5.03	42,354
Hospital	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$6.07	11,140
Hospital	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.04	10	$0.90	5%	94%	$3.53	19,659
Hospital	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	233	10	$5,215	62%	85%	$3.98	65,178
Hospital	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	748	20	$2,459	100%	N/A	$0.40	61,632
Hospital	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.01	25	$0.47	75%	85%	$5.12	29,591
Hospital	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.01	25	$0.29	35%	35%	$1.71	13,306
Hospital	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	153	15	$1,972	50%	95%	$1.80	67,841
Hospital	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	93	15	$132	95%	12%	$0.20	9,819
Hospital	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.07	10	$2	50%	98%	$4.84	31,213
Hospital	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	139	15	$726	5%	94%	$0.73	53,202
Hospital	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.01	18	$0.36	45%	45%	$3.98	53,028
Hospital	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.06	10	$0.90	5%	94%	$2.32	77,188
Hospital	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	355	10	$5,215	62%	85%	$2.61	55,905
Hospital	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	1,076	18	$1,890	22%	N/A	$0.22	87,089
Hospital	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	1,513	18	$1,890	22%	N/A	$0.16	76,456
Hospital	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.01	25	$0.47	75%	85%	$3.36	40,852
Hospital	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.13	25	$1	75%	13%	$1.46	87,752
Hospital	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.24	25	$2	10%	15%	$1.00	7,097
Hospital	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-19 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.06	25	$0.90	35%	35%	$1.46	22,969
Hospital	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.43	25	$2	10%	35%	$0.56	51,630
Hospital	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	143	15	$132	95%	24%	$0.13	85,623
Hospital	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.05	7	$0.17	90%	80%	$0.70	19,533

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hospital	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	Per Window SQFT	Existing	0.07	25	$62	10%	60%	$89.47	8,095
Hospital	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	135	15	$387	5%	94%	$0.40	28,130
Hospital	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.01	18	$0.36	45%	45%	$4.09	28,718
Hospital	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.06	10	$0.90	5%	94%	$2.38	41,803
Hospital	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	346	10	$5,215	62%	85%	$2.68	38,591
Hospital	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	1,057	18	$1,858	22%	N/A	$0.22	26,248
Hospital	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	1,049	18	$1,858	22%	N/A	$0.23	35,904
Hospital	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.01	25	$0.47	75%	85%	$3.45	76,282
Hospital	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.02	25	$0.29	35%	35%	$1.15	27,622
Hospital	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.34	98,479
Hospital	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	139	15	$132	95%	12%	$0.13	21,293
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	1,008	10	$8,243	15%	95%	$0.37	0.00
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	1,008	10	$8,243	15%	95%	$1.46	32,245
Hospital	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	Existing	27	10	$247	15%	75%	$1.62	720
Hospital	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.01	10	$0.26	55%	94%	$2.40	52,616
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	11%	25%	$0.14	0.00
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	11%	25%	$3.48	48
Hospital	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	510	10	$2,522	95%	80%	$0.88	228
Hospital	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	401	10	$3,599	95%	95%	$1.60	46,849
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	91	25	$793	5%	92%	$0.25	0.02
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	91	25	$793	5%	92%	$0.97	26,661
Hospital	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	70%	$0.07	0.01
Hospital	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	70%	$0.31	76,176

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	83%	$-0.08	0.00
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	83%	$0.70	3,841
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	4	10	$7	95%	73%	$0.28	5,082
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	4	10	$7	95%	73%	$-0.05	0.00
Hospital	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	19	10	$10	95%	35%	$-0.08	0.01
Hospital	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	19	10	$10	95%	35%	$0.09	9,746
Hospital	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	800	14	$1,943	75%	N/A	$0.35	70,309
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	19	10	$189	75%	90%	$0.33	0.05
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	19	10	$189	75%	90%	$1.72	52,468
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.86	75%	50%	$0.93	0.00
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.86	75%	50%	$139.93	13,927
Hospital	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	2,309	13	$5,655	75%	N/A	$0.37	30,990
Hospital	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	35	5	$92	75%	80%	$0.78	66,170
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	1,006	10	$8,243	15%	95%	$0.37	0.00
Hospital	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	1,006	10	$8,243	15%	95%	$1.46	17,206
Hospital	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	New	26	10	$247	15%	75%	$1.66	376
Hospital	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.01	10	$0.26	55%	94%	$2.41	77,925
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	11%	25%	$0.14	0.00
Hospital	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	11%	25%	$3.56	25
Hospital	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	498	10	$2,523	95%	80%	$0.90	53,483
Hospital	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	392	10	$3,594	95%	95%	$1.63	24,999
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	91	25	$634	25%	92%	$0.20	0.07
Hospital	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	91	25	$634	25%	92%	$0.78	56,408
Hospital	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	196	15	$1,972	50%	95%	$1.40	67,448
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	83%	$-0.08	0.00
Hospital	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	83%	$0.72	2,009
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	4	10	$7	95%	73%	$-0.05	0.00

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hospital	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	4	10	$7	95%	73%	$0.28	2,658
Hospital	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	858	14	$2,772	75%	N/A	$0.47	73,754
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	19	10	$189	75%	90%	$0.33	0.03
Hospital	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	19	10	$189	75%	90%	$1.72	34,721
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.86	75%	50%	$0.92	0.00
Hospital	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.86	75%	50%	$140.25	7,027
Hospital	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	2,477	13	$5,655	75%	N/A	$0.35	58,400
Hospital	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	35	5	$92	75%	80%	$0.79	41,151
Hotel Motel	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	Existing	1,994	10	$135	95%	75%	$0.01	20,417
Hotel Motel	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	Existing	42	8	$951	35%	65%	$4.61	140
Hotel Motel	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	Existing	4	12	$1,166	45%	75%	$44.63	53
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	230	12	$405	85%	55%	$0.14	0.00
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	230	12	$405	85%	55%	$0.28	4,979
Hotel Motel	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	Existing	11,213	10	$2,717	5%	85%	$0.04	684
Hotel Motel	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	Existing	4,029	12	$5,027	15%	90%	$0.20	2,344
Hotel Motel	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	Existing	1,326	12	$2,081	25%	75%	$0.25	20,058
Hotel Motel	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	New	1,994	10	$135	95%	75%	$0.01	10,362
Hotel Motel	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	New	42	8	$951	35%	65%	$4.61	71
Hotel Motel	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	New	4	12	$1,166	45%	75%	$44.63	27
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	230	12	$405	85%	55%	$0.14	0.00
Hotel Motel	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	230	12	$405	85%	55%	$0.28	2,527
Hotel Motel	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	New	11,213	10	$2,717	5%	85%	$0.04	347
Hotel Motel	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	New	4,029	12	$5,027	15%	90%	$0.20	1,189
Hotel Motel	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	New	1,326	12	$2,081	25%	75%	$0.25	10,179
Hotel Motel	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	Per pool (22'x44')	Existing	0.99	10	$2	95%	35%	$0.38	59,755
Hotel Motel	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	Per pool (22'x44')	New	0.54	10	$2	95%	35%	$0.68	44,421

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hotel Motel	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	10	15	$726	50%	94%	$10.09	7,930
Hotel Motel	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	15	20	$92	10%	30%	$0.74	1,966
Hotel Motel	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.00	15	$0.26	5%	52%	$4.41	588
Hotel Motel	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	5	5	$166	75%	80%	$9.14	53,851
Hotel Motel	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	8	5	$120	50%	80%	$4.40	27,653
Hotel Motel	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$11.03	4,230
Hotel Motel	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.02	10	$0.90	5%	94%	$6.42	7,021
Hotel Motel	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	132	10	$5,216	58%	85%	$7.04	21,573
Hotel Motel	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	565	20	$2,576	100%	N/A	$0.56	8,857
Hotel Motel	Space Heat Boiler	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.10	10	$0.21	10%	39%	$0.36	4,929
Hotel Motel	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.47	75%	85%	$6.52	11,293
Hotel Motel	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.06	25	$1	75%	25%	$2.84	29,069
Hotel Motel	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.10	25	$0.90	35%	45%	$0.94	44,343
Hotel Motel	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.10	25	$2	10%	35%	$2.31	13,140
Hotel Motel	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	32	15	$133	95%	31%	$0.58	1,119
Hotel Motel	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.04	10	$2	25%	98%	$8.80	58,560
Hotel Motel	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	2	20	$13	75%	65%	$0.62	74,373
Hotel Motel	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	28	3	$127	90%	45%	$2.07	78,852
Hotel Motel	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.00	25	$62	10%	50%	$881.86	311
Hotel Motel	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	7	15	$387	50%	94%	$7.61	4,247
Hotel Motel	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	14	20	$92	10%	30%	$0.76	772
Hotel Motel	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	3	5	$166	75%	80%	$12.90	22,623
Hotel Motel	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$15.57	1,794
Hotel Motel	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.01	10	$0.90	5%	94%	$9.06	3,155

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hotel Motel	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	93	10	$5,216	58%	85%	$9.94	9,695
Hotel Motel	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	415	20	$1,895	100%	N/A	$0.56	59,161
Hotel Motel	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.47	75%	85%	$9.21	5,075
Hotel Motel	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	45%	$3.30	2,220
Hotel Motel	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	79	15	$1,972	50%	95%	$3.45	10,992
Hotel Motel	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	22	15	$133	95%	15%	$0.82	2,063
Hotel Motel	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.02	10	$2	50%	98%	$12.42	52,637
Hotel Motel	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	14	15	$726	50%	94%	$6.98	4,933
Hotel Motel	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$7.63	2,631
Hotel Motel	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.03	10	$0.90	5%	94%	$4.44	3,854
Hotel Motel	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	190	10	$5,216	58%	85%	$4.87	11,842
Hotel Motel	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	573	18	$1,946	12%	N/A	$0.43	4,370
Hotel Motel	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	808	18	$1,946	12%	N/A	$0.31	7,238
Hotel Motel	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.01	25	$0.47	75%	85%	$4.51	6,199
Hotel Motel	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.09	25	$1	75%	25%	$1.96	15,517
Hotel Motel	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.12	25	$2	10%	15%	$1.91	354
Hotel Motel	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.15	25	$0.90	35%	45%	$0.65	24,296
Hotel Motel	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.18	25	$2	10%	35%	$1.33	9,294
Hotel Motel	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	46	15	$133	95%	31%	$0.40	5,808
Hotel Motel	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.03	7	$0.17	90%	80%	$1.35	55,640
Hotel Motel	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.01	25	$62	10%	50%	$610.17	193
Hotel Motel	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	10	15	$387	50%	94%	$5.13	2,168
Hotel Motel	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$10.49	1,110
Hotel Motel	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.02	10	$0.90	5%	94%	$6.10	1,610

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hotel Motel	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	138	10	$5,216	58%	85%	$6.69	4,949
Hotel Motel	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	422	18	$1,431	12%	N/A	$0.43	2,356
Hotel Motel	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	594	18	$1,431	12%	N/A	$0.31	3,894
Hotel Motel	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.47	75%	85%	$6.20	2,590
Hotel Motel	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.01	25	$0.29	35%	45%	$2.22	1,106
Hotel Motel	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.70	30	$5	50%	95%	$0.86	11,558
Hotel Motel	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	33	15	$133	95%	15%	$0.55	1,079
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	788	10	$8,244	35%	95%	$1.86	21,859
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	788	10	$8,244	35%	95%	$0.29	0.01
Hotel Motel	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	Existing	27	10	$258	35%	75%	$1.69	5,855
Hotel Motel	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.01	10	$0.26	55%	80%	$3.16	85,762
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	24%	25%	$3.46	66
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	24%	25%	$0.14	0.00
Hotel Motel	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	512	10	$2,528	95%	80%	$0.88	50,917
Hotel Motel	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	403	10	$3,605	95%	95%	$1.59	23,800
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	75	25	$793	5%	92%	$0.18	0.01
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	75	25	$793	5%	92%	$1.18	36,197
Hotel Motel	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$0.05	0.01
Hotel Motel	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$0.38	26,815
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	93%	$0.71	2,709
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	93%	$-0.07	0.00
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	6	10	$6	95%	73%	$0.16	68,373
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	6	10	$6	95%	73%	$-0.06	0.13
Hotel Motel	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	27	10	$10	95%	35%	$-0.08	0.25
Hotel Motel	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	27	10	$10	95%	35%	$0.07	31,126
Hotel Motel	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	623	14	$1,841	75%	N/A	$0.43	49,092

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	3	10	$189	75%	85%	$1.09	0.03
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	3	10	$189	75%	85%	$9.06	69,274
Hotel Motel	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	1,797	13	$5,362	75%	N/A	$0.45	94,956
Hotel Motel	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	29	5	$92	75%	5%	$0.95	11,382
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	787	10	$8,244	35%	95%	$1.87	11,664
Hotel Motel	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	787	10	$8,244	35%	95%	$0.28	0.00
Hotel Motel	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	New	26	10	$258	35%	75%	$1.73	3,063
Hotel Motel	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.01	10	$0.26	55%	80%	$3.17	44,756
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	24%	25%	$3.54	34
Hotel Motel	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	24%	25%	$0.14	0.00
Hotel Motel	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	501	10	$2,522	95%	80%	$0.90	27,170
Hotel Motel	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	394	10	$3,600	95%	95%	$1.62	12,700
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	75	25	$634	25%	92%	$0.14	0.04
Hotel Motel	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	75	25	$634	25%	92%	$0.94	770
Hotel Motel	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	200	15	$1,972	50%	95%	$1.38	49,491
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	93%	$0.72	1,417
Hotel Motel	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	93%	$-0.07	0.00
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	6	10	$6	95%	73%	$0.16	35,770
Hotel Motel	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	6	10	$6	95%	73%	$-0.06	0.07
Hotel Motel	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	668	14	$2,626	75%	N/A	$0.57	21,653
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	3	10	$189	75%	85%	$1.07	0.01
Hotel Motel	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	3	10	$189	75%	85%	$9.08	36,966
Hotel Motel	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	1,927	13	$5,362	75%	N/A	$0.42	11,218
Hotel Motel	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	29	5	$92	75%	5%	$0.95	6,028
Office	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	66	15	$747	75%	94%	$1.58	1,776
Office	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	20	20	$94	10%	45%	$0.58	56,957

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Office	Space Heat Boiler	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.02	15	$2	15%	67%	$14.56	11,680
Office	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.01	15	$0.27	5%	28%	$3.46	5,833
Office	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	7	5	$171	75%	80%	$7.16	38,974
Office	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	10	5	$123	75%	80%	$3.45	87,005
Office	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.37	45%	45%	$8.65	82,403
Office	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.03	10	$0.93	5%	94%	$5.03	30,968
Office	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	668	20	$2,350	100%	N/A	$0.43	15,630
Office	Space Heat Boiler	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.23	10	$0.22	10%	39%	$0.17	95,180
Office	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.49	75%	65%	$10.18	7,180
Office	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.04	25	$1	75%	4%	$4.43	62,379
Office	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.07	25	$0.93	35%	15%	$1.34	35,983
Office	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.12	25	$2	10%	35%	$1.99	32,207
Office	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	56	15	$137	95%	26%	$0.34	17,970
Office	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.05	10	$2	25%	98%	$6.90	29,821
Office	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	3	20	$13	75%	65%	$0.51	36,372
Office	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	37	3	$131	90%	45%	$1.63	54,005
Office	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	32	15	$399	75%	94%	$1.75	32,776
Office	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	19	20	$94	10%	45%	$0.60	15,287
Office	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	3	5	$171	75%	80%	$14.80	90,655
Office	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.37	45%	45%	$17.86	23,052
Office	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.01	10	$0.93	5%	94%	$10.40	39,196
Office	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	338	20	$1,181	100%	N/A	$0.43	28,365
Office	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.49	75%	65%	$21.02	29,983
Office	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	15%	$4.75	10,658
Office	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	104	15	$2,031	50%	95%	$2.71	35,514

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Office	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	27	15	$137	95%	13%	$0.70	22,626
Office	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.02	10	$2	50%	98%	$14.25	76,264
Office	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	95	15	$747	75%	94%	$1.10	63,326
Office	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.37	45%	45%	$5.99	89,014
Office	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.04	10	$0.93	5%	94%	$3.48	65,088
Office	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	676	18	$1,775	26%	N/A	$0.34	68,237
Office	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	954	18	$1,775	26%	N/A	$0.24	59,083
Office	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.49	75%	65%	$7.04	45,845
Office	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.06	25	$1	75%	4%	$3.06	26,260
Office	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.17	25	$2	10%	15%	$1.50	23,783
Office	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.11	25	$0.93	35%	15%	$0.93	63,563
Office	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.28	25	$2	10%	35%	$0.86	71,206
Office	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	81	15	$137	95%	26%	$0.24	40,101
Office	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.03	7	$0.18	90%	80%	$1.06	16,825
Office	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	47	15	$399	75%	94%	$1.18	87,079
Office	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.37	45%	45%	$12.03	52,064
Office	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.02	10	$0.93	5%	94%	$7.00	73,019
Office	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	344	18	$2,678	26%	N/A	$0.99	70,007
Office	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	484	18	$2,678	26%	N/A	$0.71	5,194
Office	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.49	75%	65%	$14.16	67,718
Office	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.01	25	$0.29	35%	15%	$3.20	19,856
Office	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.63	30	$5	50%	95%	$0.99	56,747
Office	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	40	15	$137	95%	13%	$0.47	43,201
Office	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.00	10	$0.27	55%	80%	$28.46	43,110

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$43	8%	25%	$3.56	933
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$43	8%	25%	$0.14	0.00
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	42	25	$817	5%	92%	$2.17	60,401
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	42	25	$817	5%	92%	$0.13	0.14
Office	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.66	12	$2	75%	30%	$0.72	15,155
Office	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.66	12	$2	75%	30%	$0.04	0.03
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$10	95%	73%	$0.47	5,464
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$10	95%	73%	$-0.03	0.02
Office	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$10	95%	35%	$0.12	10,479
Office	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$10	95%	35%	$-0.08	0.03
Office	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	64	14	$343	75%	N/A	$0.78	80,535
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	4	10	$195	75%	85%	$8.16	9,361
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	4	10	$195	75%	85%	$0.39	0.25
Office	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	185	13	$1,004	75%	N/A	$0.82	51,436
Office	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	16	5	$95	75%	40%	$1.76	55,088
Office	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.00	10	$0.27	55%	80%	$28.52	72,065
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$43	8%	25%	$3.64	488
Office	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$43	8%	25%	$0.14	0.00
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	42	25	$654	25%	92%	$0.10	0.39
Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	42	25	$654	25%	92%	$1.74	65,611
Office	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	33	15	$2,031	50%	95%	$8.48	79,690
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$10	95%	73%	$0.48	2,858
Office	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$10	95%	73%	$-0.03	0.01
Office	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	68	14	$491	75%	N/A	$1.04	34,796
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	4	10	$195	75%	85%	$0.39	0.13
Office	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	4	10	$195	75%	85%	$8.17	58,362
Office	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	198	13	$1,004	75%	N/A	$0.77	942
Office	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	16	5	$95	75%	40%	$1.76	79,261

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Other	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	43	15	$736	50%	94%	$2.37	1,225
Other	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	13	20	$93	10%	90%	$0.86	60,536
Other	Space Heat Boiler	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.01	15	$2	15%	67%	$21.80	99,921
Other	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.00	15	$0.26	45%	66%	$5.18	61,084
Other	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	4	5	$169	75%	80%	$10.72	95,384
Other	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	7	5	$122	50%	80%	$5.16	55,512
Other	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$12.95	39,215
Other	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.02	10	$0.91	5%	94%	$7.54	64,485
Other	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	78	10	$5,295	5%	85%	$12.05	14,842
Other	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	337	20	$1,793	100%	N/A	$0.65	61,768
Other	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	85%	$18.02	84,036
Other	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.02	25	$1	75%	30%	$7.84	87,216
Other	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.05	25	$0.92	35%	50%	$1.77	63,254
Other	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.12	25	$2	10%	35%	$2.02	26,596
Other	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	42	15	$135	95%	28%	$0.44	9,918
Other	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.03	10	$2	25%	98%	$10.33	38,700
Other	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	1	20	$13	75%	65%	$0.87	14,917
Other	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	24	3	$129	90%	45%	$2.43	99,732
Other	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.02	25	$63	10%	70%	$277.93	3,946
Other	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	21	15	$393	50%	94%	$2.53	47,937
Other	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	12	20	$93	10%	90%	$0.90	15,658
Other	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	2	5	$169	75%	80%	$21.46	51,958
Other	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$25.92	12,029
Other	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.01	10	$0.91	5%	94%	$15.08	20,492

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Other	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	39	10	$5,295	5%	85%	$24.11	4,553
Other	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	175	20	$930	100%	N/A	$0.65	95,340
Other	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	85%	$36.06	25,778
Other	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	50%	$8.83	21,720
Other	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	69	15	$2,001	50%	95%	$4.05	71,242
Other	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	21	15	$135	95%	14%	$0.89	12,868
Other	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.01	10	$2	50%	98%	$20.67	53,560
Other	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	62	15	$736	50%	94%	$1.64	95,278
Other	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$8.96	37,368
Other	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.03	10	$0.91	5%	94%	$5.21	99,329
Other	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	113	10	$5,295	5%	85%	$8.34	51,994
Other	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	341	18	$1,354	31%	N/A	$0.51	90,103
Other	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	481	18	$1,354	31%	N/A	$0.36	26,444
Other	Space Heat Furnace	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.32	10	$0.21	10%	39%	$0.12	90,099
Other	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	85%	$12.47	94,376
Other	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.03	25	$1	75%	30%	$5.42	87,813
Other	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.11	25	$2	10%	15%	$2.24	17,823
Other	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-7 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.08	25	$0.92	35%	50%	$1.22	5,124
Other	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.23	25	$2	10%	35%	$1.05	48,189
Other	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	61	15	$135	95%	28%	$0.31	87,374
Other	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.02	7	$0.18	90%	80%	$1.58	36,054
Other	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.03	25	$63	10%	70%	$192.31	14,009
Other	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	32	15	$393	50%	94%	$1.71	15,622
Other	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$17.46	41,968

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Other	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.01	10	$0.91	5%	94%	$10.16	58,972
Other	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	58	10	$5,295	5%	85%	$16.24	15,885
Other	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	178	18	$2,108	31%	N/A	$1.51	78,896
Other	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	250	18	$2,108	31%	N/A	$1.08	12,670
Other	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	85%	$24.29	89,936
Other	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	50%	$5.95	62,507
Other	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.43	30	$5	50%	95%	$1.44	40,990
Other	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	31	15	$135	95%	14%	$0.60	37,768
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	54	10	$8,365	5%	95%	$2.00	0.00
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	54	10	$8,365	5%	95%	$27.15	4,068
Other	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	Existing	11	10	$250	5%	75%	$3.92	232
Other	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.00	10	$0.26	75%	94%	$31.63	84,103
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	5%	25%	$0.14	0.00
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	5%	25%	$3.49	124
Other	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	517	10	$2,608	95%	80%	$0.90	21,497
Other	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	407	10	$3,651	95%	95%	$1.60	10,048
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	26	25	$805	5%	92%	$0.25	0.04
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	26	25	$805	5%	92%	$3.43	48,495
Other	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.41	12	$2	75%	90%	$0.07	0.03
Other	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.41	12	$2	75%	90%	$1.12	36,997
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$4	95%	93%	$-0.08	0.06
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$4	95%	93%	$0.66	30,117
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$10	95%	73%	$-0.03	0.00
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$10	95%	73%	$0.46	5,063
Other	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$10	95%	35%	$-0.08	0.01

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Other	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$10	95%	35%	$0.12	9,710
Other	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	43	14	$373	75%	N/A	$1.25	64,496
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	3	10	$192	75%	95%	$0.50	0.09
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	3	10	$192	75%	95%	$9.06	868
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	**%	$3.45	0.00
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	**%	$4,603.40	4,224
Other	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	125	13	$1,088	75%	N/A	$1.31	21,038
Other	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	10	5	$93	75%	55%	$2.76	72,743
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	54	10	$8,365	5%	95%	$1.99	0.00
Other	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	54	10	$8,365	5%	95%	$27.21	2,170
Other	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	New	11	10	$250	5%	75%	$4.01	121
Other	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.00	10	$0.26	90%	94%	$31.70	11,782
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	5%	25%	$0.14	0.00
Other	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	5%	25%	$3.57	65
Other	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	506	10	$2,557	95%	80%	$0.90	11,471
Other	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	398	10	$3,750	95%	95%	$1.68	5,362
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	26	25	$644	25%	92%	$0.20	0.12
Other	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	26	25	$644	25%	92%	$2.75	34,798
Other	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	28	15	$2,001	50%	95%	$9.73	64,288
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$4	95%	93%	$-0.08	0.03
Other	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$4	95%	93%	$0.68	15,756
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$10	95%	73%	$0.47	2,648
Other	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$10	95%	73%	$-0.03	0.00
Other	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	46	14	$533	75%	N/A	$1.66	27,757
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	3	10	$192	75%	95%	$9.08	53,826
Other	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	3	10	$192	75%	95%	$0.49	0.05

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	**%	$3.42	0.00
Other	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	**%	$4,613.63	2,122
Other	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	134	13	$1,088	75%	N/A	$1.22	99,444
Other	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	10	5	$93	75%	55%	$2.77	88,706
Restaurant	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	Existing	256	10	$199	95%	75%	$0.14	34,697
Restaurant	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	Existing	169	8	$1,057	65%	65%	$1.30	31,297
Restaurant	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	Existing	59	12	$1,164	75%	75%	$3.11	77,226
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	63	12	$400	85%	85%	$1.01	26,145
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	63	12	$400	85%	85%	$0.14	0.03
Restaurant	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	Existing	1,441	10	$2,696	35%	85%	$0.33	78,551
Restaurant	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	Existing	517	12	$5,100	45%	80%	$1.56	2,479
Restaurant	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	Existing	362	12	$2,074	65%	75%	$0.91	54,887
Restaurant	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	New	256	10	$199	95%	75%	$0.14	69,864
Restaurant	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	New	169	8	$1,057	65%	65%	$1.30	66,635
Restaurant	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	New	59	12	$1,164	75%	75%	$3.11	39,193
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	63	12	$400	85%	85%	$1.01	64,020
Restaurant	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	63	12	$400	85%	85%	$0.14	0.01
Restaurant	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	New	1,441	10	$2,696	35%	85%	$0.33	39,866
Restaurant	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	New	517	12	$5,100	45%	80%	$1.56	52,010
Restaurant	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	New	362	12	$2,074	65%	75%	$0.91	33,870
Restaurant	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$30.30	3,879
Restaurant	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.00	10	$1	5%	94%	$33.42	5,375
Restaurant	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	9	10	$5,216	100%	85%	$96.65	28,522
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	28	18	$1,167	86%	N/A	$5.33	7,055
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	40	18	$1,167	86%	N/A	$3.69	79,383

