



In the Community to Serve[®]

**2014
Integrated Resource Plan**

Appendix Volume 3 (Sec D-E)

Appendix D

Demand Side Management

Cascade Natural Gas Corporation

Integrated Resource Plan 2014

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New & Existing Homes