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Restaurant	Space Heat Furnace	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.05	10	$0.21	10%	39%	$0.76	4,031
Restaurant	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.47	75%	98%	$33.88	11,419
Restaurant	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-11 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.01	25	$1	75%	85%	$14.74	92,307
Restaurant	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.03	25	$2	10%	15%	$7.58	548
Restaurant	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.01	25	$0.90	35%	90%	$5.87	66,300
Restaurant	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.02	25	$2	10%	35%	$8.12	10,712
Restaurant	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	5	15	$133	95%	25%	$3.68	7,523
Restaurant	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.00	7	$0.17	90%	80%	$5.36	92,594
Restaurant	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.00	25	$62	10%	80%	$1,852.47	430
Restaurant	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$40.34	1,892
Restaurant	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.00	10	$1	5%	94%	$44.50	2,621
Restaurant	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	7	10	$5,216	100%	85%	$128.71	13,910
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	21	18	$886	86%	N/A	$5.20	4,249
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	31	18	$886	86%	N/A	$3.64	47,337
Restaurant	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.47	75%	98%	$45.12	5,569
Restaurant	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.28	35%	90%	$13.43	4,992
Restaurant	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.18	30	$5	50%	95%	$3.32	18,956
Restaurant	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	3	15	$133	95%	13%	$4.90	1,379
Restaurant	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.02	10	$0.26	75%	94%	$2.31	31,990
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	46%	25%	$0.14	0.00
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	46%	25%	$3.50	247
Restaurant	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	506	10	$2,525	95%	80%	$0.89	65,514
Restaurant	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	398	10	$3,600	95%	95%	$1.61	11,083
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	126	25	$793	5%	92%	$0.02	0.06

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	126	25	$793	5%	92%	$0.70	34,768
Restaurant	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$0.25	26,844
Restaurant	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$-0.00	0.04
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	29	5	$4	95%	46%	$-0.10	0.21
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	29	5	$4	95%	46%	$0.05	87,476
Restaurant	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	172	14	$301	75%	N/A	$0.25	46,162
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	17	10	$189	75%	75%	$0.05	0.12
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	17	10	$189	75%	75%	$1.89	71,904
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.86	75%	**%	$0.20	0.05
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.86	75%	**%	$17.43	58,454
Restaurant	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	497	13	$877	75%	N/A	$0.27	50,500
Restaurant	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	48	5	$92	75%	75%	$0.57	70,918
Restaurant	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.02	10	$0.26	90%	94%	$2.32	80,022
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	46%	25%	$0.13	0.00
Restaurant	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	46%	25%	$3.57	129
Restaurant	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	495	10	$2,525	95%	80%	$0.91	55,135
Restaurant	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	390	10	$3,599	95%	95%	$1.64	66,002
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	126	25	$634	25%	92%	$0.01	0.16
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	126	25	$634	25%	92%	$0.56	97,663
Restaurant	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	178	15	$1,972	50%	95%	$1.54	46,023
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	28	5	$4	95%	46%	$-0.10	0.11
Restaurant	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	28	5	$4	95%	46%	$0.05	45,765
Restaurant	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	185	14	$429	75%	N/A	$0.34	19,443
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	17	10	$189	75%	75%	$0.05	0.06
Restaurant	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	17	10	$189	75%	75%	$1.90	38,369

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.86	75%	**%	$0.20	0.02
Restaurant	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.86	75%	**%	$17.47	29,316
Restaurant	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	533	13	$877	75%	N/A	$0.25	78,770
Restaurant	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	48	5	$92	75%	75%	$0.57	87,639
School	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	Existing	3,568	10	$0.00	95%	75%	$0.00	15,287
School	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	Existing	35	8	$905	45%	65%	$5.28	62
School	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	Existing	1	12	$1,395	65%	75%	$157.34	8
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	567	12	$232	85%	40%	$0.07	2,711
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	567	12	$232	85%	40%	$0.15	0.00
School	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	Existing	20,058	10	$2,717	5%	85%	$0.02	512
School	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	Existing	7,208	12	$5,435	25%	90%	$0.12	2,925
School	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	Existing	3,263	12	$1,997	25%	75%	$0.10	15,017
School	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	New	3,568	10	$0.00	95%	75%	$0.00	7,758
School	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	New	35	8	$905	45%	65%	$5.28	31
School	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	New	1	12	$1,395	65%	75%	$157.34	4
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	567	12	$232	85%	40%	$0.15	0.00
School	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	567	12	$232	85%	40%	$0.07	1,376
School	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	New	20,058	10	$2,717	5%	85%	$0.02	260
School	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	New	7,208	12	$5,435	25%	90%	$0.12	1,484
School	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	New	3,263	12	$1,997	25%	75%	$0.10	7,621
School	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	Per pool (22'x44')	Existing	4	10	$2	95%	35%	$0.08	31,353
School	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	Per pool (22'x44')	New	0.72	10	$2	95%	35%	$0.52	33,956
School	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	34	15	$736	25%	94%	$2.99	8,856
School	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	10	20	$93	10%	65%	$1.09	31,886
School	Space Heat Boiler	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.01	15	$2	15%	67%	$27.55	81,601

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
School	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.00	15	$0.26	5%	34%	$6.55	2,793
School	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	3	5	$169	75%	80%	$13.55	4,594
School	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	5	5	$122	50%	80%	$6.52	6,073
School	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$16.36	32,089
School	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.01	10	$0.91	5%	94%	$9.52	51,001
School	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	276	10	$5,294	73%	85%	$3.42	18,402
School	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	1,198	20	$7,999	100%	N/A	$0.82	5,379
School	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	85%	$20.51	81,259
School	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.02	25	$1	75%	15%	$6.54	89,284
School	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.03	25	$0.92	35%	35%	$3.38	30,376
School	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.29	25	$2	10%	35%	$0.84	72,317
School	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	160	15	$132	95%	21%	$0.12	5,691
School	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.02	10	$2	25%	98%	$13.05	39,971
School	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	3	20	$13	75%	65%	$0.52	67,462
School	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	19	3	$129	90%	45%	$3.08	97,526
School	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	Per Window SQFT	Existing	0.01	25	$63	10%	60%	$374.21	4,772
School	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	28	15	$393	25%	94%	$1.93	97,093
School	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	10	20	$93	10%	65%	$1.13	14,823
School	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	3	5	$169	75%	80%	$16.36	99,120
School	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$19.75	15,792
School	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.01	10	$0.91	5%	94%	$11.49	26,852
School	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	228	10	$5,294	73%	85%	$4.12	12,237
School	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	887	20	$6,875	100%	N/A	$0.95	42,065
School	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	85%	$24.76	39,991

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
School	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	35%	$7.01	20,319
School	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	54	15	$2,003	50%	95%	$5.12	93,154
School	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	133	15	$132	95%	10%	$0.14	12,244
School	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.02	10	$2	50%	98%	$15.75	63,290
School	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	49	15	$736	25%	94%	$2.07	76,991
School	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$11.32	14,792
School	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.02	10	$0.91	5%	94%	$6.59	20,745
School	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	399	10	$5,294	73%	85%	$2.36	86,462
School	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	1,217	18	$6,038	3%	N/A	$0.63	342
School	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	1,712	18	$6,038	3%	N/A	$0.45	6,476
School	Space Heat Furnace	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.21	10	$0.22	10%	39%	$0.18	14,184
School	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	85%	$14.19	37,458
School	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.04	25	$1	75%	15%	$4.53	76,966
School	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.08	25	$2	10%	15%	$2.83	1,903
School	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.04	25	$0.92	35%	35%	$2.34	91,203
School	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.28	25	$2	10%	35%	$0.87	46,005
School	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	232	15	$132	95%	21%	$0.08	21,682
School	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.02	7	$0.18	90%	80%	$2.00	24,021
School	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	Per Window SQFT	Existing	0.02	25	$63	10%	60%	$258.93	2,229
School	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	42	15	$393	25%	94%	$1.30	35,727
School	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$13.30	7,216
School	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.02	10	$0.91	5%	94%	$7.74	10,121
School	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	339	10	$5,294	73%	85%	$2.78	41,300
School	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	1,047	18	$5,191	3%	N/A	$0.63	210

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
School	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	1,259	18	$5,191	3%	N/A	$0.53	3,455
School	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	85%	$16.68	18,274
School	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	35%	$4.72	7,658
School	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.56	30	$5	50%	95%	$1.09	75,816
School	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	197	15	$132	95%	10%	$0.09	4,713
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	448	10	$8,363	35%	95%	$0.11	0.02
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	448	10	$8,363	35%	95%	$3.33	24,543
School	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	Existing	27	10	$261	35%	75%	$1.70	3,102
School	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.00	10	$0.26	55%	94%	$17.28	18,171
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	35%	25%	$0.14	0.00
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$42	35%	25%	$3.50	79
School	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	513	10	$2,571	95%	80%	$0.89	35,323
School	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	404	10	$3,659	95%	95%	$1.61	16,511
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	62	25	$805	5%	92%	$0.05	0.04
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	62	25	$805	5%	92%	$1.45	42,447
School	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.97	12	$2	75%	70%	$0.01	0.00
School	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	0.97	12	$2	75%	70%	$0.47	24,563
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	65%	$-0.07	0.00
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	65%	$0.78	4,198
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$5	95%	73%	$0.26	16,898
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$5	95%	73%	$-0.02	0.01
School	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$11	95%	35%	$-0.07	0.02
School	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$11	95%	35%	$0.13	32,407
School	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	358	14	$1,292	75%	N/A	$0.52	56,477
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	6	10	$192	75%	75%	$0.12	0.06
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	6	10	$192	75%	75%	$4.95	68,631

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	93%	$1,005.84	8,706
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	93%	$0.89	0.00
School	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	1,033	13	$3,758	75%	N/A	$0.55	5,834
School	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	23	5	$94	75%	15%	$1.18	40,276
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	447	10	$8,363	35%	95%	$0.11	0.01
School	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	447	10	$8,363	35%	95%	$3.33	13,096
School	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	New	26	10	$261	35%	75%	$1.74	1,623
School	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.00	10	$0.26	55%	94%	$17.32	60,005
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	35%	25%	$0.14	0.00
School	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$42	35%	25%	$3.57	41
School	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	502	10	$2,569	95%	80%	$0.91	18,848
School	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	395	10	$3,635	95%	95%	$1.64	8,810
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	62	25	$644	25%	92%	$0.04	0.11
School	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	62	25	$644	25%	92%	$1.16	15,652
School	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	31	15	$2,003	50%	95%	$8.82	56,472
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	65%	$-0.07	0.00
School	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	65%	$0.80	2,196
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$5	95%	73%	$-0.02	0.00
School	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$5	95%	73%	$0.27	8,840
School	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	384	14	$1,840	75%	N/A	$0.70	24,523
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	6	10	$192	75%	75%	$4.96	36,622
School	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	6	10	$192	75%	75%	$0.13	0.03
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	93%	$0.89	0.00
School	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	93%	$1,008.10	4,421

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
School	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	1,109	13	$3,758	75%	N/A	$0.51	53,058
School	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	23	5	$94	75%	15%	$1.18	20,756
University	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	Existing	4,374	10	$0.00	95%	75%	$0.00	21,806
University	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	Existing	83	8	$993	45%	65%	$2.47	170
University	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	Existing	2	12	$1,274	65%	75%	$75.52	17
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	695	12	$382	85%	40%	$0.14	0.00
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	Existing	695	12	$382	85%	40%	$0.09	3,867
University	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	Existing	24,590	10	$2,483	5%	85%	$0.02	731
University	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	Existing	8,837	12	$5,464	25%	90%	$0.10	4,172
University	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	Existing	4,001	12	$2,068	25%	75%	$0.08	21,422
University	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	per installation	New	4,374	10	$0.00	95%	75%	$0.00	11,066
University	Cooking	Fryers - Commercial Gas Cooking	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	per installation	New	83	8	$993	45%	65%	$2.47	86
University	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	per installation	New	2	12	$1,274	65%	75%	$75.52	9
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	695	12	$382	85%	40%	$0.14	0.00
University	Cooking	High Efficiency Convection Oven	Convection Oven	Standard Oven	per installation	New	695	12	$382	85%	40%	$0.09	1,962
University	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	per installation	New	24,590	10	$2,483	5%	85%	$0.02	371
University	Cooking	Oven - Power Burner	Power Burner Oven - Improved Atmospheric Burner (60% Efficient)	Standard (40%-50% Efficiency)	per installation	New	8,837	12	$5,464	25%	90%	$0.10	2,117
University	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	per installation	New	4,001	12	$2,068	25%	75%	$0.08	10,872
University	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	Per pool (22'x44')	Existing	3	10	$2	95%	35%	$0.10	16,683
University	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	Per pool (22'x44')	New	1	10	$2	95%	35%	$0.30	36,305
University	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	68	15	$736	25%	94%	$1.50	55,667
University	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	20	20	$93	10%	90%	$0.55	57,266
University	Space Heat Boiler	Convert Constant Volume Air System to VAV	Variable Volume Air System	Constant Volume Air System	per building CFM	Existing	0.02	15	$2	15%	67%	$13.81	5,453
University	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.01	15	$0.26	5%	34%	$3.28	3,600
University	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	7	5	$169	75%	80%	$6.79	16,120
University	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	11	5	$122	50%	80%	$3.27	59,663

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
University	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$8.20	40,934
University	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.03	10	$0.91	5%	94%	$4.77	65,059
University	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	576	10	$5,292	73%	85%	$1.63	75,197
University	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	2,509	20	$8,367	100%	N/A	$0.41	39,299
University	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.01	25	$0.48	75%	85%	$4.40	25,575
University	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.13	25	$1	75%	13%	$1.40	56,297
University	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.09	25	$0.92	35%	35%	$1.05	34,009
University	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.37	25	$2	10%	35%	$0.65	41,842
University	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	149	15	$136	95%	21%	$0.13	7,241
University	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.05	10	$2	25%	98%	$6.54	61,249
University	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	6	20	$13	75%	65%	$0.26	22,074
University	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	38	3	$129	90%	45%	$1.54	31,449
University	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	Per Window SQFT	Existing	0.03	25	$63	10%	60%	$187.61	6,167
University	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	56	15	$393	25%	94%	$0.97	23,383
University	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	20	20	$93	10%	90%	$0.57	26,118
University	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	6	5	$169	75%	80%	$8.20	50,009
University	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$9.90	19,828
University	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.02	10	$0.91	5%	94%	$5.76	33,714
University	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	477	10	$5,292	73%	85%	$1.97	42,628
University	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	1,859	20	$7,196	100%	N/A	$0.47	62,149
University	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.01	25	$0.48	75%	85%	$5.31	65,074
University	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.01	25	$0.29	35%	35%	$2.17	19,095
University	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	109	15	$2,003	50%	95%	$2.57	17,924
University	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	123	15	$136	95%	10%	$0.15	15,581

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
University	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.04	10	$2	50%	98%	$7.90	81,693
University	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	Existing	99	15	$736	25%	94%	$1.04	93,822
University	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$5.68	18,784
University	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.04	10	$0.91	5%	94%	$3.30	26,345
University	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	Existing	833	10	$5,292	73%	85%	$1.13	8,457
University	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	2,549	18	$6,321	7%	N/A	$0.32	14,848
University	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	3,584	18	$6,321	7%	N/A	$0.23	28,301
University	Space Heat Furnace	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.42	10	$0.22	10%	39%	$0.09	18,049
University	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.01	25	$0.48	75%	85%	$3.04	50,850
University	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-7 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.20	25	$1	75%	13%	$0.97	3,356
University	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.17	25	$2	10%	15%	$1.42	2,387
University	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-11 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.14	25	$0.92	35%	35%	$0.72	94,368
University	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.52	25	$2	10%	35%	$0.47	54,789
University	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	216	15	$136	95%	21%	$0.09	27,590
University	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.04	7	$0.18	90%	80%	$1.00	94,859
University	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.67 (Average Existing Conditions)	Per Window SQFT	Existing	0.05	25	$63	10%	60%	$129.81	2,867
University	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	1 unit per 3,000 sqft	New	84	15	$393	25%	94%	$0.65	45,460
University	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$6.67	9,072
University	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.04	10	$0.91	5%	94%	$3.88	12,724
University	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Per Kitchen Exhaust	New	709	10	$5,292	73%	85%	$1.33	52,551
University	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	2,190	18	$5,434	7%	N/A	$0.32	9,040
University	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	2,635	18	$5,434	7%	N/A	$0.26	14,953
University	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.01	25	$0.48	75%	85%	$3.58	24,560
University	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.02	25	$0.29	35%	35%	$1.46	7,035

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
University	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	1	30	$5	50%	95%	$0.55	96,470
University	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	183	15	$136	95%	10%	$0.10	5,997
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	793	10	$8,367	35%	95%	$1.88	26,491
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	Existing	793	10	$8,367	35%	95%	$0.11	0.00
University	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	Existing	27	10	$261	35%	75%	$1.70	1,973
University	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.00	10	$0.26	55%	94%	$10.21	28,245
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$41	35%	25%	$0.13	0.00
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$41	35%	25%	$3.45	109
University	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	Existing	512	10	$2,562	95%	80%	$0.89	36,423
University	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	Existing	403	10	$3,661	95%	95%	$1.62	17,025
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	104	25	$805	5%	92%	$0.05	0.01
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	104	25	$805	5%	92%	$0.86	46,066
University	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	70%	$0.01	0.00
University	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	70%	$0.28	26,657
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	65%	$-0.23	0.00
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	Existing	2	5	$5	95%	65%	$0.82	2,551
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$5	95%	73%	$-1.25	0.00
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$5	95%	73%	$0.26	10,751
University	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$11	95%	35%	$-0.72	0.00
University	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$11	95%	35%	$0.13	20,618
University	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	636	14	$1,364	75%	N/A	$0.31	61,209
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	11	10	$192	75%	75%	$0.13	0.02
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	11	10	$192	75%	75%	$2.93	74,075
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	**%	$594.52	10,130
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	**%	$0.90	0.00

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
University	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	1,836	13	$3,956	75%	N/A	$0.33	73,842
University	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	40	5	$94	75%	15%	$0.70	43,710
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	791	10	$8,367	35%	95%	$0.11	0.00
University	Water Heat	Clothes Washer - Ozonating	Ozonating Clothes Washer	Standard Commercial Clothes Washer	Per unit, (average 72.5 gallon	New	791	10	$8,367	35%	95%	$1.88	14,136
University	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.73	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	per installation	New	26	10	$261	35%	75%	$1.74	1,032
University	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.00	10	$0.26	55%	94%	$10.23	64,934
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$41	35%	25%	$0.13	0.00
University	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$41	35%	25%	$3.53	57
University	Water Heat	Dishwashing - Commercial - High Temp	High Efficiency Dishwasher	Standard Dishwasher	per installation	New	501	10	$2,572	95%	80%	$0.91	19,436
University	Water Heat	Dishwashing - Commercial - Low Temp	Low-Temp Commercial Dishwasher (Includes Extra Chemmical Cost)	High Temp Commercial Dishwasher	per installation	New	394	10	$3,679	95%	95%	$1.66	9,085
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	104	25	$644	25%	92%	$0.04	0.03
University	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	104	25	$644	25%	92%	$0.69	25,151
University	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	53	15	$2,003	50%	95%	$5.21	61,110
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	65%	$-0.23	0.00
University	Water Heat	Low-Flow Pre-Rinse Spray Valves	0.6 GPM	1.6 GPM (Federal Standard)	Per unit. Ea.	New	2	5	$5	95%	65%	$0.84	1,334
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$5	95%	73%	$-1.25	0.00
University	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$5	95%	73%	$0.27	5,624
University	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	682	14	$1,944	75%	N/A	$0.41	26,551
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	11	10	$192	75%	75%	$0.13	0.01
University	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	11	10	$192	75%	75%	$2.93	39,528
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	**%	$0.90	0.00
University	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	**%	$595.84	5,129
University	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	1,969	13	$3,956	75%	N/A	$0.30	81,902
University	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	40	5	$94	75%	15%	$0.70	22,461
Warehouse	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	Existing	7	20	$93	10%	90%	$1.46	1,284

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Warehouse	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Per Building SQ.FT.	Existing	0.00	15	$0.26	5%	93%	$8.78	224
Warehouse	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	Existing	2	5	$169	75%	98%	$18.17	14,455
Warehouse	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Number of Points	Existing	4	5	$122	75%	98%	$8.74	11,158
Warehouse	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$21.94	922
Warehouse	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.01	10	$0.91	5%	94%	$12.77	1,487
Warehouse	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	Existing	1,002	20	$9,039	100%	N/A	$1.10	23,035
Warehouse	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	85%	$39.70	1,632
Warehouse	Space Heat Boiler	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-8 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.01	25	$1	75%	10%	$12.67	2,536
Warehouse	Space Heat Boiler	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-8 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.03	25	$0.92	35%	45%	$3.14	13,798
Warehouse	Space Heat Boiler	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.06	25	$2	10%	35%	$3.51	2,886
Warehouse	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	136	15	$135	95%	24%	$0.14	186
Warehouse	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	Existing	0.02	10	$2	25%	98%	$17.50	12,832
Warehouse	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Linear Foot	Existing	2	20	$13	75%	65%	$0.66	16,197
Warehouse	Space Heat Boiler	Steam Trap Maintenance	Actively stop steam trap leaks	No Maintanence	Per Steam Trap	Existing	14	3	$129	90%	45%	$4.13	16,630
Warehouse	Space Heat Boiler	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.03	25	$63	10%	98%	$231.69	131
Warehouse	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Boiler HP - Horse Power	New	7	20	$93	10%	90%	$1.52	383
Warehouse	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Number of Points	New	1	5	$169	75%	98%	$33.50	4,785
Warehouse	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$40.45	305
Warehouse	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.00	10	$0.91	5%	94%	$23.54	526
Warehouse	Space Heat Boiler	Gas Boiler	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Per installation	New	564	20	$5,091	100%	N/A	$1.10	10,007
Warehouse	Space Heat Boiler	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	85%	$73.20	540
Warehouse	Space Heat Boiler	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	45%	$14.44	514
Warehouse	Space Heat Boiler	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	40	15	$2,002	50%	95%	$6.87	1,830
Warehouse	Space Heat Boiler	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	74	15	$135	95%	12%	$0.25	262
Warehouse	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery-70% sensible and latent recovery effectiveness	No Heat Recovery	Building SQ.FT.	New	0.01	10	$2	50%	98%	$32.27	9,089

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Warehouse	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	Existing	0.00	18	$0.36	45%	45%	$15.18	82,083
Warehouse	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	Existing	0.01	10	$0.91	5%	94%	$8.83	15,120
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	Existing	1,018	18	$6,829	12%	N/A	$0.86	27,036
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	Existing	1,432	18	$6,829	12%	N/A	$0.61	11,438
Warehouse	Space Heat Furnace	Infiltration Reduction	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	per window sqft	Existing	0.18	10	$0.22	10%	39%	$0.21	23,690
Warehouse	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	Existing	0.00	25	$0.48	75%	85%	$27.47	45,286
Warehouse	Space Heat Furnace	Insulation - Ceiling	R-30 + 8 c.i. (WA State Code)	R-8 (Average Existing Conditions)	Ceiling SQ.FT.	Existing	0.02	25	$1	75%	10%	$8.76	96,273
Warehouse	Space Heat Furnace	Insulation - Duct	R-7 (WA State Code)	No Insulation	per surface area of duct insul	Existing	0.06	25	$2	10%	15%	$3.80	10,417
Warehouse	Space Heat Furnace	Insulation - Floor (non-slab)	R-30 (WA State Code)	R-8 (Average Existing Conditions)	Floor SQ.FT.	Existing	0.04	25	$0.92	35%	45%	$2.17	25,784
Warehouse	Space Heat Furnace	Insulation - Wall	R-13 + 7.5 (WA State Code)	R-3 (Average Existing Conditions)	Wall SQ.FT.	Existing	0.15	25	$2	10%	35%	$1.56	60,376
Warehouse	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	Existing	197	15	$135	95%	24%	$0.10	33,160
Warehouse	Space Heat Furnace	Re-Commissioning	Re-Commissioning	Average Existing Conditions	Building SQFT	Existing	0.01	7	$0.18	90%	80%	$2.68	35,416
Warehouse	Space Heat Furnace	Windows-High Efficiency	U-0.40 (WA State Code)	U-0.65 (Average Existing Conditions)	Per Window SQFT	Existing	0.04	25	$63	10%	98%	$160.32	11,742
Warehouse	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Building SQ.FT.	New	0.00	18	$0.36	45%	45%	$27.25	26,589
Warehouse	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Building CFM	New	0.01	10	$0.91	5%	94%	$15.86	37,291
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Per installation	New	573	18	$3,844	12%	N/A	$0.86	53,768
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Per installation	New	806	18	$3,844	12%	N/A	$0.61	89,449
Warehouse	Space Heat Furnace	Insulation - Ceiling	R-30 + 19 c.i.	R-30 + 8 c.i. (WA State Code)	Ceiling SQ.FT.	New	0.00	25	$0.48	75%	85%	$49.31	47,063
Warehouse	Space Heat Furnace	Insulation - Floor (non-slab)	R-38	R-30 (WA State Code)	Floor SQ.FT.	New	0.00	25	$0.29	35%	45%	$9.73	36,454
Warehouse	Space Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands	Std duct workmanship	per linear feet of duct insula	New	0.27	30	$5	50%	95%	$2.24	65,605
Warehouse	Space Heat Furnace	Programmable Thermostat	Energy Star Programmable Thermostat	Manual Thermostat	per installation	New	110	15	$135	95%	12%	$0.17	18,948
Warehouse	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	Existing	0.00	10	$0.26	55%	94%	$50.82	25,220
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$43	3%	25%	$0.13	0.00
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	Existing	1	12	$43	3%	25%	$3.52	13
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	130	25	$807	5%	92%	$0.04	0.02
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	Existing	130	25	$807	5%	92%	$0.70	9,059

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Warehouse	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$0.00	0.01
Warehouse	Water Heat	Hot Water (SHW) Pipe Insulation	1.0" of Insulation, assuming R-4 (WA State Code)	No Insulation	per linear foot	Existing	1	12	$2	75%	90%	$0.26	6,870
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$0.00	95%	73%	$-0.06	0.00
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	Existing	3	10	$0.00	95%	73%	$0.00	746
Warehouse	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$20	95%	35%	$-0.09	0.00
Warehouse	Water Heat	Low-Flow Showerheads	2.5 GPM (Federal Code)	4.5 GPM	Per unit. Ea.	Existing	15	10	$20	95%	35%	$0.23	1,431
Warehouse	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	Existing	136	14	$239	75%	N/A	$0.26	12,144
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	11	10	$192	75%	95%	$0.17	0.04
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	Existing	11	10	$192	75%	95%	$2.92	18,498
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	49%	$6.57	0.00
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	Existing	0.00	10	$0.87	75%	49%	$27,956.67	103
Warehouse	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	Existing	394	13	$693	75%	N/A	$0.27	73,883
Warehouse	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	Existing	50	5	$91	75%	45%	$0.54	26,246
Warehouse	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Per Building SQ.FT.	New	0.00	10	$0.26	55%	94%	$50.94	12,756
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$43	3%	25%	$0.13	0.00
Warehouse	Water Heat	Dishwasher Residential	ENERGY STAR <= 324 kWh/yr, <= 5.8 gal/cycle	Federal Standard <= 355 kWh/yr, <= 6.5 gal/cycle	per installation	New	1	12	$43	3%	25%	$3.60	7
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	129	25	$645	25%	92%	$0.56	24,373
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Per DWH. Ea. (40gallons = 1 un	New	129	25	$645	25%	92%	$0.03	0.06
Warehouse	Water Heat	Integrated Space Heating/Water Heating	Integrated System	Separate Boiler And HW Heater	Per 200 kbtu boiler unit	New	16	15	$2,002	50%	95%	$16.98	12,005
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$0.00	95%	73%	$-0.05	0.00
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM (Federal Code)	Per unit. Ea.	New	3	10	$0.00	95%	73%	$0.00	390
Warehouse	Water Heat	Tankless Water Heater	EF = 0.82	EF = 0.67	Per installation	New	146	14	$337	75%	N/A	$0.33	5,279
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	11	10	$192	75%	95%	$0.17	0.02
Warehouse	Water Heat	Ultrasonic Faucet Control	Install Ultrasonic Motion Faucet Control	No Faucet Control	Per unit. Ea.	New	11	10	$192	75%	95%	$2.93	9,872
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	49%	$6.47	0.00
Warehouse	Water Heat	Water Cooled Refrigeration with Heat Recovery	Heat Recovery from refrigeration system. Applied to Water Heating Electric End use	No heat recovery	Building SQ.FT.	New	0.00	10	$0.87	75%	49%	$28,017.75	52
Warehouse	Water Heat	Water Heater - Condensing	EF = 0.90	EF = 0.67	Per installation	New	423	13	$693	75%	N/A	$0.25	75,969

Segment	End Use	Measure Name	Measure Description	Baseline Description	Unit Description	Construction Vintage	Savings per Unit (Therms)	Measure Life	Incremental Cost per Unit	Percent of Installations Technically Feasible	Percent of Installations Incomplete	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Warehouse	Water Heat	Water Heater Temperature Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Per DWH. Ea. (40gallons = 1 un	New	49	5	$91	75%	45%	$0.55	14,122

Table B.3.6. Industrial Gas Measure Details

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per Therms	Measure Applicability	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Chemical Mfg	Hvac	HVAC Improvements	21%	15	$0.94	100%	$0.13	3,530
Chemical Mfg	Hvac	HVAC O&M	14%	2	$1.11	100%	$0.74	1,869
Chemical Mfg	Indirect Boiler	Boiler Improvements	2%	15	$0.26	100%	$0.04	14,025
Chemical Mfg	Indirect Boiler	Boiler O&M	3%	2	$0.16	100%	$0.11	20,012
Chemical Mfg	Process Heat	Boiler Improvements	21%	15	$0.06	100%	$0.01	52,309
Chemical Mfg	Process Heat	Heat Improvements	10%	15	$0.36	100%	$0.05	20,955
Chemical Mfg	Process Heat	Heat O&M	1%	2	$0.53	100%	$0.36	1,028
Chemical Mfg	Process Heat	Steam Distribution	14%	15	$0.05	100%	$0.01	42,263
Chemical Mfg	Process Other	Other O&M	10%	2	$0.28	100%	$0.19	9,052
Computer Electronic Mfg	Hvac	HVAC Improvements	11%	15	$0.74	100%	$0.10	82,844
Computer Electronic Mfg	Hvac	HVAC O&M	14%	2	$0.38	100%	$0.25	91,322
Computer Electronic Mfg	Indirect Boiler	Boiler Improvements	12%	15	$1.17	100%	$0.16	94,746
Computer Electronic Mfg	Indirect Boiler	Boiler O&M	9%	2	$0.13	100%	$0.09	79,228
Computer Electronic Mfg	Process Heat	Boiler Improvements	4%	15	$1.69	100%	$0.24	4,265
Computer Electronic Mfg	Process Heat	Heat Improvements	24%	15	$0.37	100%	$0.05	33,585
Computer Electronic Mfg	Process Heat	Heat O&M	4%	2	$0.58	100%	$0.39	3,936
Computer Electronic Mfg	Process Heat	Steam Distribution	10%	15	$0.49	100%	$0.07	10,420
Electrical Equipment Mfg	Hvac	HVAC Improvements	10%	15	$0.60	100%	$0.08	16,791
Electrical Equipment Mfg	Hvac	HVAC O&M	5%	2	$0.18	100%	$0.12	6,622
Electrical Equipment Mfg	Indirect Boiler	Boiler Improvements	12%	15	$1.13	100%	$0.16	14,798
Electrical Equipment Mfg	Indirect Boiler	Boiler O&M	13%	2	$0.23	100%	$0.15	18,227
Electrical Equipment Mfg	Process Heat	Boiler Improvements	7%	15	$0.53	100%	$0.07	30,529
Electrical Equipment Mfg	Process Heat	Heat Improvements	17%	15	$0.56	100%	$0.08	66,263
Electrical Equipment Mfg	Process Heat	Heat O&M	3%	2	$0.43	100%	$0.29	8,059
Electrical Equipment Mfg	Process Heat	Steam Distribution	6%	15	$0.34	100%	$0.05	27,898
Fabricated Metal Products	Hvac	HVAC Improvements	15%	15	$1.22	100%	$0.17	75,476
Fabricated Metal Products	Hvac	HVAC O&M	13%	2	$0.69	100%	$0.46	57,765
Fabricated Metal Products	Indirect Boiler	Boiler Improvements	17%	15	$1.57	100%	$0.22	84,001
Fabricated Metal Products	Indirect Boiler	Boiler O&M	12%	2	$0.11	100%	$0.07	65,210
Fabricated Metal Products	Process Heat	Boiler Improvements	6%	15	$0.47	100%	$0.07	36,750
Fabricated Metal Products	Process Heat	Heat Improvements	7%	15	$0.91	100%	$0.13	39,670
Fabricated Metal Products	Process Heat	Heat O&M	4%	2	$0.48	100%	$0.32	67,061
Fabricated Metal Products	Process Heat	Steam Distribution	5%	15	$0.65	100%	$0.09	11,660
Fabricated Metal Products	Process Other	Other O&M	12%	2	$0.49	100%	$0.33	1,903
Food Mfg	Hvac	HVAC Improvements	20%	15	$0.58	100%	$0.08	34,841
Food Mfg	Hvac	HVAC O&M	6%	2	$0.21	100%	$0.14	7,627
Food Mfg	Indirect Boiler	Boiler Improvements	6%	15	$0.82	100%	$0.11	20,632
Food Mfg	Indirect Boiler	Boiler O&M	4%	2	$0.36	100%	$0.24	78,488
Food Mfg	Process Heat	Boiler Improvements	7%	15	$0.32	100%	$0.04	84,730
Food Mfg	Process Heat	Heat Improvements	13%	15	$0.50	100%	$0.07	35,753
Food Mfg	Process Heat	Heat O&M	4%	2	$0.35	100%	$0.23	32,362
Food Mfg	Process Heat	Steam Distribution	5%	15	$0.46	100%	$0.06	57,763
Food Mfg	Process Other	Other O&M	28%	2	$0.14	100%	$0.09	36,324
Industrial Machinery	Hvac	HVAC Improvements	14%	15	$0.82	100%	$0.11	87,685
Industrial Machinery	Hvac	HVAC O&M	15%	2	$0.34	100%	$0.23	62,993
Industrial Machinery	Indirect Boiler	Boiler Improvements	19%	15	$1.03	100%	$0.14	39,427
Industrial Machinery	Indirect Boiler	Boiler O&M	15%	2	$0.17	100%	$0.12	31,488
Industrial Machinery	Process Heat	Boiler Improvements	2%	15	$1.09	100%	$0.15	17,720
Industrial Machinery	Process Heat	Heat Improvements	13%	15	$0.51	100%	$0.07	29,834
Industrial Machinery	Process Heat	Heat O&M	10%	2	$0.57	100%	$0.38	80,887

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per Therms	Measure Applicability	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Industrial Machinery	Process Heat	Steam Distribution	6%	15	$0.36	100%	$0.05	64,966
Miscellaneous Mfg	Hvac	HVAC Improvements	17%	15	$0.70	50%	$0.10	97,136
Miscellaneous Mfg	Hvac	HVAC O&M	20%	2	$0.05	50%	$0.03	126
Miscellaneous Mfg	Indirect Boiler	Boiler Improvements	14%	15	$0.59	50%	$0.08	94,587
Miscellaneous Mfg	Indirect Boiler	Boiler O&M	5%	2	$0.21	50%	$0.14	33,533
Miscellaneous Mfg	Process Heat	Boiler Improvements	4%	15	$1.05	50%	$0.15	32,638
Miscellaneous Mfg	Process Heat	Heat Improvements	8%	15	$0.46	50%	$0.06	63,232
Miscellaneous Mfg	Process Heat	Heat O&M	4%	2	$0.33	50%	$0.22	25,924
Miscellaneous Mfg	Process Heat	Steam Distribution	12%	15	$0.21	50%	$0.03	97,135
Nonmetallic Mineral Products	Hvac	HVAC Improvements	11%	15	$1.16	100%	$0.16	6,926
Nonmetallic Mineral Products	Hvac	HVAC O&M	2%	2	$0.46	100%	$0.31	1,103
Nonmetallic Mineral Products	Indirect Boiler	Boiler O&M	5%	2	$0.07	100%	$0.04	3,598
Nonmetallic Mineral Products	Process Heat	Boiler Improvements	22%	15	$0.20	100%	$0.03	85,785
Nonmetallic Mineral Products	Process Heat	Heat Improvements	13%	15	$0.90	100%	$0.13	26,146
Nonmetallic Mineral Products	Process Heat	Heat O&M	3%	2	$0.30	100%	$0.20	25,887
Nonmetallic Mineral Products	Process Heat	Steam Distribution	5%	15	$0.41	100%	$0.06	47,569
Nonmetallic Mineral Products	Process Other	Other O&M	15%	2	$1.95	100%	$1.30	3,466
Paper Mfg	Hvac	HVAC Improvements	18%	15	$0.66	100%	$0.09	1,978
Paper Mfg	Hvac	HVAC O&M	22%	2	$0.14	100%	$0.09	3,052
Paper Mfg	Indirect Boiler	Boiler Improvements	8%	15	$0.48	100%	$0.07	22,273
Paper Mfg	Indirect Boiler	Boiler O&M	4%	2	$0.12	100%	$0.08	10,890
Paper Mfg	Process Heat	Boiler Improvements	6%	15	$0.48	100%	$0.07	7,680
Paper Mfg	Process Heat	Heat Improvements	10%	15	$0.68	100%	$0.09	11,983
Paper Mfg	Process Heat	Heat O&M	3%	2	$0.24	100%	$0.16	3,200
Paper Mfg	Process Heat	Steam Distribution	4%	15	$0.18	100%	$0.02	4,812
Paper Mfg	Process Other	Other O&M	20%	2	$0.66	100%	$0.44	3,827
Petroleum Coal Products	Indirect Boiler	Boiler Improvements	9%	15	$0.92	100%	$0.13	5,596
Petroleum Coal Products	Indirect Boiler	Boiler O&M	6%	2	$0.17	100%	$0.11	3,926
Petroleum Coal Products	Process Heat	Boiler Improvements	2%	15	$0.77	100%	$0.11	2,152
Petroleum Coal Products	Process Heat	Heat Improvements	5%	15	$0.75	100%	$0.10	5,689
Petroleum Coal Products	Process Heat	Heat O&M	2%	2	$0.19	100%	$0.13	2,521
Petroleum Coal Products	Process Heat	Steam Distribution	3%	15	$0.05	100%	$0.01	3,691
Plastics Rubber Products	Hvac	HVAC Improvements	9%	15	$0.63	100%	$0.09	22,148
Plastics Rubber Products	Hvac	HVAC O&M	12%	2	$31.16	100%	$20.83	27,022
Plastics Rubber Products	Indirect Boiler	Boiler Improvements	12%	15	$0.31	100%	$0.04	69,425
Plastics Rubber Products	Indirect Boiler	Boiler O&M	6%	2	$0.22	100%	$0.15	31,244
Plastics Rubber Products	Process Heat	Boiler Improvements	10%	15	$0.63	100%	$0.09	25,694
Plastics Rubber Products	Process Heat	Heat Improvements	13%	15	$0.63	100%	$0.09	37,851
Plastics Rubber Products	Process Heat	Heat O&M	8%	2	$0.62	100%	$0.42	18,961
Plastics Rubber Products	Process Heat	Steam Distribution	7%	15	$0.16	100%	$0.02	20,901
Plastics Rubber Products	Process Other	Other O&M	17%	2	$0.19	100%	$0.13	9,909
Primary Metal Mfg	Hvac	HVAC Improvements	14%	15	$0.46	100%	$0.06	2,890
Primary Metal Mfg	Indirect Boiler	Boiler Improvements	18%	15	$0.98	100%	$0.14	4,811
Primary Metal Mfg	Indirect Boiler	Boiler O&M	14%	2	$0.15	100%	$0.10	4,255
Primary Metal Mfg	Process Heat	Boiler Improvements	8%	15	$0.43	100%	$0.06	18,600

Segment	End Use	Measure Name	Percent of End Use Consumption Saved	Measure Life	Incremental Cost per Therms	Measure Applicability	Levelized Cost ($ per Therms)	2031 Achievable Technical Potential (Therms)
Primary Metal Mfg	Process Heat	Heat Improvements	8%	15	$0.74	100%	$0.10	18,430
Primary Metal Mfg	Process Heat	Heat O&M	2%	2	$0.49	100%	$0.33	3,326
Primary Metal Mfg	Process Heat	Steam Distribution	4%	15	$0.39	100%	$0.05	10,475
Printing Related Support	Hvac	HVAC Improvements	17%	15	$0.44	100%	$0.06	69,542
Printing Related Support	Hvac	HVAC O&M	31%	2	$0.33	100%	$0.22	1,626
Printing Related Support	Indirect Boiler	Boiler Improvements	12%	15	$1.04	100%	$0.15	31,541
Printing Related Support	Indirect Boiler	Boiler O&M	10%	2	$0.13	100%	$0.09	29,422
Printing Related Support	Process Heat	Boiler Improvements	16%	15	$1.75	100%	$0.24	82,601
Printing Related Support	Process Heat	Heat Improvements	5%	15	$0.44	100%	$0.06	55,013
Printing Related Support	Process Heat	Heat O&M	4%	2	$0.60	100%	$0.40	41,114
Printing Related Support	Process Heat	Steam Distribution	17%	15	$0.36	100%	$0.05	46,085
Transportation Equipment Mfg	Hvac	HVAC Improvements	7%	15	$0.99	100%	$0.14	66,016
Transportation Equipment Mfg	Hvac	HVAC O&M	14%	2	$0.18	100%	$0.12	43,044
Transportation Equipment Mfg	Indirect Boiler	Boiler Improvements	19%	15	$0.99	100%	$0.14	95,191
Transportation Equipment Mfg	Indirect Boiler	Boiler O&M	6%	2	$0.71	100%	$0.47	25,533
Transportation Equipment Mfg	Process Heat	Boiler Improvements	15%	15	$0.25	100%	$0.03	39,237
Transportation Equipment Mfg	Process Heat	Heat Improvements	20%	15	$0.32	100%	$0.04	53,041
Transportation Equipment Mfg	Process Heat	Heat O&M	3%	2	$0.73	100%	$0.49	21,556
Transportation Equipment Mfg	Process Heat	Steam Distribution	5%	15	$8.28	100%	$1.16	32,326
Transportation Equipment Mfg	Process Other	Other O&M	17%	2	$0.42	100%	$0.28	10,935
Wood Product Mfg	Hvac	HVAC Improvements	10%	15	$1.09	100%	$0.15	9,650
Wood Product Mfg	Hvac	HVAC O&M	5%	2	$0.17	100%	$0.12	4,653
Wood Product Mfg	Indirect Boiler	Boiler Improvements	12%	15	$0.48	100%	$0.07	48,124
Wood Product Mfg	Indirect Boiler	Boiler O&M	4%	2	$0.08	100%	$0.05	14,819
Wood Product Mfg	Process Heat	Boiler Improvements	11%	15	$0.34	100%	$0.05	88,752
Wood Product Mfg	Process Heat	Heat Improvements	8%	15	$2.21	100%	$0.31	52,089
Wood Product Mfg	Process Heat	Heat O&M	6%	2	$0.11	100%	$0.07	40,001
Wood Product Mfg	Process Heat	Steam Distribution	1%	15	$0.08	100%	$0.01	11,596
Wood Product Mfg	Process Other	Other O&M	7%	2	$0.16	100%	$0.10	3,548

Appendix B.4: Detailed Results

The following pie charts show how achievable technical potential is distributed by fuel, sector, segment, and end use.

Figure B.4.1 Electric Achievable Technical Potential: Residential by Segment

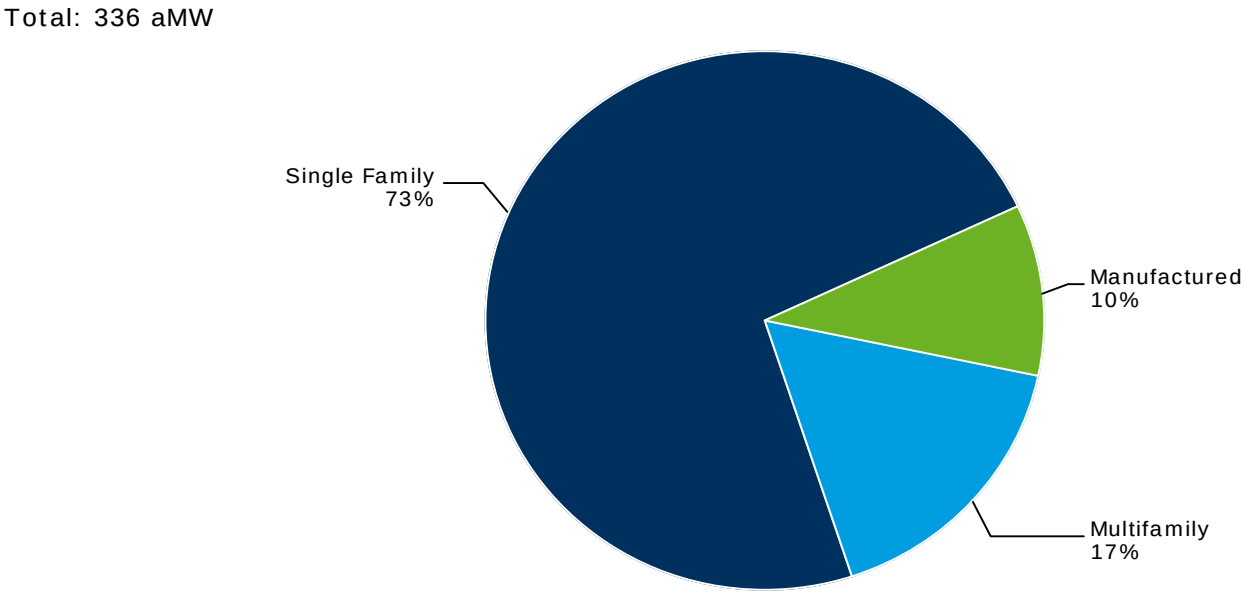


Figure B.4.2 Electric Achievable Technical Potential: Commercial by Segment

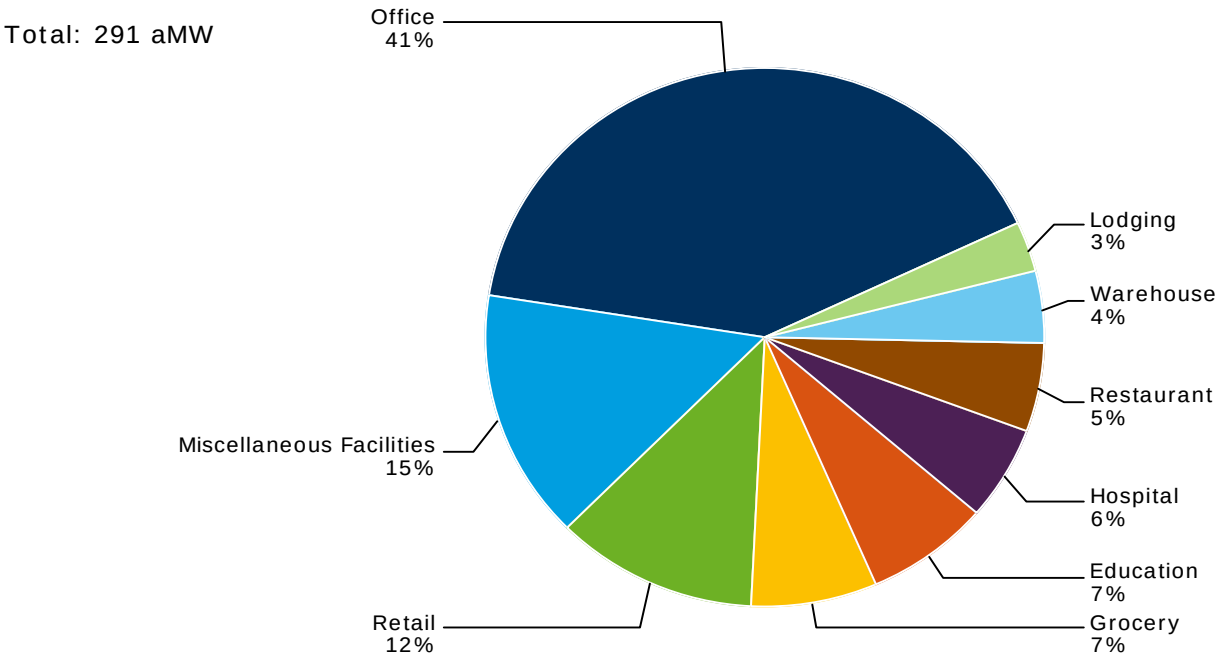
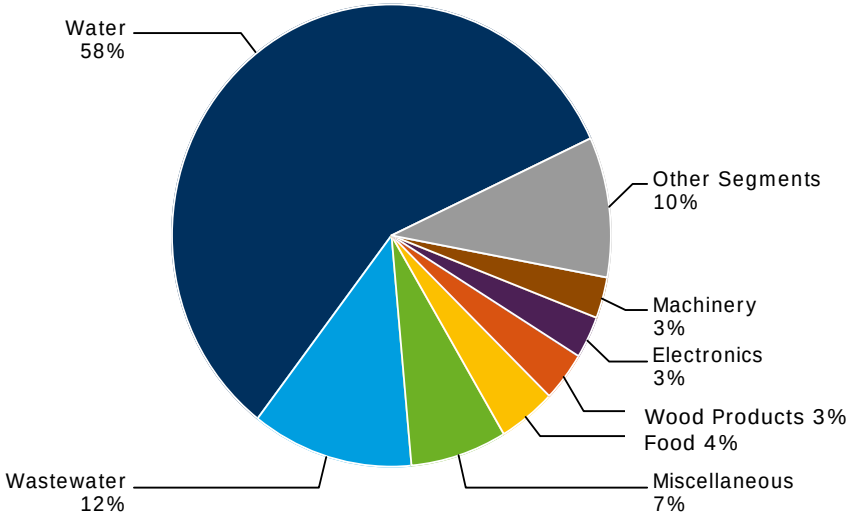


Figure B.4.3 Electric Achievable Technical Potential: Industrial by Segment

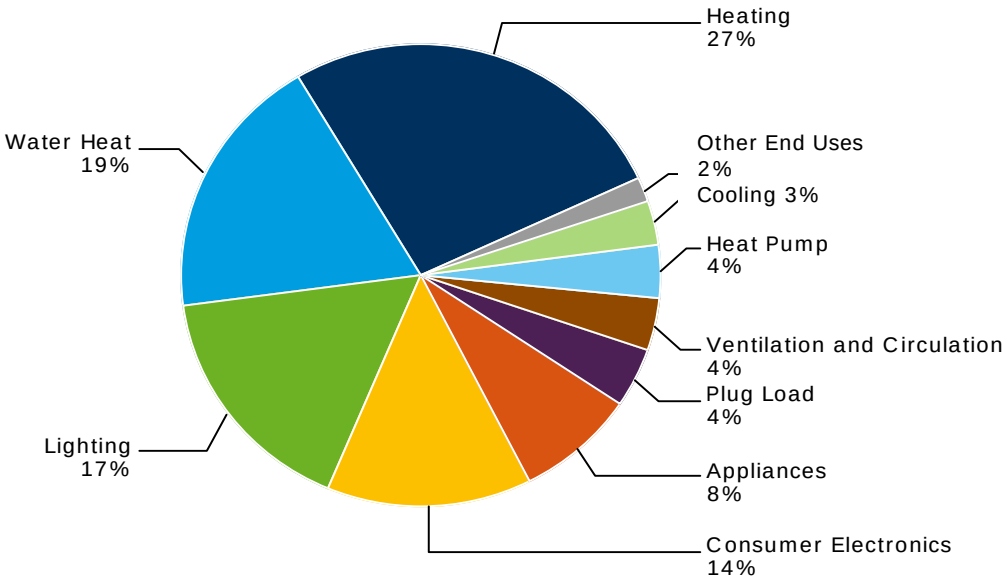
Total: 18 aMW



Note: 'Other Segments' includes:
Metals: 2%, Transportation: 2%, Printing: 1%, Paper: 1%, Minerals: 1%, Electrical: <1%, Chemicals: <1%, Plastic/Rubber: <1%, Petroleum: <1%

Figure B.4.4 Electric Achievable Technical Potential: Residential by End Use

Total: 336 aMW



Note: 'Other End Uses' includes:
Computer: 1%, Pool Pump: <1%

Figure B.4.5 Electric Achievable Technical Potential: Commercial by End Use

Total: 291 aMW

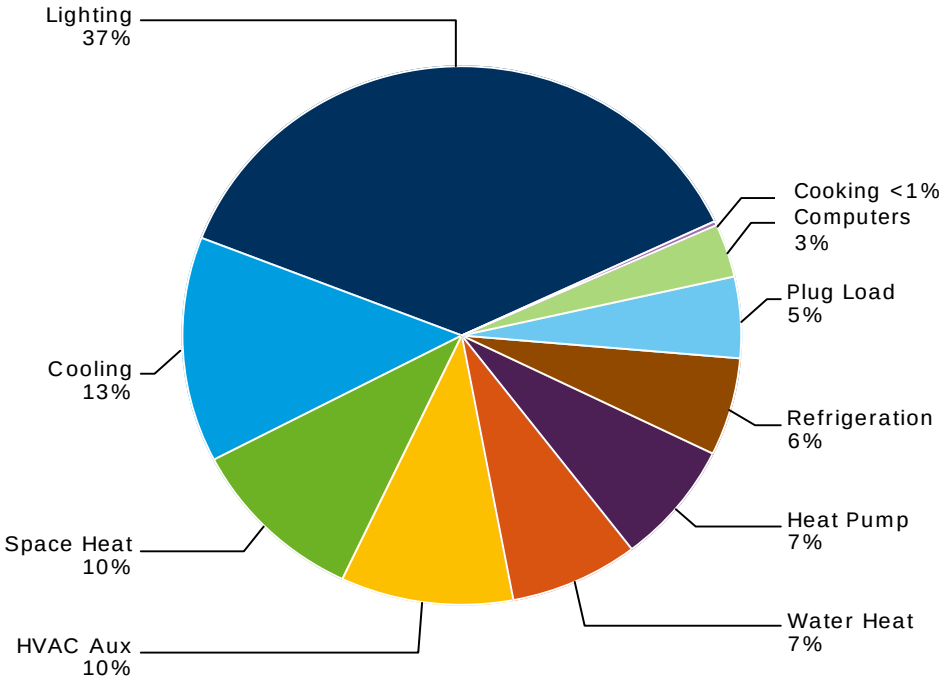


Figure B.4.6 Electric Achievable Technical Potential: Industrial by End Use

Total: 18 aMW

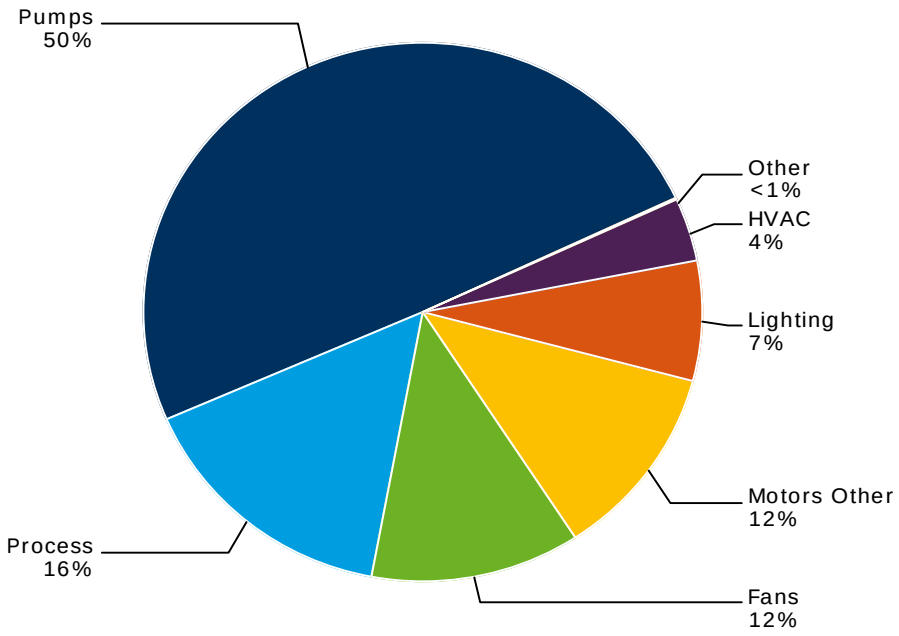
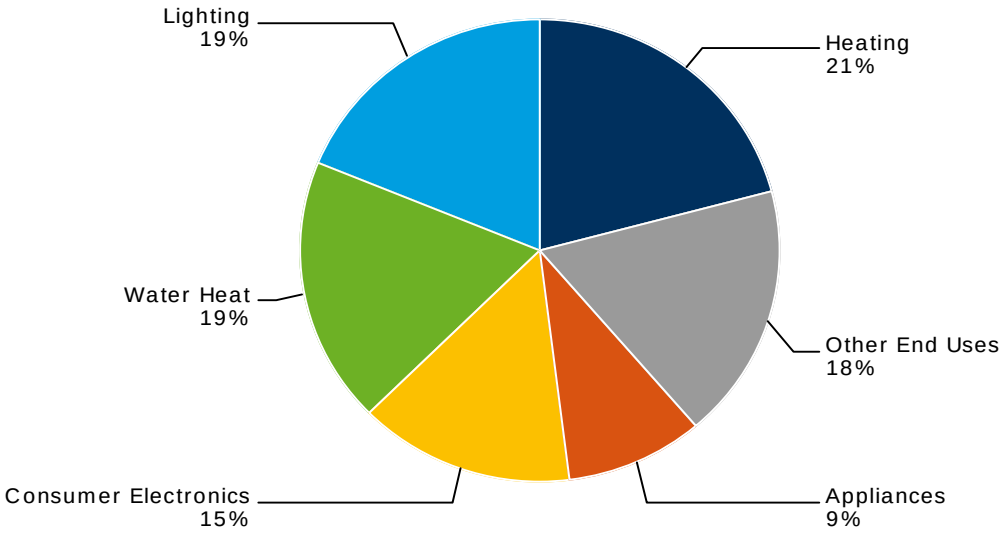


Figure B.4.7 Electric Achievable Technical Potential: Residential Single Family by End Use

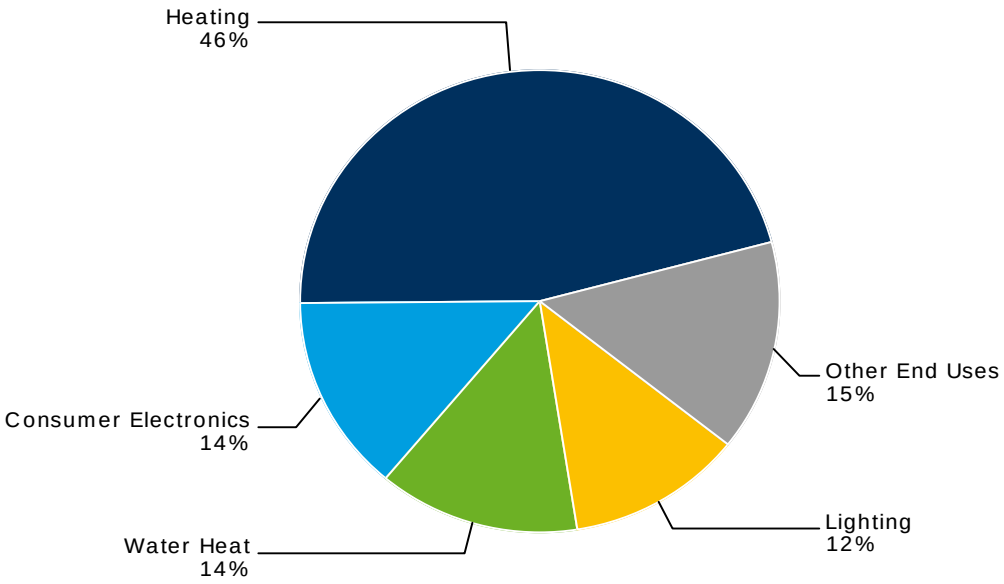
Total: 246 aMW



Note: 'Other End Uses' includes:
Plug Load: 4%, Heat Pump: 4%, Ventilation and Circulation: 4%, Cooling: 4%, Computer: 2%, Pool Pump: <1%

Figure B.4.8 Electric Achievable Technical Potential: Residential Multifamily by End Use

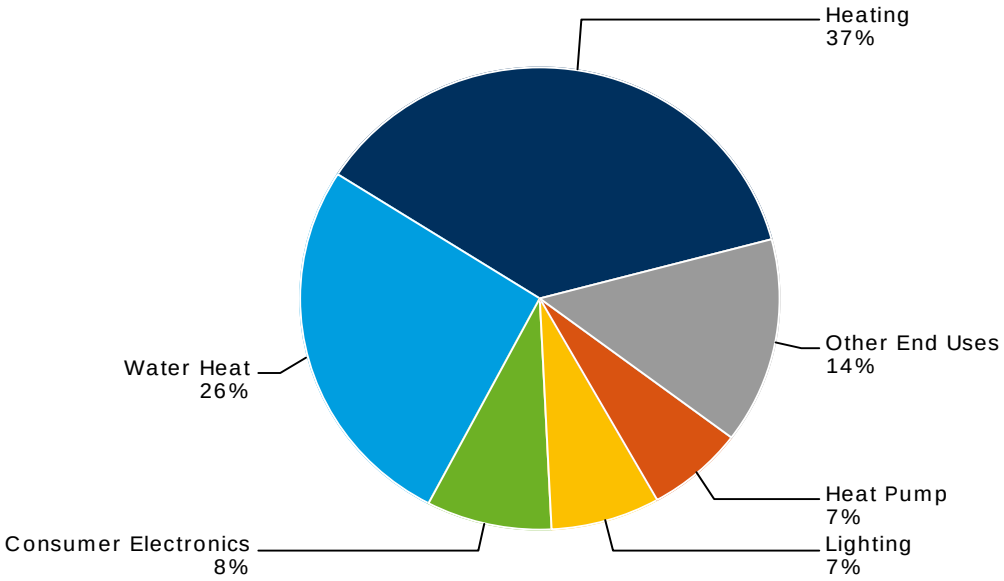
Total: 56 aMW



Note: 'Other End Uses' includes:
Appliances: 5%, Plug Load: 4%, Ventilation and Circulation: 4%, Computer: 1%, Cooling: <1%

Figure B.4.9 Electric Achievable Technical Potential: Residential Manufactured by End Use

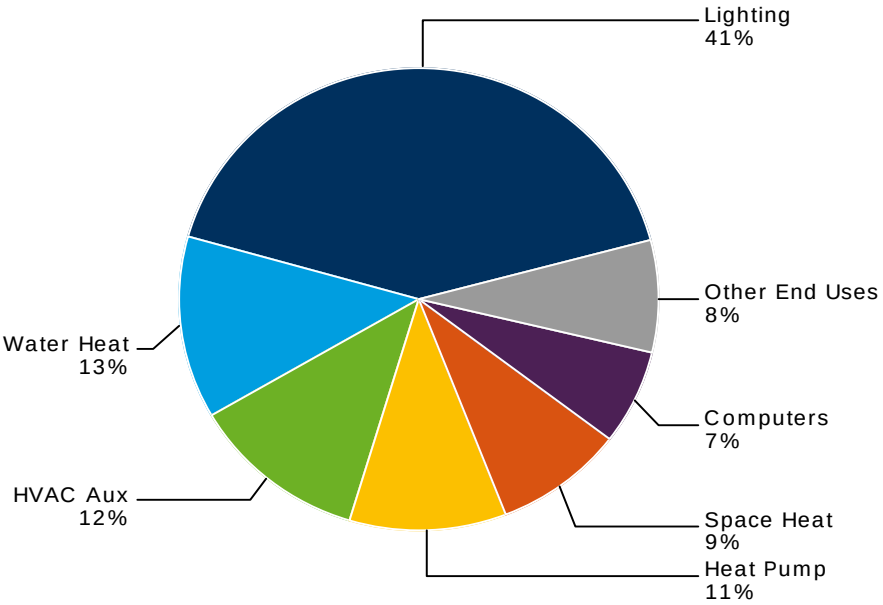
Total: 34 aMW



Note: 'Other End Uses' includes:
Appliances: 5%, Cooling: 3%, Ventilation and Circulation: 3%, Plug Load: 3%, Computer: <1%

Figure B.4.10 Electric Achievable Technical Potential: Commercial Education by End Use

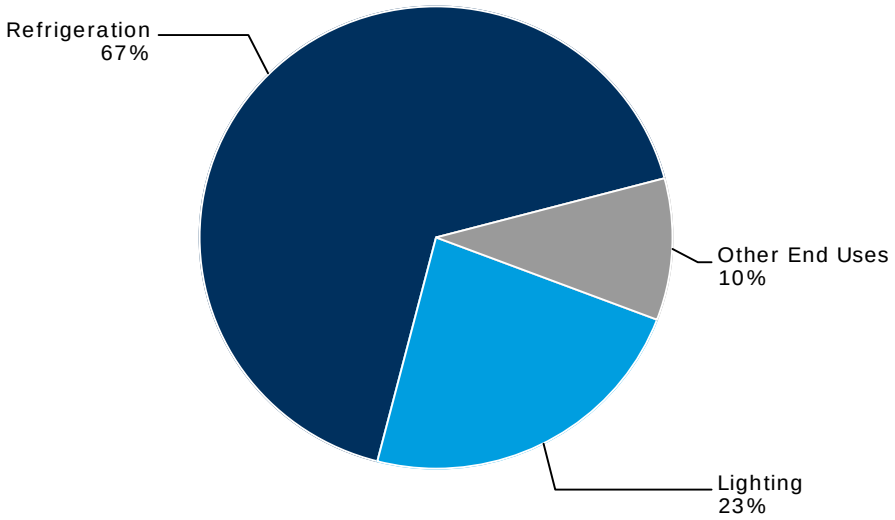
Total: 21 aMW



Note: 'Other End Uses' includes:
Cooling: 3%, Plug Load: 3%, Refrigeration: 2%, Cooking: <1%

Figure B.4.11 Electric Achievable Technical Potential: Commercial Grocery by End Use

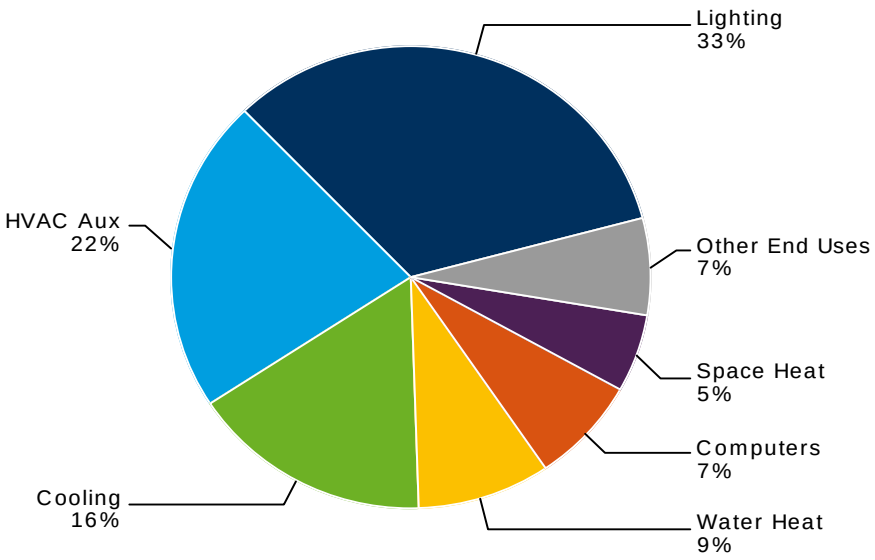
Total: 21 aMW



Note: 'Other End Uses' includes:
Cooling: 4%, HVAC Aux: 2%, Heat Pump: 2%, Plug Load: <1%, Space Heat: <1%, Water Heat: <1%, Computers: <1%, Cooking: <1%

Figure B.4.12 Electric Achievable Technical Potential: Commercial Hospital by End Use

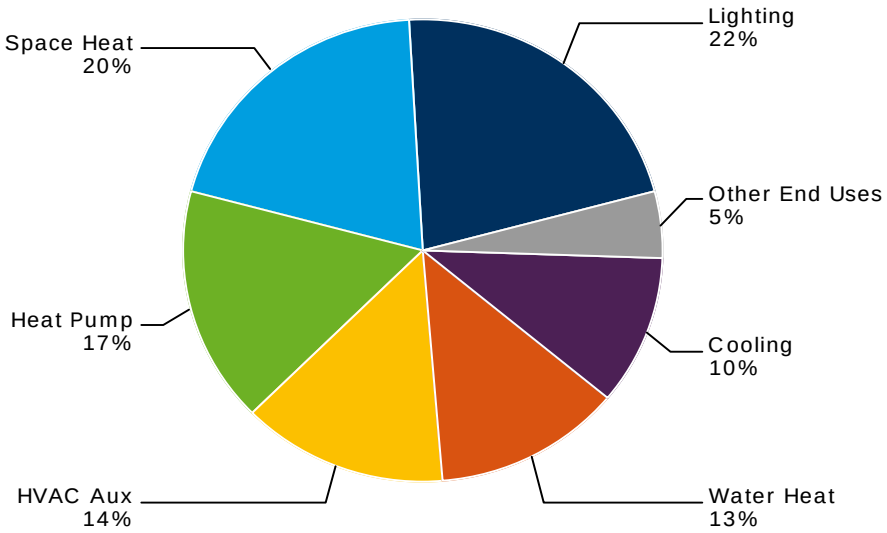
Total: 16 aMW



Note: 'Other End Uses' includes:
Plug Load: 4%, Heat Pump: 2%, Refrigeration: <1%, Cooking: <1%

Figure B.4.13 Electric Achievable Technical Potential: Commercial Lodging by End Use

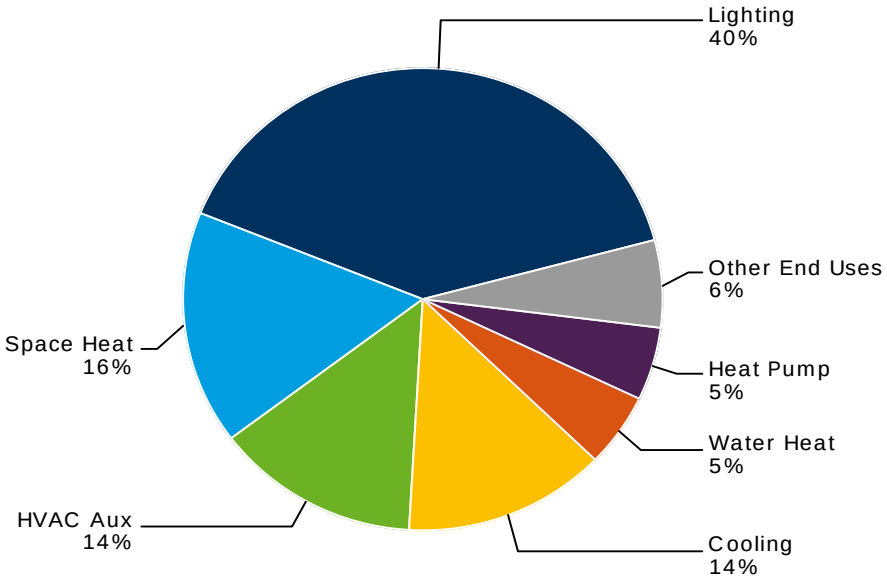
Total: 9 aMW



Note: 'Other End Uses' includes:
Plug Load: 4%, Computers: <1%, Cooking: <1%

Figure B.4.14 Electric Achievable Technical Potential: Commercial Miscellaneous Facilities by End Use

Total: 44 aMW



Note: 'Other End Uses' includes:
Plug Load: 4%, Computers: 2%, Refrigeration: <1%

Figure B.4.15 Electric Achievable Technical Potential: Commercial Office by End Use

Total: 118 aMW

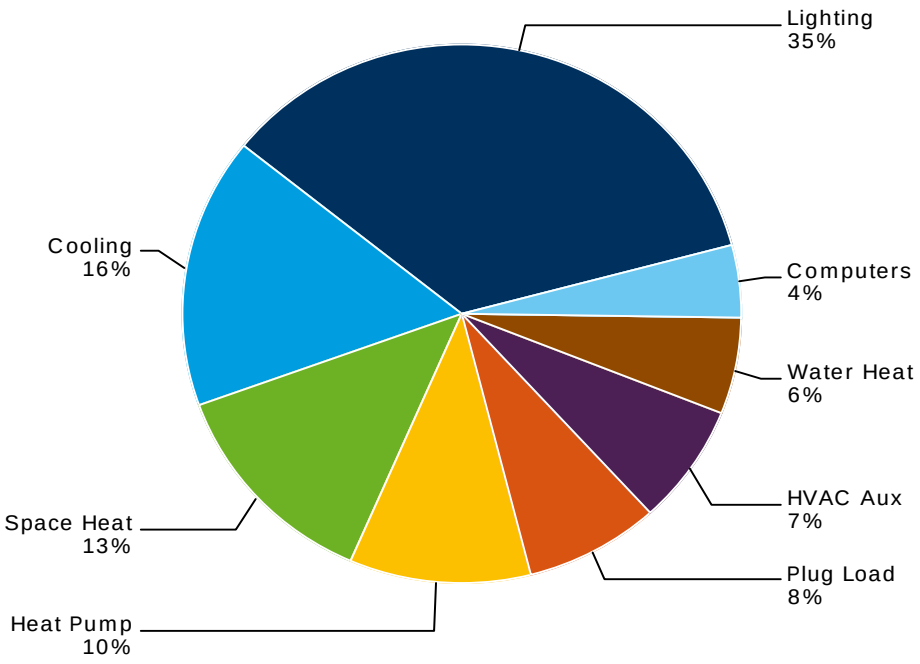
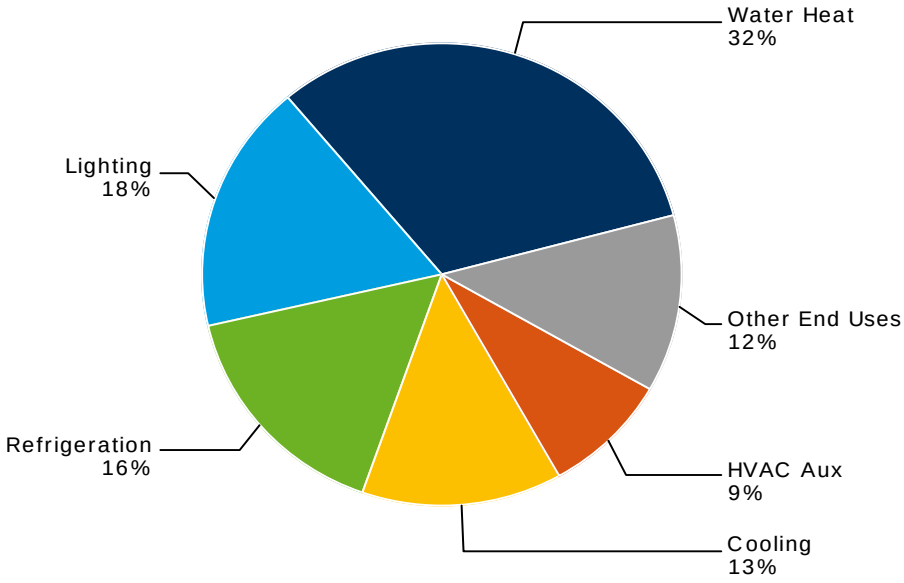


Figure B.4.16 Electric Achievable Technical Potential: Commercial Restaurant by End Use

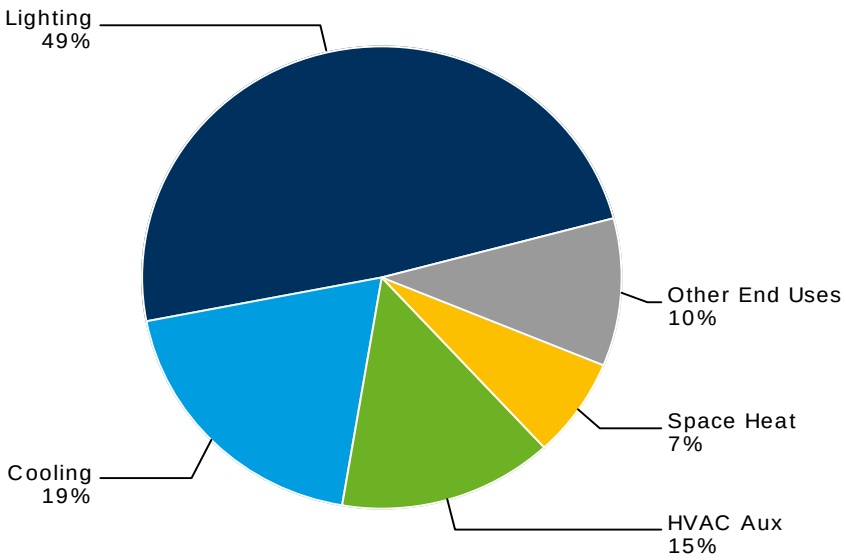
Total: 15 aMW



Note: 'Other End Uses' includes:
Plug Load: 4%, Cooking: 4%, Heat Pump: 3%, Space Heat: <1%, Computers: <1%

Figure B.4.17 Electric Achievable Technical Potential: Commercial Retail by End Use

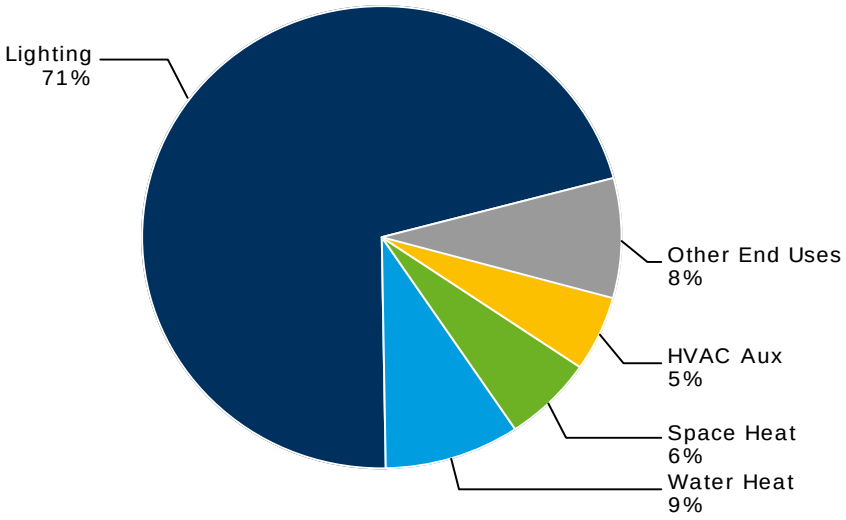
Total: 34 aMW



Note: 'Other End Uses' includes:
Heat Pump: 4%, Water Heat: 4%, Plug Load: 2%, Computers: <1%

Figure B.4.18 Electric Achievable Technical Potential: Commercial Warehouse by End Use

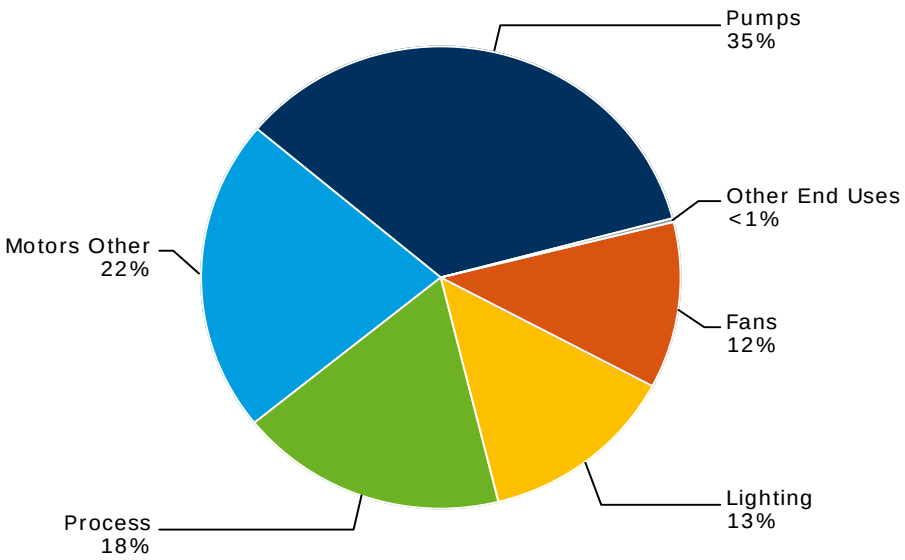
Total: 13 aMW



Note: 'Other End Uses' includes:
Cooling: 2%, Plug Load: 2%, Heat Pump: 2%, Computers: 2%, Refrigeration: <1%

Figure B.4.19 Electric Achievable Technical Potential: Industrial Chemicals by End Use

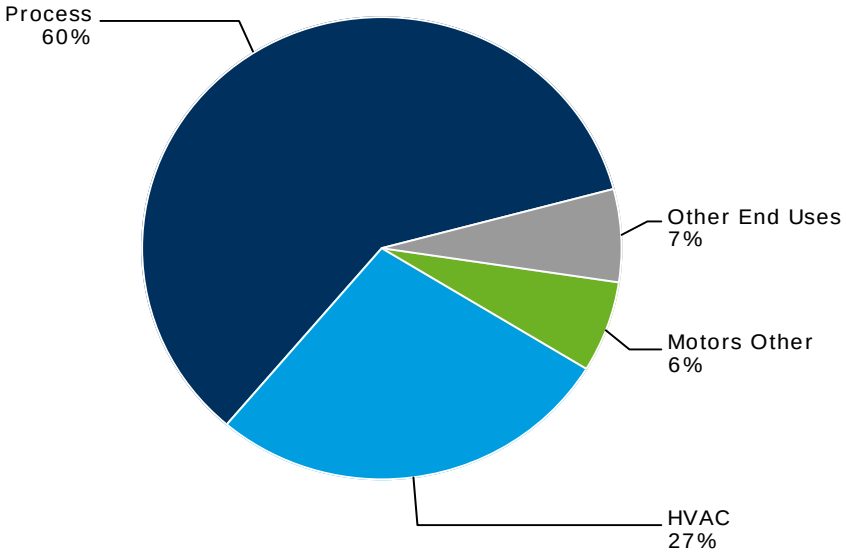
Total: 0 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Other: <1%

Figure B.4.20 Electric Achievable Technical Potential: Industrial Electrical by End Use

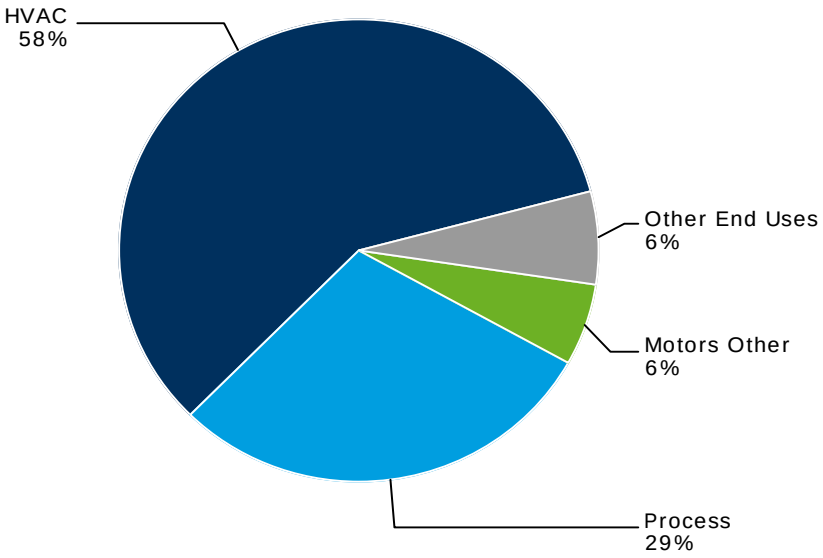
Total: 0 aMW



Note: 'Other End Uses' includes:
Lighting: 3%, Pumps: 2%, Fans: <1%, Other: <1%

Figure B.4.21 Electric Achievable Technical Potential: Industrial Electronics by End Use

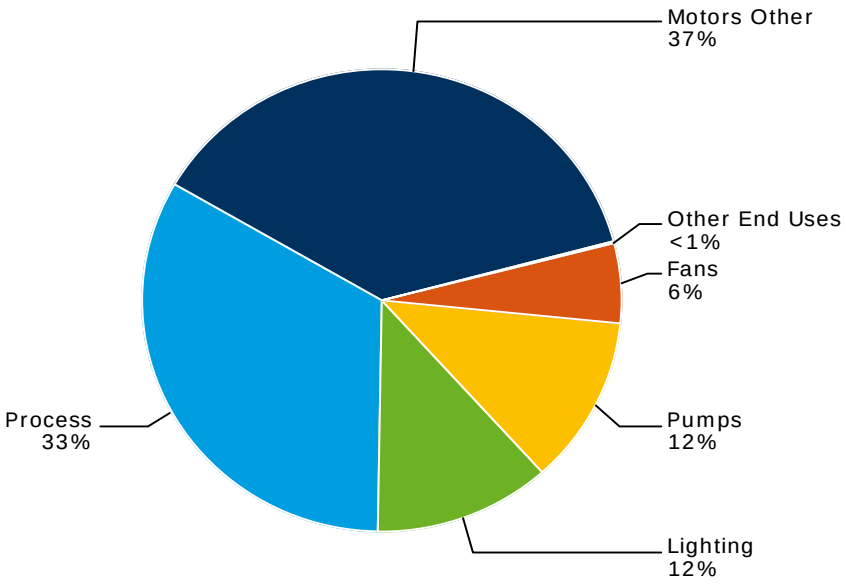
Total: 1 aMW



Note: 'Other End Uses' includes:
Lighting: 4%, Pumps: 2%, Fans: 1%, Other: <1%

Figure B.4.22 Electric Achievable Technical Potential: Industrial Food by End Use

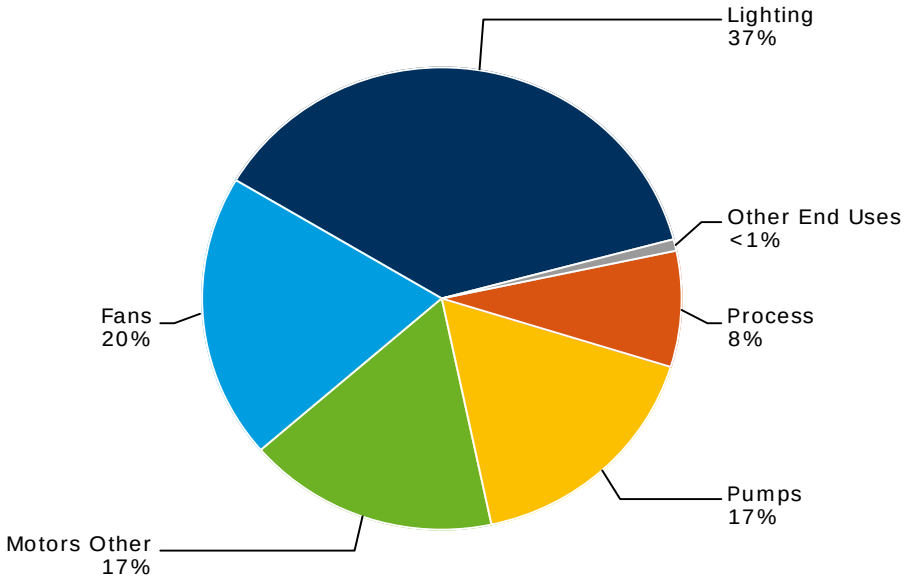
Total: 1 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Other: <1%

Figure B.4.23 Electric Achievable Technical Potential: Industrial Machinery by End Use

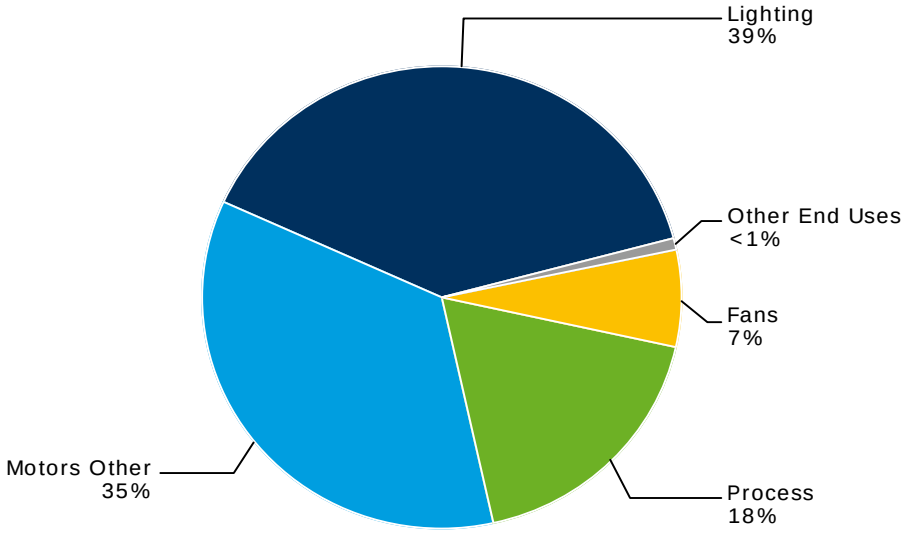
Total: 1 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Other: <1%

Figure B.4.24 Electric Achievable Technical Potential: Industrial Metals by End Use

Total: 0 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Pumps: <1%, Other: <1%

Figure B.4.25 Electric Achievable Technical Potential: Industrial Minerals by End Use

Total: 0 aMW

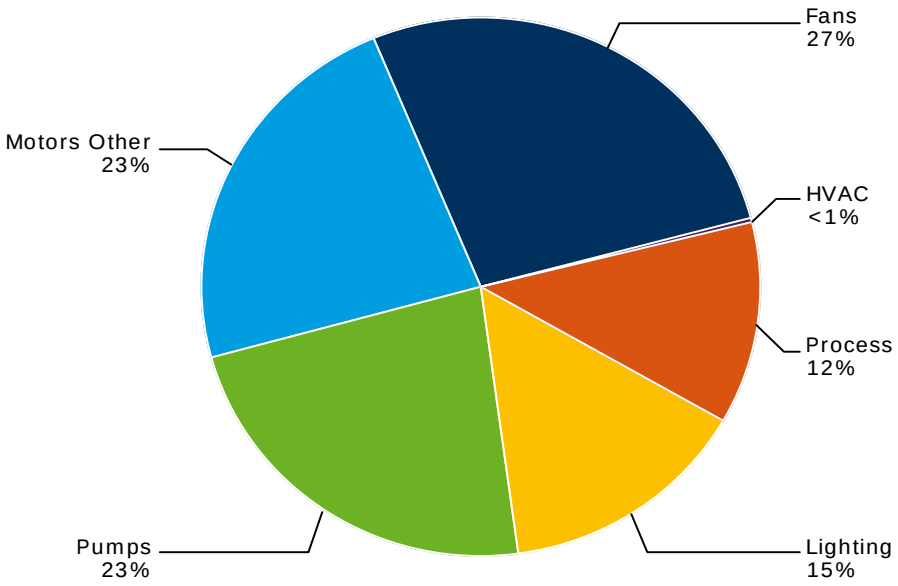
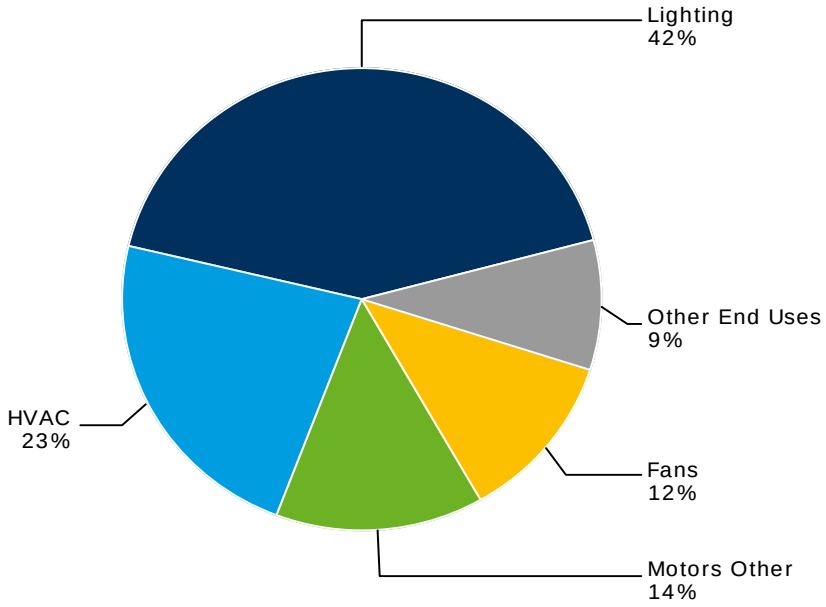


Figure B.4.26 Electric Achievable Technical Potential: Industrial Miscellaneous by End Use

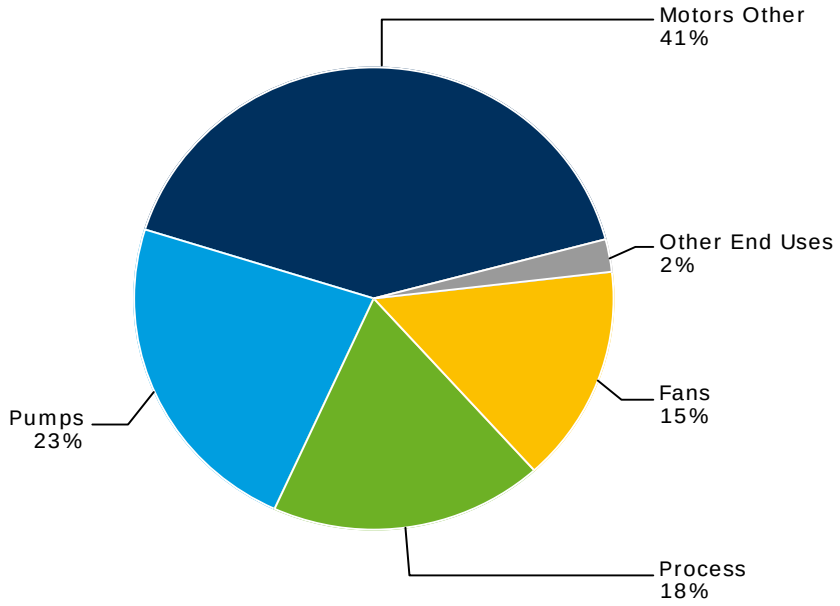
Total: 1 aMW



Note: 'Other End Uses' includes:
Pumps: 5%, Process: 4%, Other: <1%

Figure B.4.27 Electric Achievable Technical Potential: Industrial Petroleum by End Use

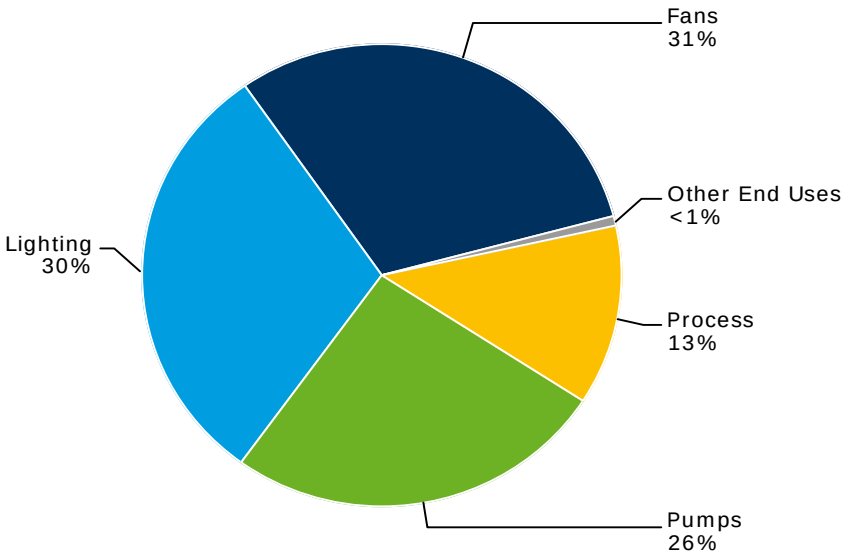
Total: 0 aMW



Note: 'Other End Uses' includes:
Lighting: 2%, HVAC: <1%, Other: <1%

Figure B.4.28 Electric Achievable Technical Potential: Industrial Plastic/Rubber by End Use

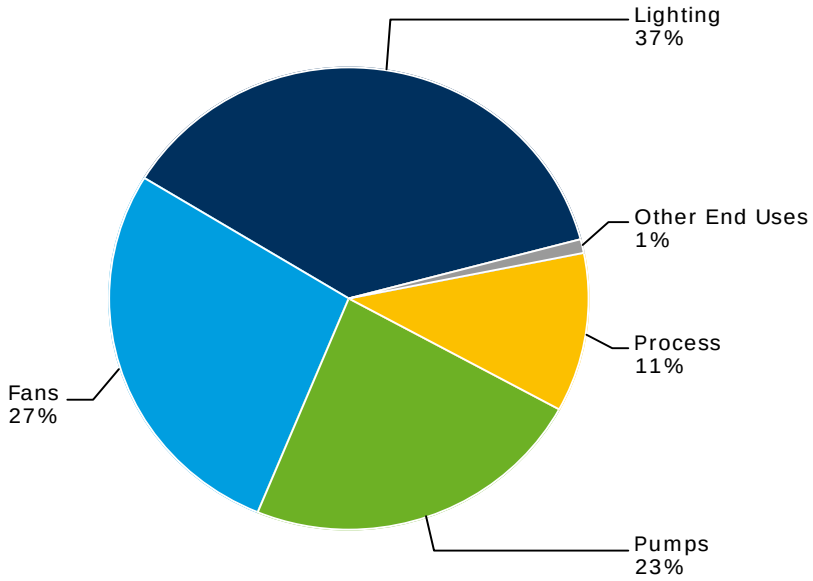
Total: 0 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Other: <1%

Figure B.4.29 Electric Achievable Technical Potential: Industrial Printing by End Use

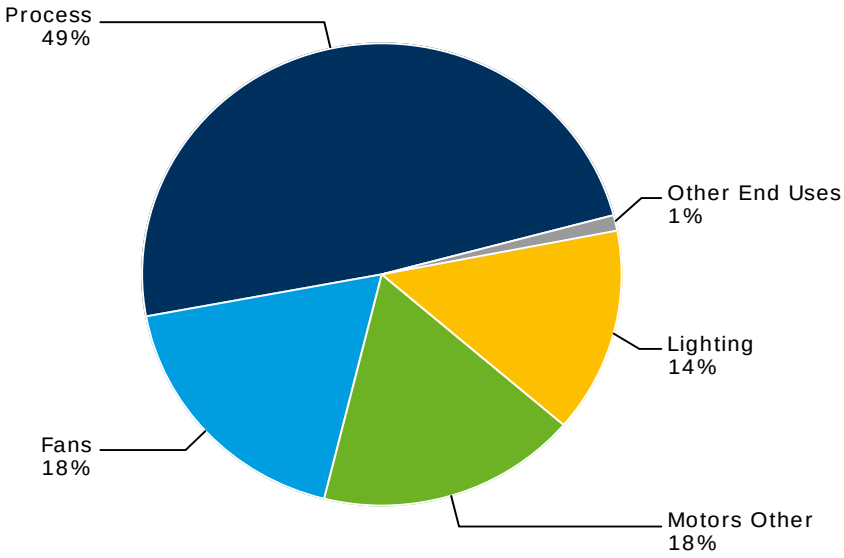
Total: 0 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Other: <1%

Figure B.4.30 Electric Achievable Technical Potential: Industrial Transportation by End Use

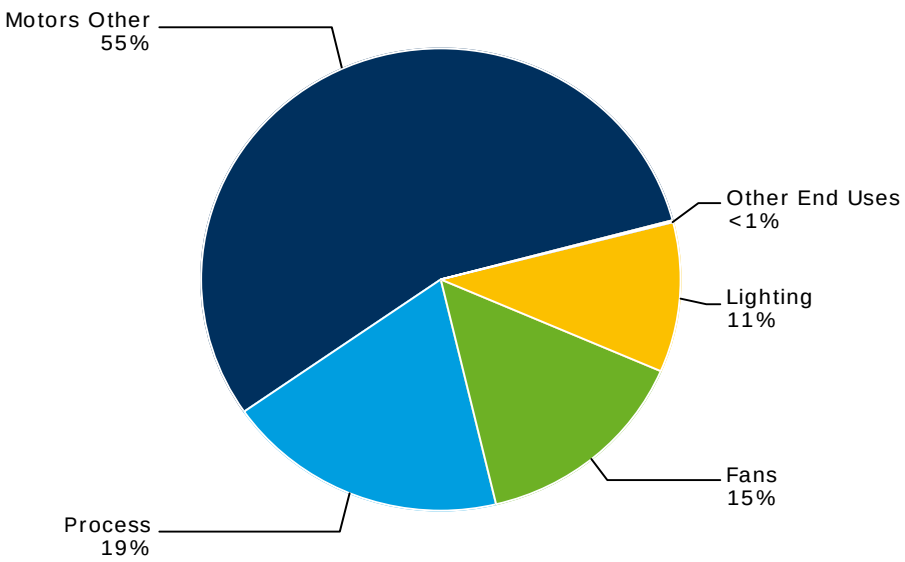
Total: 0 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Other: <1%

Figure B.4.31 Electric Achievable Technical Potential: Industrial Wood Products by End Use

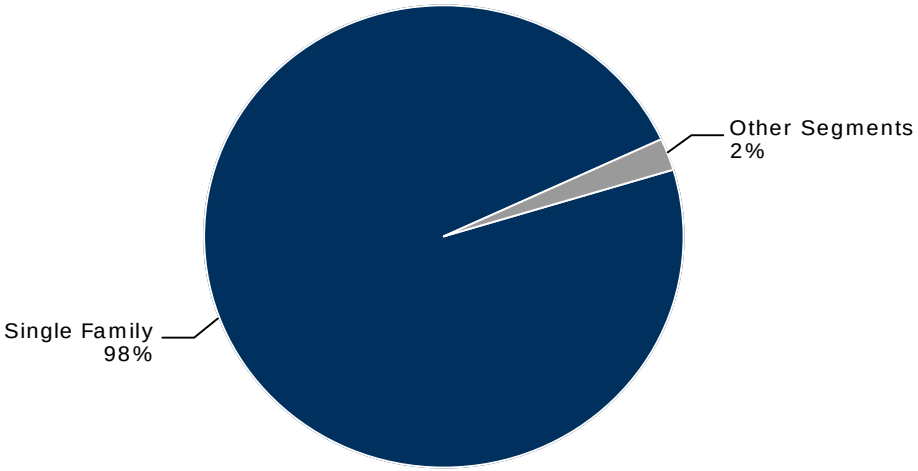
Total: 1 aMW



Note: 'Other End Uses' includes:
HVAC: <1%, Other: <1%

Figure B.4.32 Gas Achievable Technical Potential: Residential by Segment

Total: 183,346,243 Therms



Note: 'Other Segments' includes:
Multifamily: 2%, Manufactured: <1%

Figure B.4.33 Gas Achievable Technical Potential: Commercial by Segment

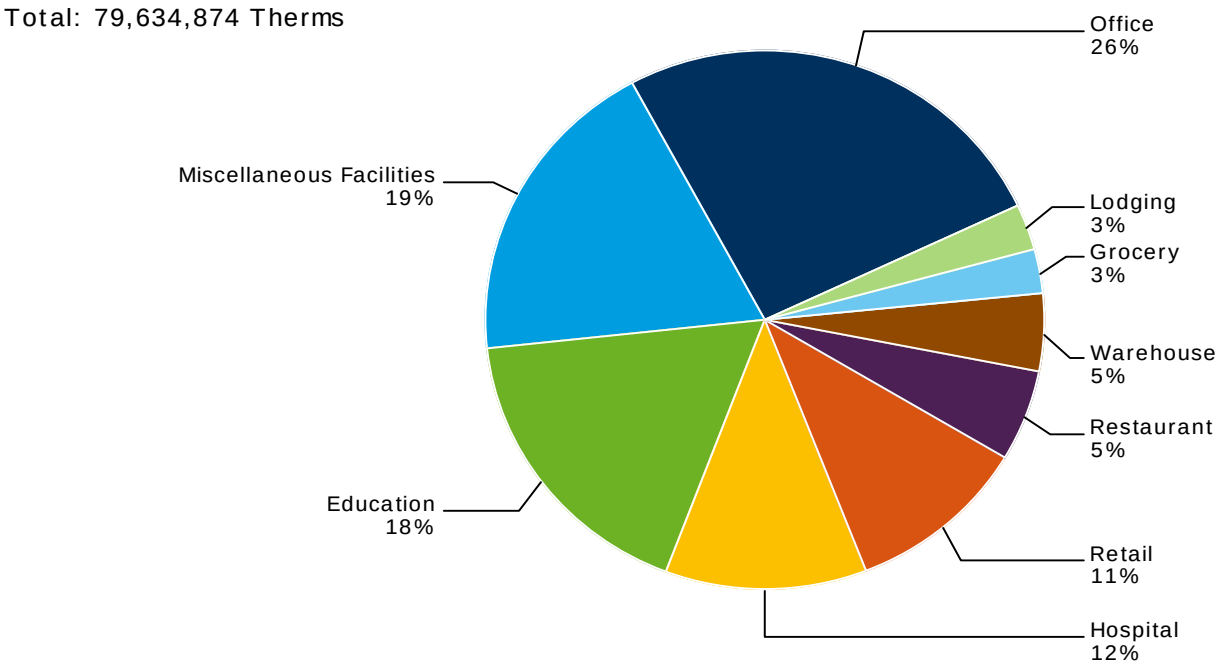
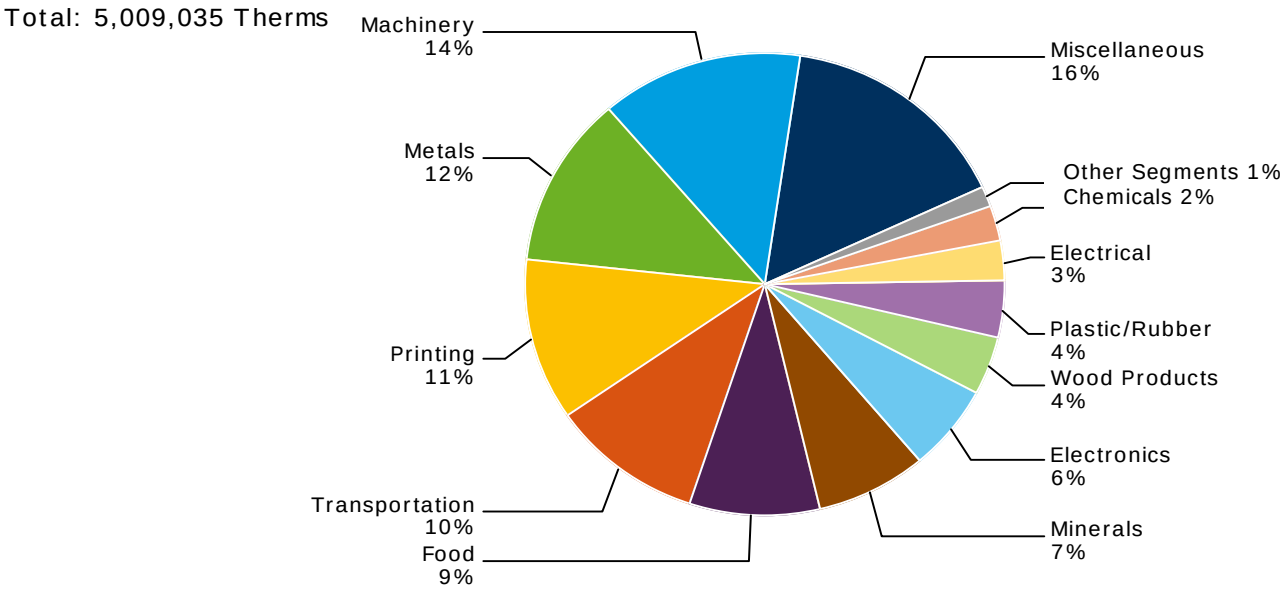


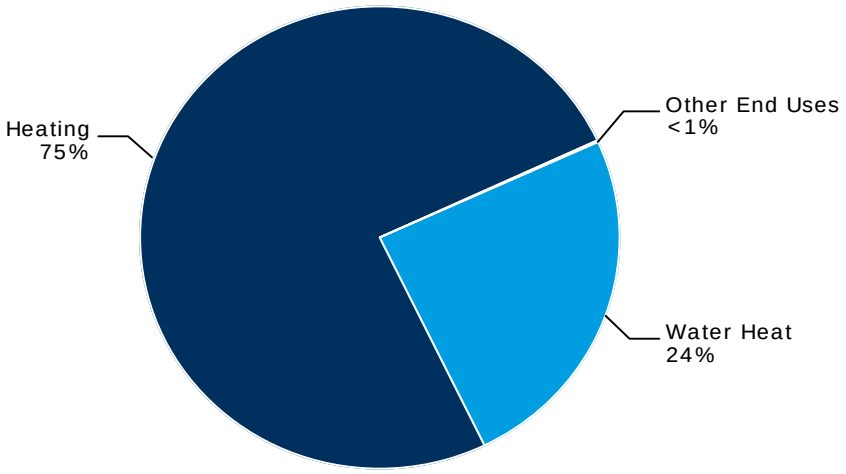
Figure B.4.34 Gas Achievable Technical Potential: Industrial by Segment



Note: 'Other Segments' includes:
Paper: 1%, Petroleum: <1%

Figure B.4.35 Gas Achievable Technical Potential: Residential by End Use

Total: 183,346,243 Therms



Note: 'Other End Uses' includes:
Dryer: <1%, Pool Heat: <1%

Figure B.4.36 Gas Achievable Technical Potential: Commercial by End Use

Total: 79,634,874 Therms

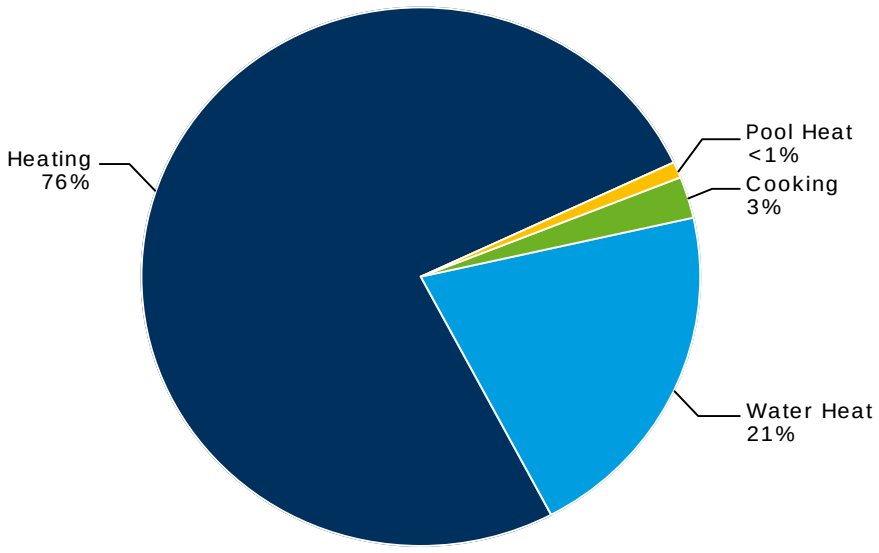


Figure B.4.37 Gas Achievable Technical Potential: Industrial by End Use

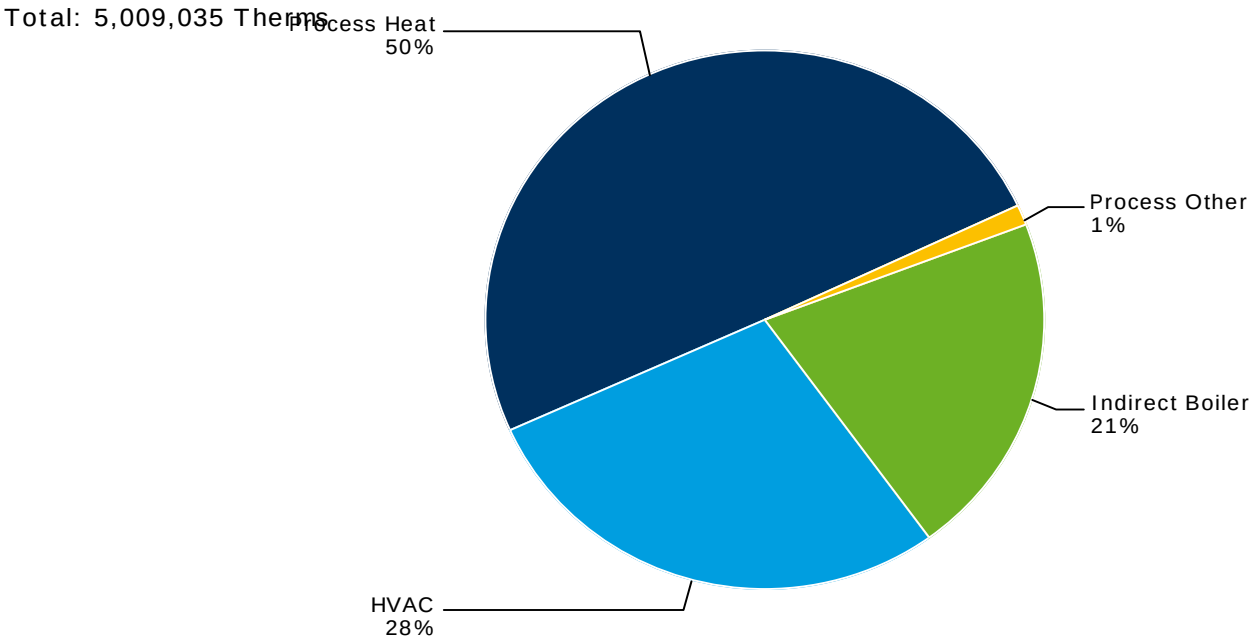
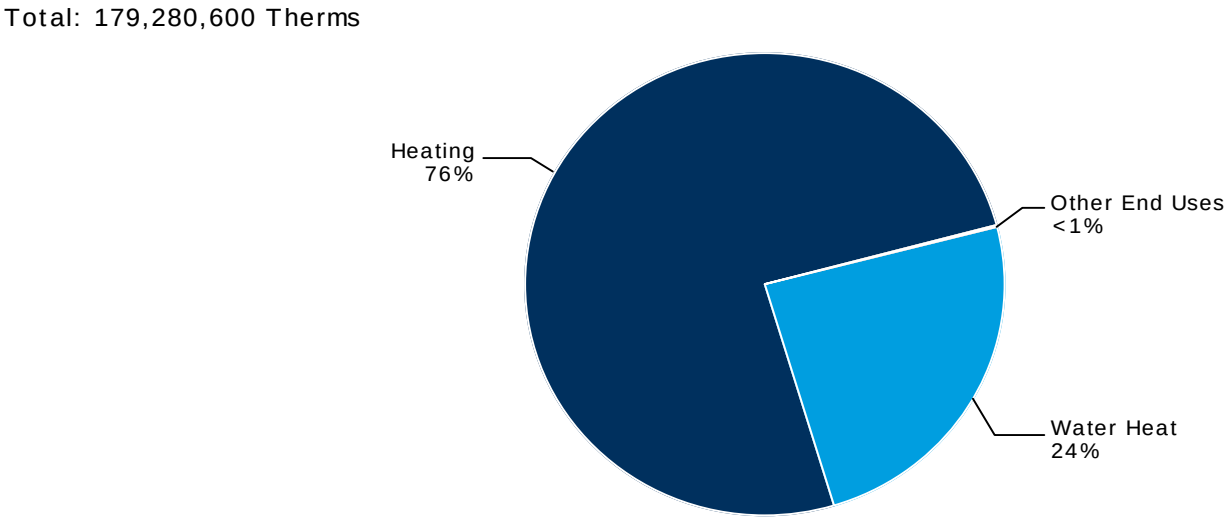


Figure B.4.38 Gas Achievable Technical Potential: Residential Single Family by End Use



Note: 'Other End Uses' includes:
Dryer: <1%, Pool Heat: <1%

Figure B.4.39 Gas Achievable Technical Potential: Residential Multifamily by End Use

Total: 3,418,576 Therms

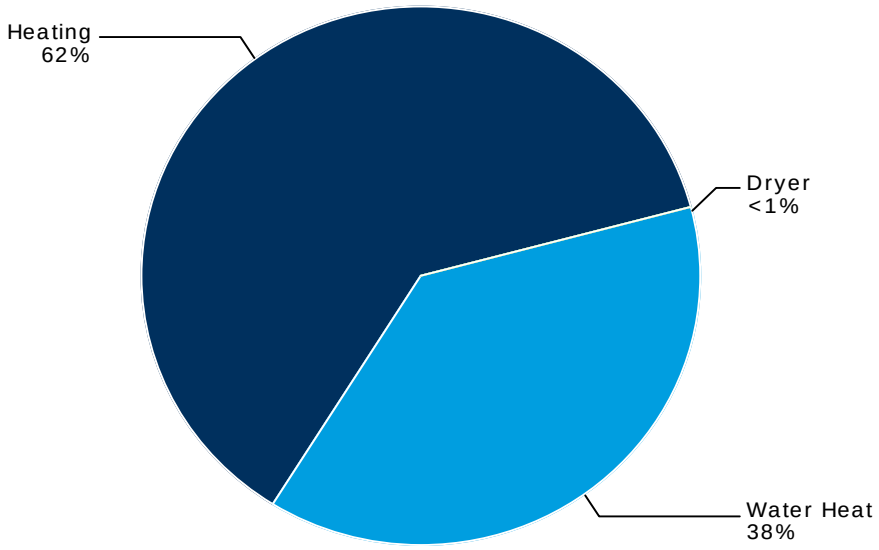


Figure B.4.40 Gas Achievable Technical Potential: Residential Manufactured by End Use

Total: 647,067 Therms

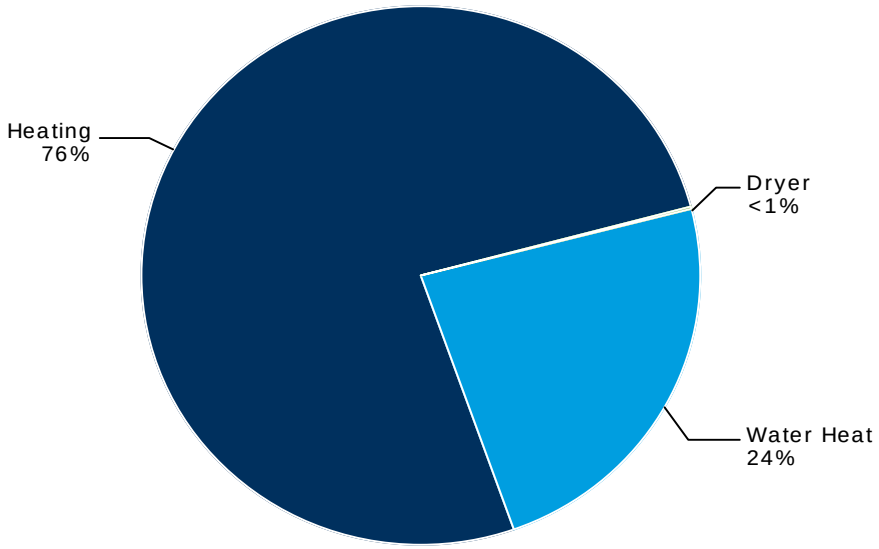
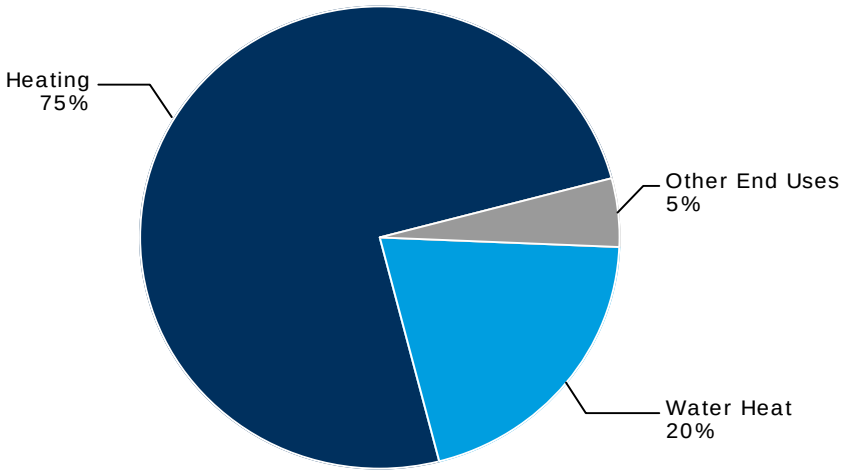


Figure B.4.41 Gas Achievable Technical Potential: Commercial Education by End Use

Total: 13,979,954 Therms



Note: 'Other End Uses' includes:
Pool Heat: 4%, Cooking: <1%

Figure B.4.42 Gas Achievable Technical Potential: Commercial Grocery by End Use

Total: 2,160,060 Therms

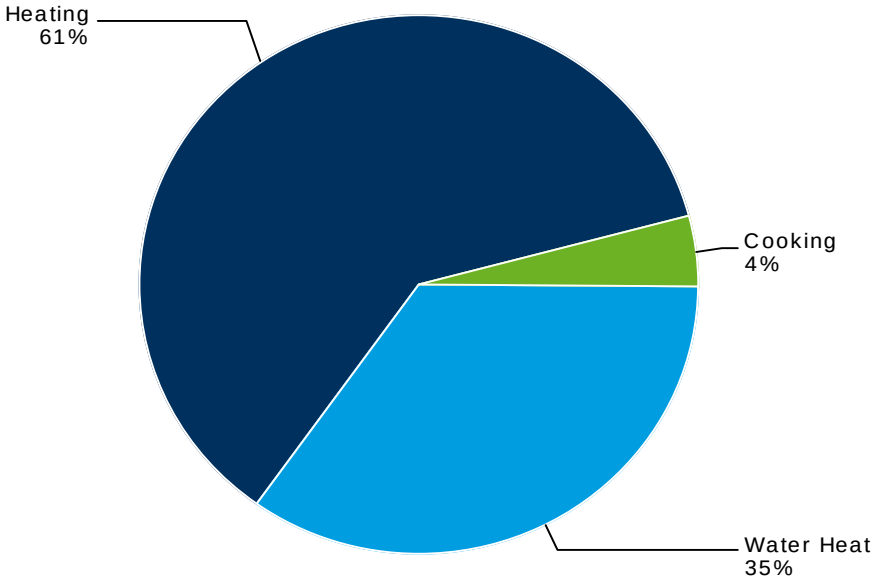


Figure B.4.43 Gas Achievable Technical Potential: Commercial Hospital by End Use

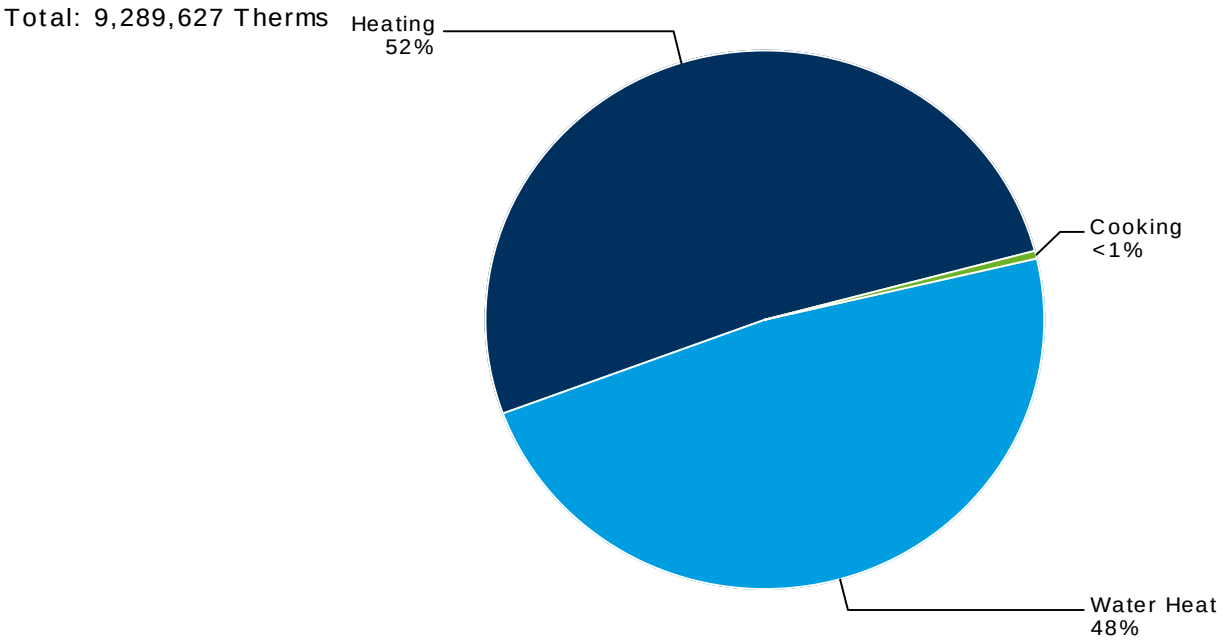


Figure B.4.44 Gas Achievable Technical Potential: Commercial Lodging by End Use

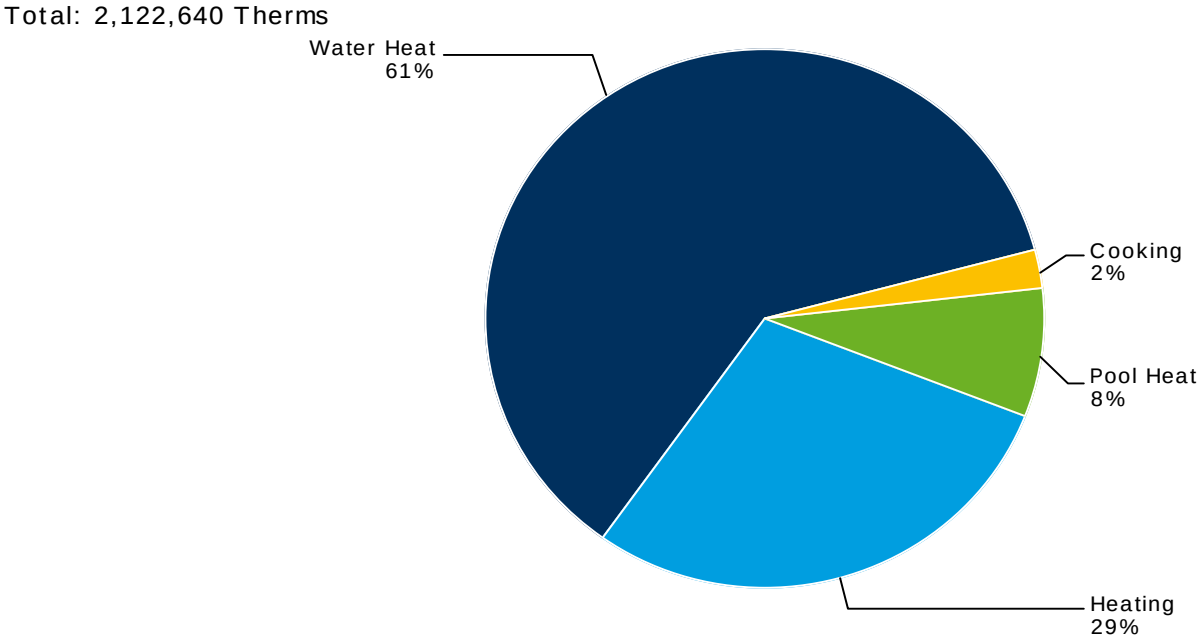


Figure B.4.45 Gas Achievable Technical Potential: Commercial Miscellaneous Facilities by End Use

Total: 15,023,824 Therms

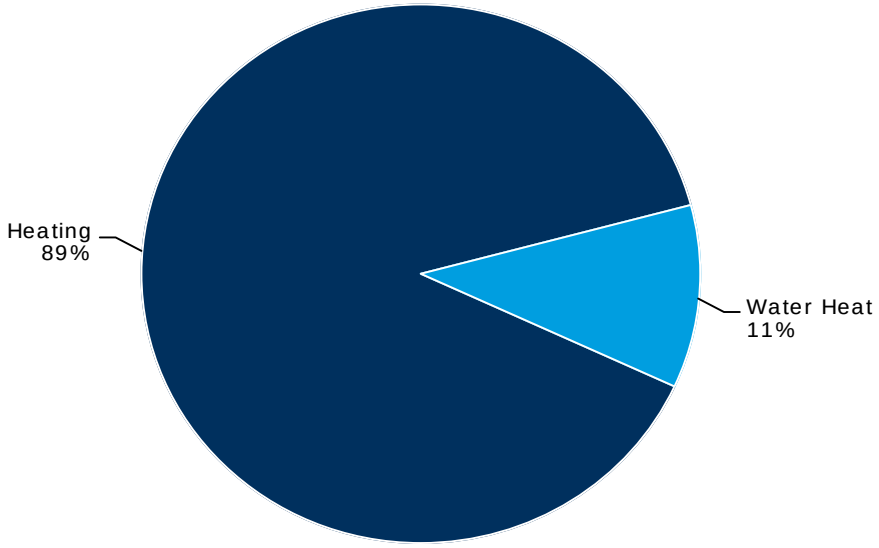


Figure B.4.46 Gas Achievable Technical Potential: Commercial Office by End Use

Total: 20,613,137 Therms

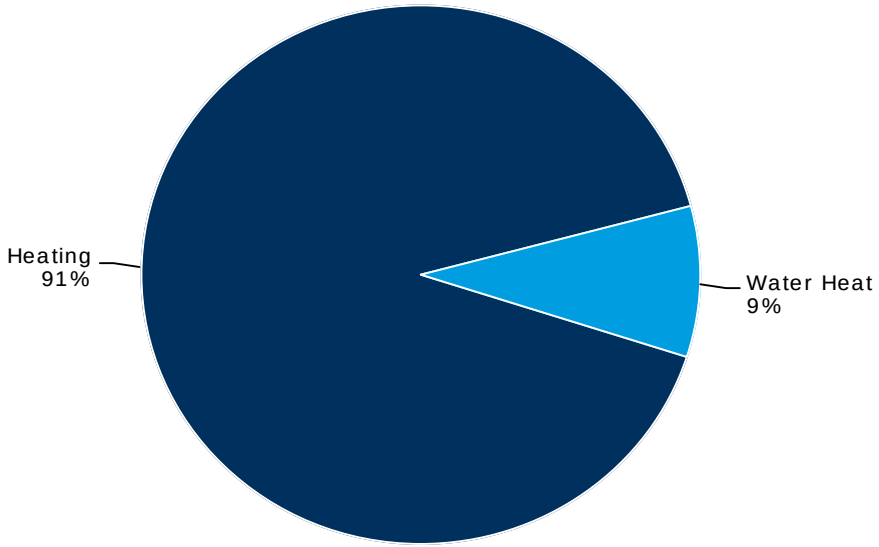


Figure B.4.47 Gas Achievable Technical Potential: Commercial Restaurant by End Use

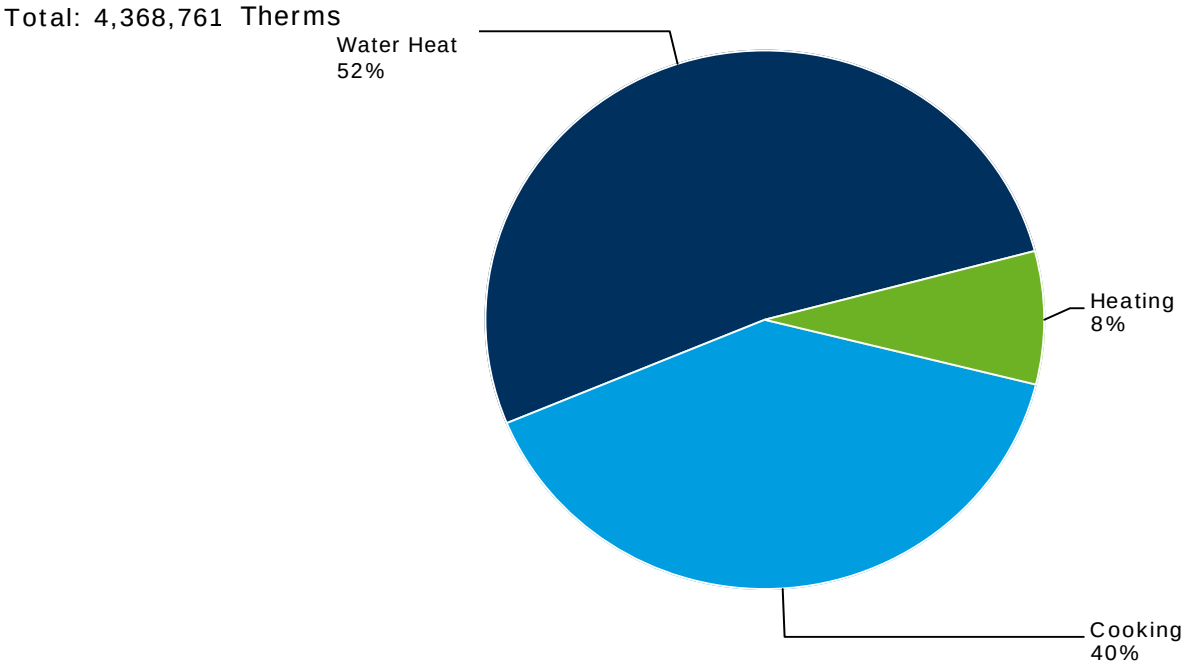


Figure B.4.48 Gas Achievable Technical Potential: Commercial Retail by End Use

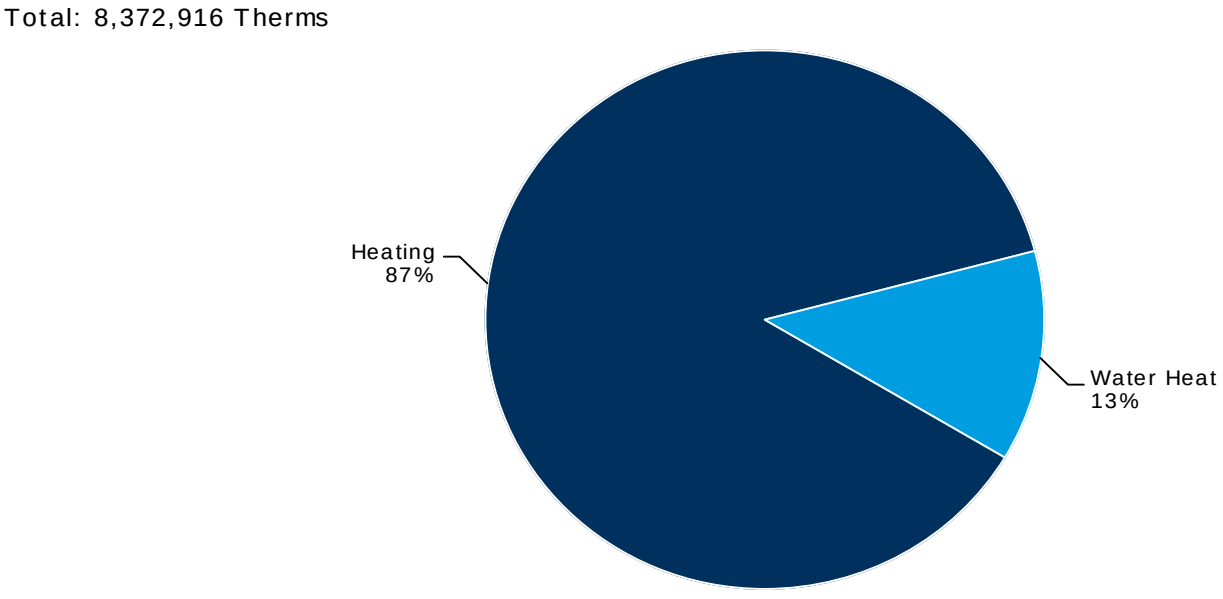


Figure B.4.49 Gas Achievable Technical Potential: Commercial Warehouse by End Use

Total: 3,703,955 Therms

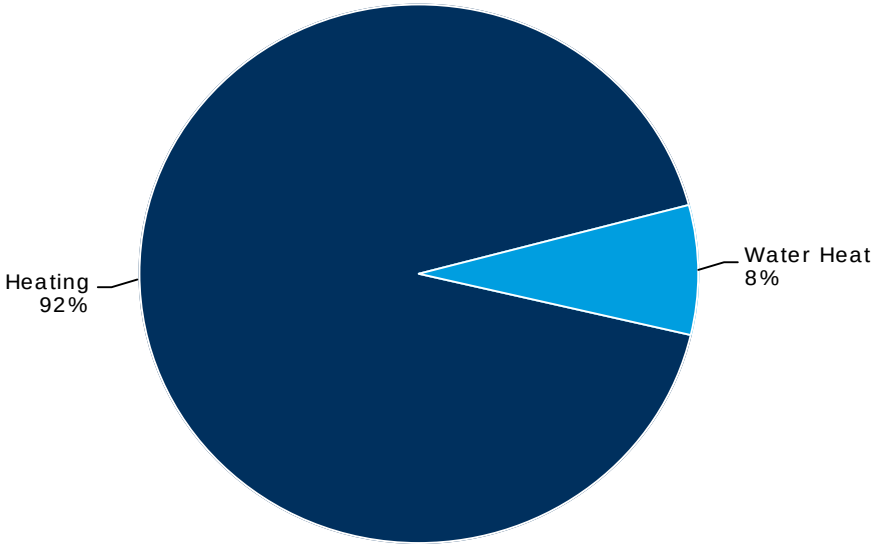


Figure B.4.50 Gas Achievable Technical Potential: Industrial Chemicals by End Use

Total: 123,785 Therms

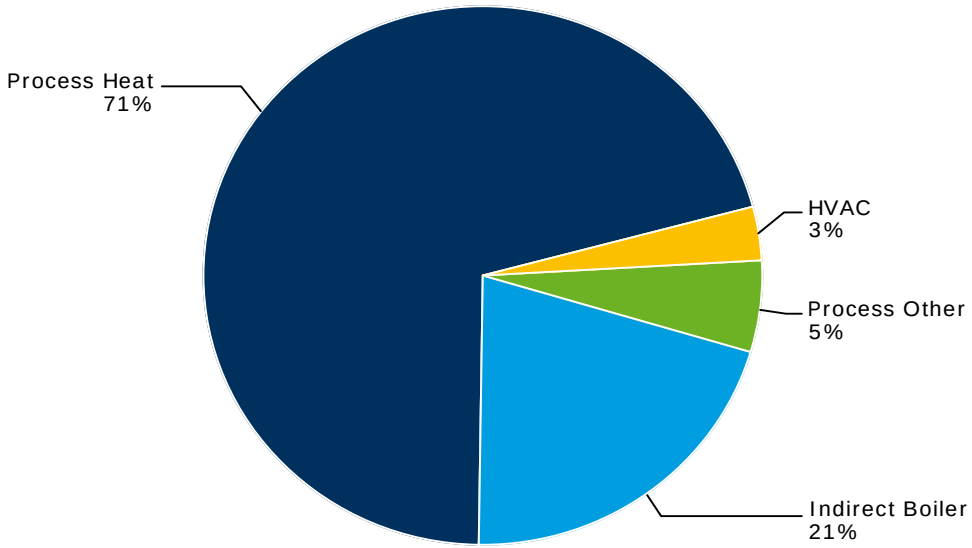


Figure B.4.51 Gas Achievable Technical Potential: Industrial Electrical by End Use

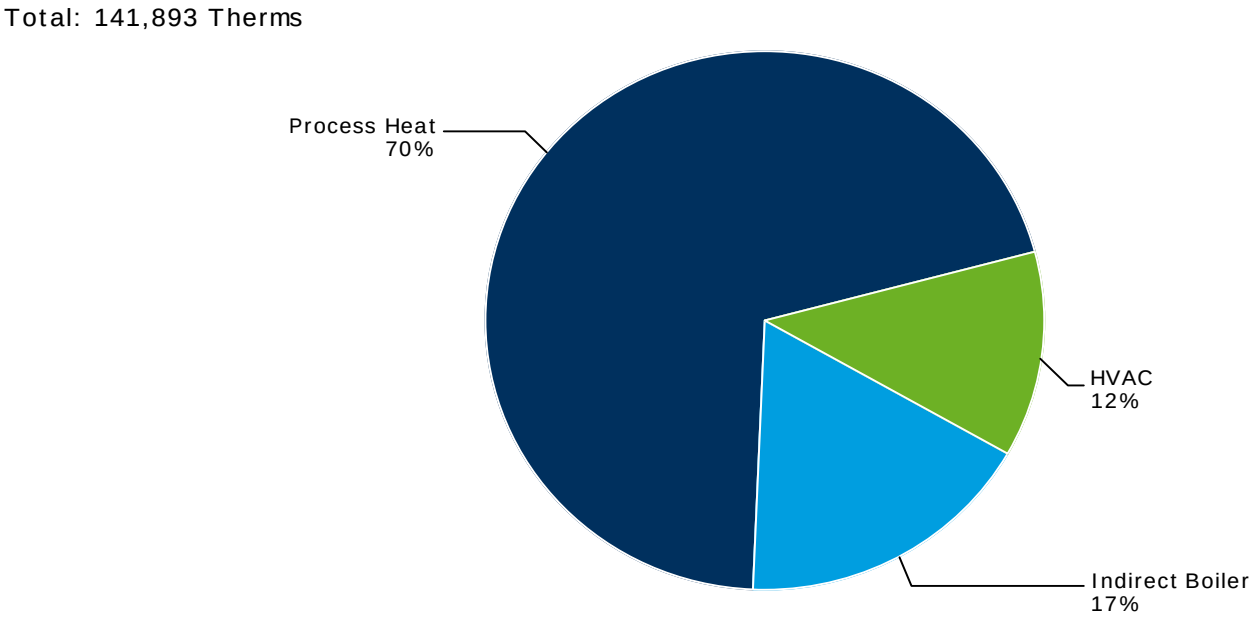


Figure B.4.52 Gas Achievable Technical Potential: Industrial Electronics by End Use

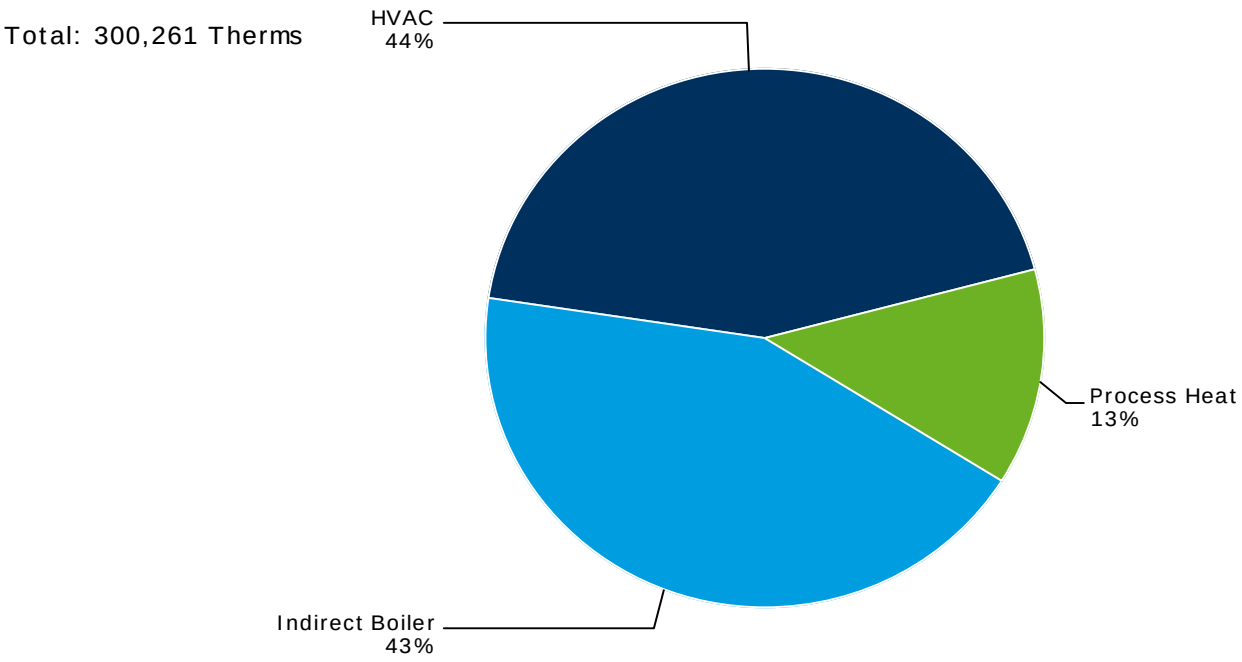


Figure B.4.53 Gas Achievable Technical Potential: Industrial Food by End Use

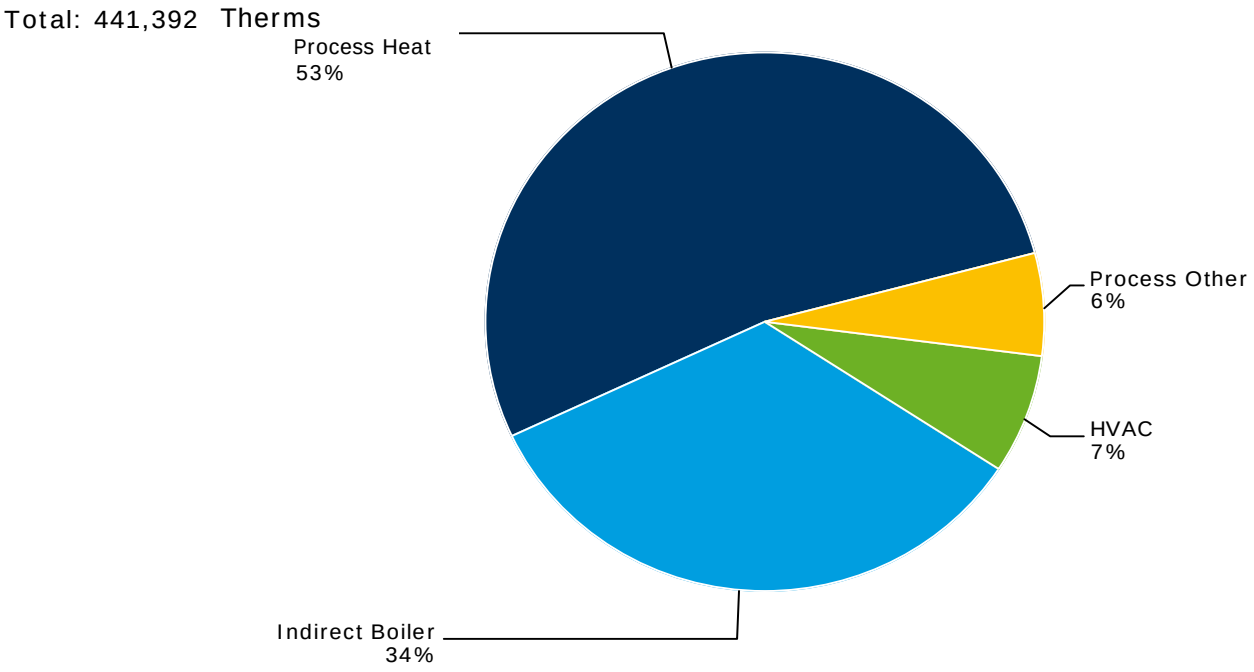


Figure B.4.54 Gas Achievable Technical Potential: Industrial Machinery by End Use

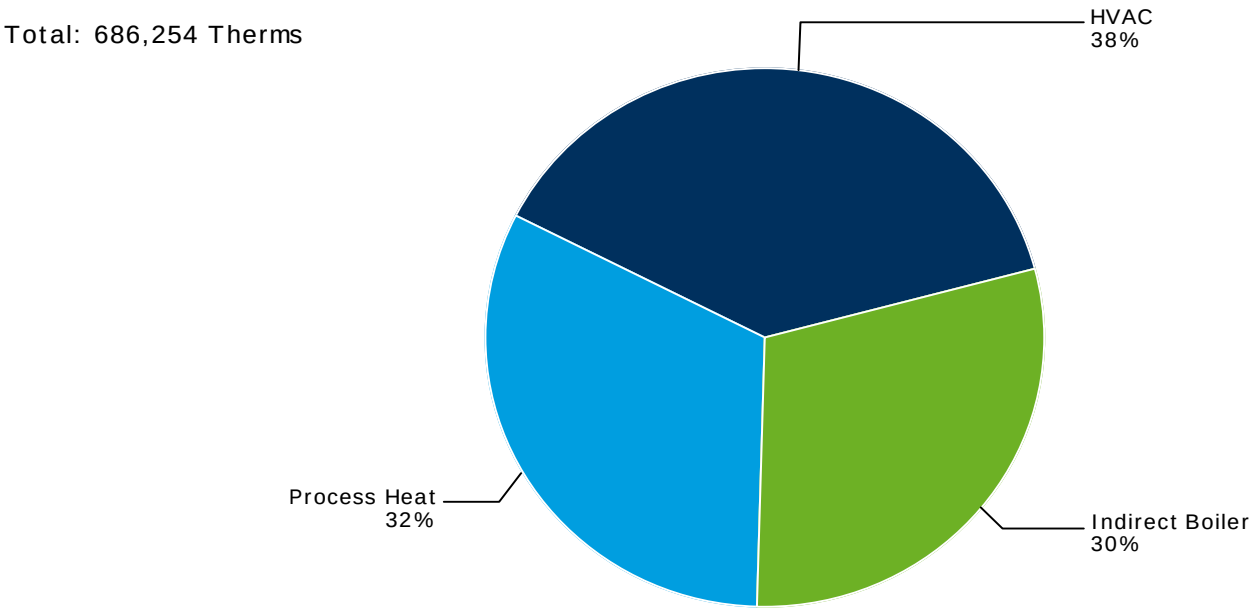


Figure B.4.55 Gas Achievable Technical Potential: Industrial Metals by End Use

Total: 601,719 Therms

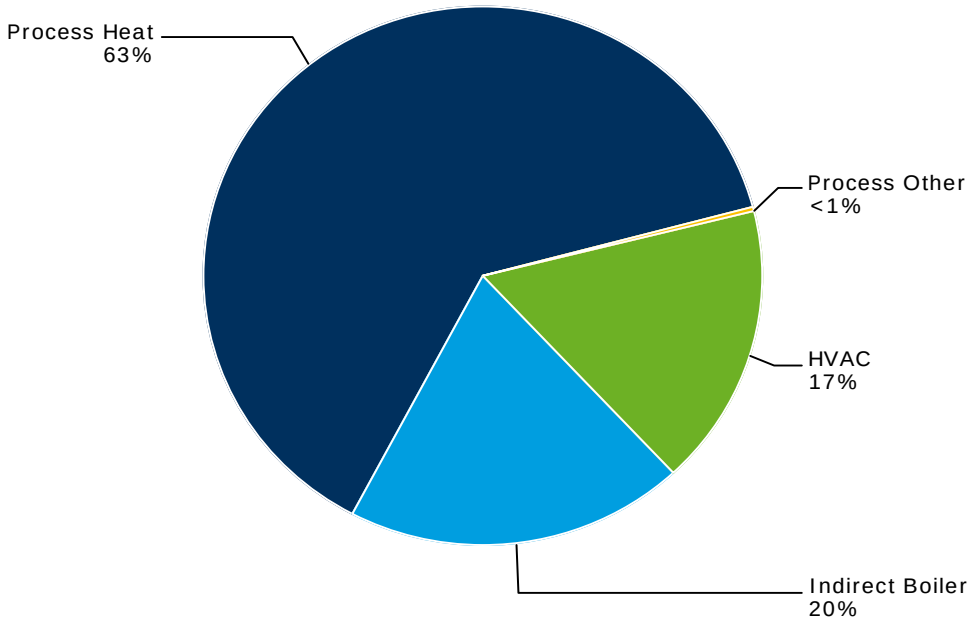
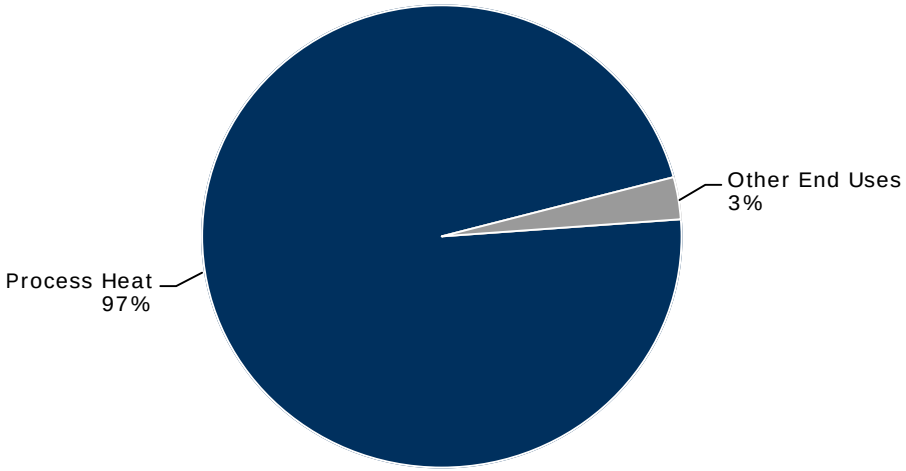


Figure B.4.56 Gas Achievable Technical Potential: Industrial Minerals by End Use

Total: 375,362 Therms



Note: 'Other End Uses' includes:
HVAC: 2%, Indirect Boiler: <1%, Process Other: <1%

Figure B.4.57 Gas Achievable Technical Potential: Industrial Miscellaneous by End Use

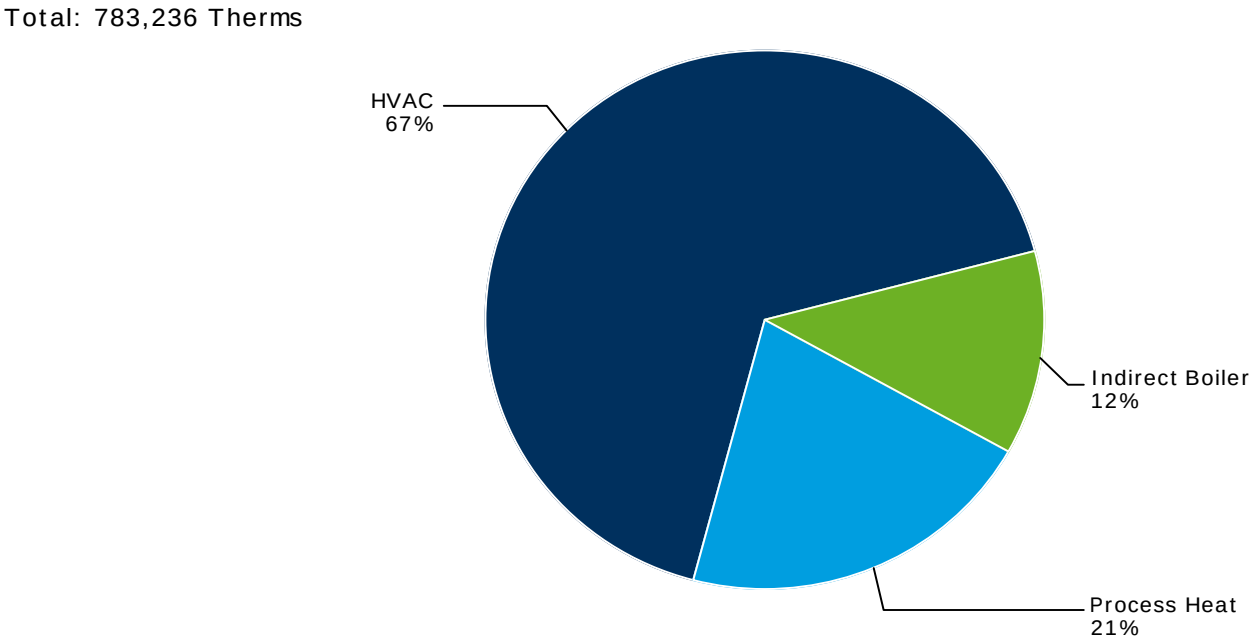


Figure B.4.58 Gas Achievable Technical Potential: Industrial Petroleum by End Use

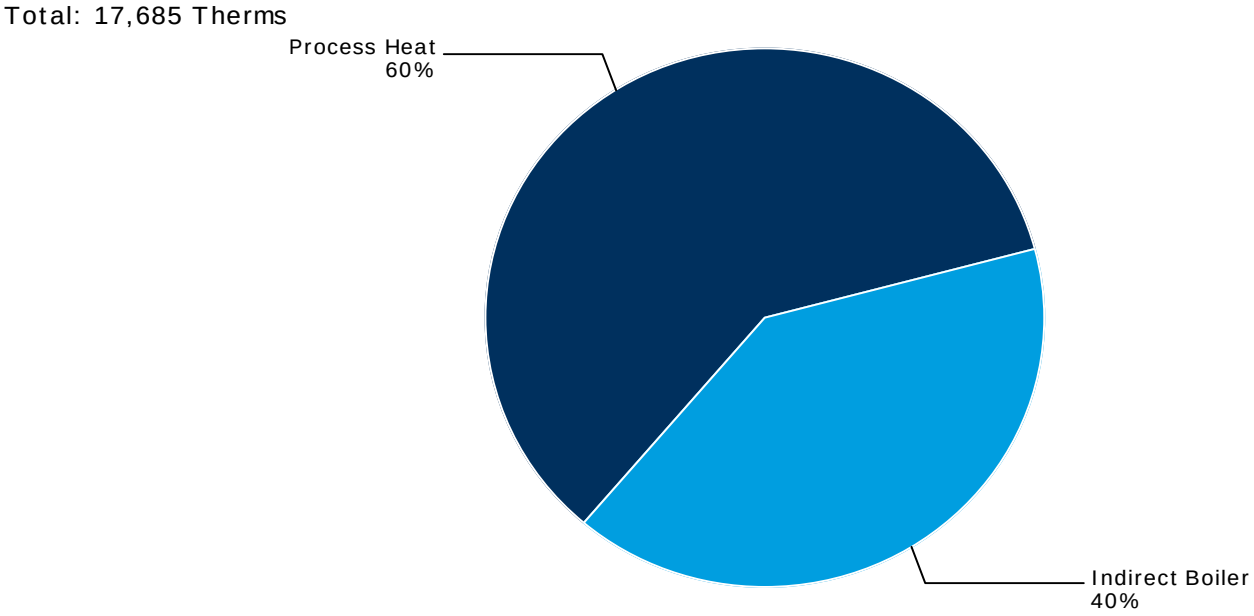


Figure B.4.59 Gas Achievable Technical Potential: Industrial Plastic/Rubber by End Use

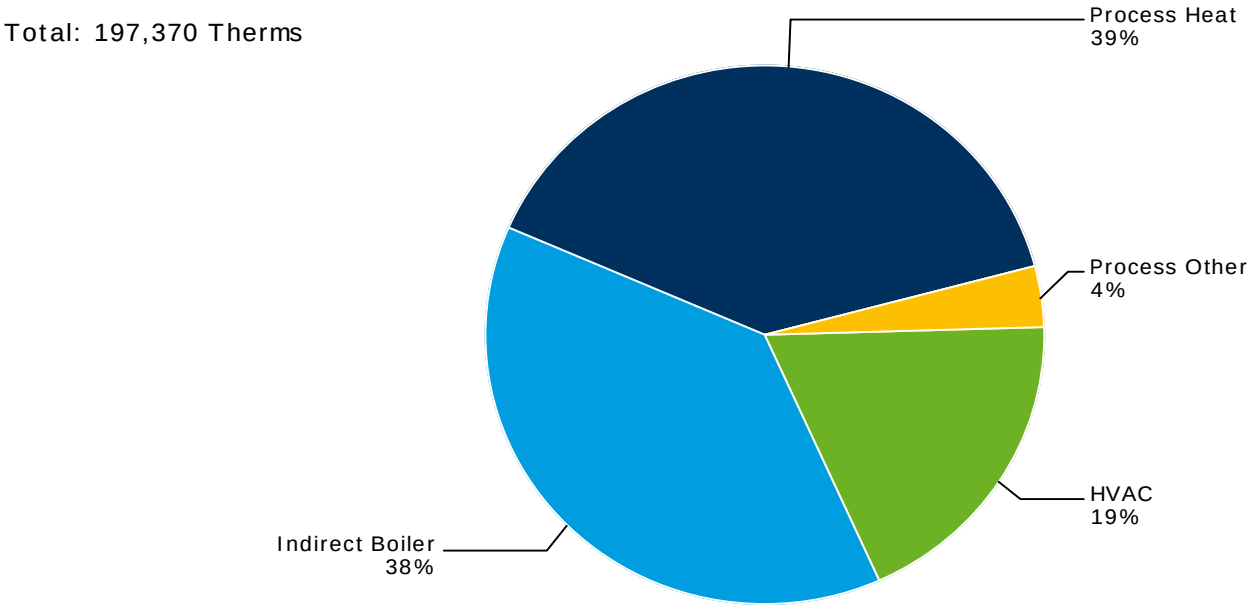


Figure B.4.60 Gas Achievable Technical Potential: Industrial Printing by End Use

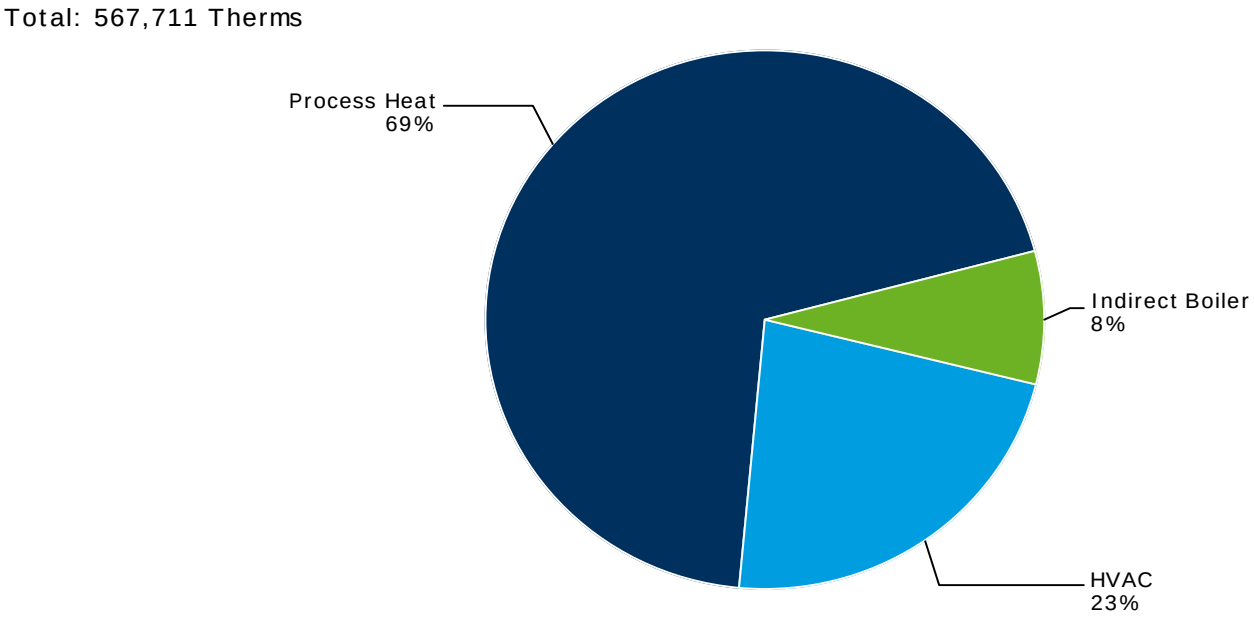


Figure B.4.61 Gas Achievable Technical Potential: Industrial Transportation by End Use

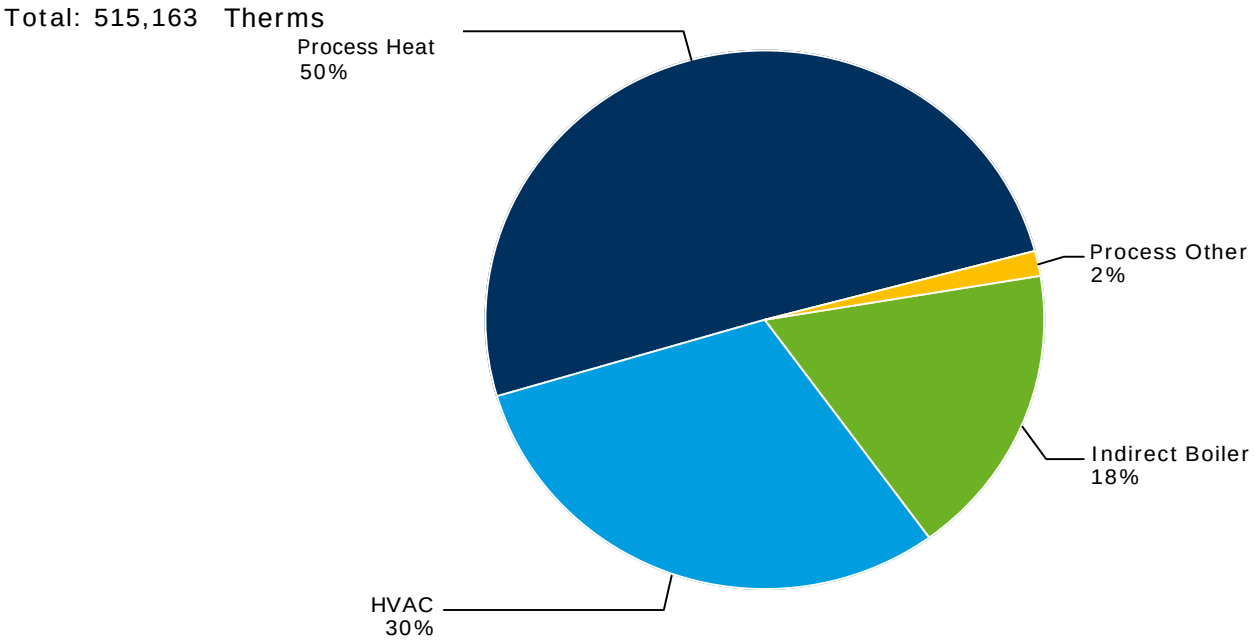
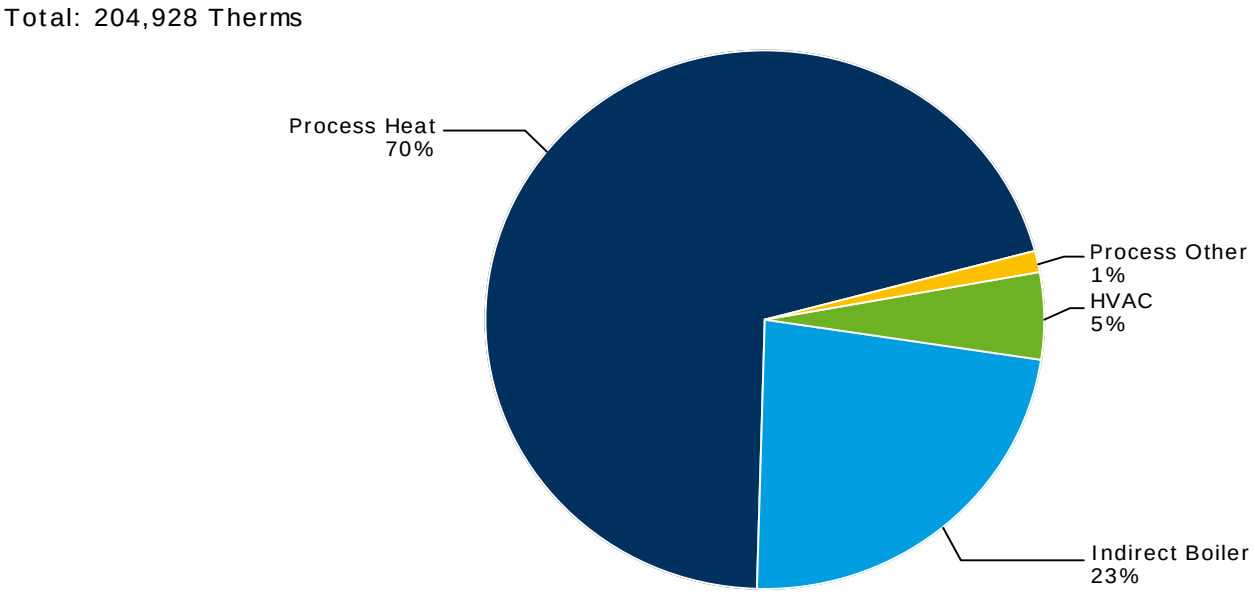


Figure B.4.62 Gas Achievable Technical Potential: Industrial Wood Products by End Use



Appendix C. Technical Supplements: Fuel Conversion

This appendix contains technical details about the fuel conversion potentials.

Table C.1 Economic Assumptions

Assumption	Value
Discount Rate	8.10%
Inflation Rate	2.50%
Electric T&D Savings	0.00%
Gas T&D Savings	0.80%
Admin Adder	5.00%
Conservation Credit	10.00%
Electric: Carbon Adder	20.00%
Gas: Carbon Adder	10.00%
Main Ext - Short (ft)	50
Main Ext - Medium (ft)	300
Main Ext - Long (ft)	500
Line Cost per foot	$40
In-House Extension	$3,406
NPV Avoided Generation ($/kW)	$0.00
therms/kWh Conversion Factor	0.0341
Zone Heating Adoption Percentage	5%
Electric Dryer Energy Factor	2.67
Gas Dryer Energy Factor	3.01
Electric Range Energy Factor	0.068
Gas Range Energy Factor	0.112
Electric Retail Rate - Residential	$0.107
Electric Retail Rate - Commercial	$0.090
Gas Retail Rate - Residential	$1.53
Gas Retail Rate - Commercial	$1.39
Utility/Participant Cost Basis	Total
Rate Escalators	Yearly
Levelized Gas Avoided Cost (Dth)	$9.53

Source for Electricity Use Data is 2001 Electric End Use Model.

Labor is included for Space/Zone Heating Equipment Cost.

One-year potential assumes linear acquisition

UECs for electric dryer/cooking: PSE gas tariff information

UECs for space/water heating: EndUse Forecaster Model
All calculations done for kWh/therms at GENERATION

Table C.2 Piping and Labor Costs

End Use	Costs
Space Heating, Ducted	$700
Space Heating, Baseboard	$500
Clothes Drying	$200
Cooking	$200
Water Heating	$200
Space Heating	$700

Table C.3 Total Customers

Cutstomer Type	New	Existing
Single Family	NA	883,839
Commercial	107,443	172,072
Multifamily	200,715	NA

Table C.4 Distribution of Single-Family Home Size

Home Size	% of Homes
SFam - 1800 sq ft	50%
SFam - 2100 sq ft	10%
SFam - 2400 sq ft	40%

Table C.5 Fuel Conversion Measure Assumptions

Fuel Conversion Measure Assumptions

Sector	Segment	End Use	Construction Type	Discretionary / Lost Opportunity	Measure Name	Measure Description	Baseline Description	Measure Life	Unit Definition	Avg # of Units	EEM Per Unit Cost ($)	Baseline Measure Per Unit Cost ($)	Incremental Per Unit Cost ($)	Per Unit Site Savings (kWh)	Coincidence Factor	Annual Incremental Gas Costs
Residential	SFam - 2100 sq ft	Space Heating: Ducted	Existing	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 5,526.00	$ 875.42	$ 4,650.58	9287	0.000234	$ 563.51
Residential	SFam - 2400 sq ft	Space Heating: Ducted	Existing	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 5,526.00	$ 875.42	$ 4,650.58	10614	0.000234	$ 644.01
Residential	SFam - 2100 sq ft	Clothes Drying	Existing	Discretionary	Dryer	Moisture Sensor Dryer	Electric dryer w/ moisture sens, 7.0cuft	30	Per installation	1	$ 679.00	$ 636.52	$ 42.48	738	0.000163	$ 30.68
Residential	SFam - 2100 sq ft	Cooking	Existing	Discretionary	Over	Convection Cooking	Convection Electric range, 30"	30	Per installation	1	$ 849.00	$ 759.62	$ 89.38	121	0.000423	$ 14.22
Residential	SFam - 2100 sq ft	Water Heating	Existing	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 1,471.00	$ 654.26	$ 816.74	3500	0.000183	$ 154.41
Residential	SFam - 2100 sq ft	Water Heating	Existing	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 943.10	$ 654.26	$ 288.84	3500	0.000183	$ 203.09
Residential	SFam - 2400 sq ft	Clothes Drying	Existing	Discretionary	Dryer	Moisture Sensor Dryer	Electric dryer w/ moisture sens, 7.0cuft	30	Per installation	1	$ 679.00	$ 636.52	$ 42.48	738	0.000163	$ 30.68
Residential	SFam - 2400 sq ft	Cooking	Existing	Discretionary	Over	Convection Cooking	Convection Electric range, 30"	30	Per installation	1	$ 849.00	$ 759.62	$ 89.38	121	0.000423	$ 14.22
Residential	SFam - 2400 sq ft	Water Heating	Existing	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 1,471.00	$ 654.26	$ 816.74	3500	0.000183	$ 154.41
Residential	SFam - 2400 sq ft	Water Heating	Existing	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 943.10	$ 654.26	$ 288.84	3500	0.000183	$ 203.09
Commercial	Commercial	Space Heating: Ducted	Existing	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 8,147.92	$ 1,974.10	$ 6,173.82	8552	0.000234	$ 667.39
Commercial	Commercial	Water Heating	Existing	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 3,866.82	$ 1,957.73	$ 1,909.09	14247	0.000183	$ 1,034.51
Commercial	Commercial	Water Heating	Existing	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 3,357.84	$ 1,957.73	$ 1,400.10	14247	0.000183	$ 1,174.81
Commercial	Commercial	Water Heating	New	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 3,866.82	$ 1,957.73	$ 1,909.09	14074	0.000183	$ 1,109.78
Commercial	Commercial	Water Heating	New	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 3,124.85	$ 1,957.73	$ 1,167.12	14074	0.000183	$ 1,260.27
Commercial	Commercial	Space Heating	New	Discretionary	Warm-Up Heat	Gas warm up heat	Electric Furnace	30	Per installation	1	$ 17,032.37	$ 9,424.58	$ 7,607.79	22055	0.000234	$ 1,024.78
Commercial	Commercial	Space Heating	New	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 2,996.11	$ 1,974.10	$ 1,022.01	2115	0.000234	$ 379.61
Residential	MFam Mid Rise: Renter	Space Heating: Ducted	New	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 2,120.00	$ 875.42	$ 1,244.58	3361	0.000234	$ 284.95
Residential	MFam Mid Rise: Renter	Space Heating: Baseboard	New	Discretionary	Furnace	90% Furnace	Baseboard Heating	30	Per installation	1	$ 1,920.00	$ 164.87	$ 1,755.13	2588	0.000234	$ 284.95
Residential	MFam Mid Rise: Renter	Clothes Drying	New	Discretionary	Dryer	Moisture Sensor Dryer	Electric dryer w/ moisture sens, 7.0cuft	30	Per installation	1	$ 679.00	$ 636.52	$ 42.48	578	0.000163	$ 30.68
Residential	MFam Mid Rise: Renter	Cooking	New	Discretionary	Over	Convection Cooking	Convection Electric range, 30"	30	Per installation	1	$ 849.00	$ 759.62	$ 89.38	157	0.000423	$ 14.22
Residential	MFam Mid Rise: Renter	Water Heating	New	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 1,267.00	$ 654.26	$ 612.74	1696	0.000183	$ 111.02
Residential	MFam Mid Rise: Renter	Water Heating	New	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 943.10	$ 654.26	$ 288.84	1696	0.000183	$ 146.02
Residential	MFam Low Rise: Renter	Space Heating: Ducted	New	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 2,120.00	$ 875.42	$ 1,244.58	3361	0.000234	$ 284.95
Residential	MFam Low Rise: Renter	Space Heating: Baseboard	New	Discretionary	Furnace	90% Furnace	Baseboard Heating	30	Per installation	1	$ 1,920.00	$ 164.87	$ 1,755.13	2588	0.000234	$ 284.95
Residential	MFam Low Rise: Renter	Clothes Drying	New	Discretionary	Dryer	Moisture Sensor Dryer	Electric dryer w/ moisture sens, 7.0cuft	30	Per installation	1	$ 679.00	$ 636.52	$ 42.48	578	0.000163	$ 30.68
Residential	MFam Low Rise: Renter	Cooking	New	Discretionary	Over	Convection Cooking	Convection Electric range, 30"	30	Per installation	1	$ 849.00	$ 759.62	$ 89.38	157	0.000423	$ 14.22
Residential	MFam Low Rise: Renter	Water Heating	New	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 1,267.00	$ 654.26	$ 612.74	1696	0.000183	$ 111.02
Residential	MFam Low Rise: Renter	Water Heating	New	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 943.10	$ 654.26	$ 288.84	1696	0.000183	$ 146.02
Residential	MFam Mid Rise: Owner	Space Heating: Ducted	New	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 2,120.00	$ 875.42	$ 1,244.58	3361	0.000234	$ 284.95
Residential	MFam Mid Rise: Owner	Space Heating: Baseboard	New	Discretionary	Furnace	90% Furnace	Baseboard Heating	30	Per installation	1	$ 1,920.00	$ 164.87	$ 1,755.13	2588	0.000234	$ 284.95
Residential	MFam Mid Rise: Owner	Clothes Drying	New	Discretionary	Dryer	Moisture Sensor Dryer	Electric dryer w/ moisture sens, 7.0cuft	30	Per installation	1	$ 679.00	$ 636.52	$ 42.48	578	0.000163	$ 30.68
Residential	MFam Mid Rise: Owner	Cooking	New	Discretionary	Over	Convection Cooking	Convection Electric range, 30"	30	Per installation	1	$ 849.00	$ 759.62	$ 89.38	157	0.000423	$ 14.22
Residential	MFam Mid Rise: Owner	Water Heating	New	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 1,267.00	$ 654.26	$ 612.74	1696	0.000183	$ 111.02
Residential	MFam Mid Rise: Owner	Water Heating	New	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 943.10	$ 654.26	$ 288.84	1696	0.000183	$ 146.02
Residential	MFam Low Rise: Owner	Space Heating: Ducted	New	Discretionary	Furnace	90% Furnace	Electric Furnace	30	Per installation	1	$ 2,120.00	$ 875.42	$ 1,244.58	3361	0.000234	$ 284.95
Residential	MFam Low Rise: Owner	Space Heating: Baseboard	New	Discretionary	Furnace	90% Furnace	Baseboard Heating	30	Per installation	1	$ 1,920.00	$ 164.87	$ 1,755.13	2588	0.000234	$ 284.95
Residential	MFam Low Rise: Owner	Clothes Drying	New	Discretionary	Dryer	Moisture Sensor Dryer	Electric dryer w/ moisture sens, 7.0cuft	30	Per installation	1	$ 941.00	$ 636.52	$ 304.48	578	0.000163	$ 30.68
Residential	MFam Low Rise: Owner	Cooking	New	Discretionary	Over	Convection Cooking	Convection Electric range, 30"	30	Per installation	1	$ 849.00	$ 759.62	$ 89.38	157	0.000423	$ 14.22
Residential	MFam Low Rise: Owner	Water Heating	New	Discretionary	Water Heater	Tankless WH	Electric Water Heater, 50 gal.	30	Per installation	1	$ 1,267.00	$ 654.26	$ 612.74	1696	0.000183	$ 111.02
Residential	MFam Low Rise: Owner	Water Heating	New	Discretionary	Water Heater	WH (>67% EF)	Electric Water Heater, 50 gal.	30	Per installation	1	$ 943.10	$ 654.26	$ 288.84	1696	0.000183	$ 146.02

Figure C.1 Customers Available for Fuel Conversion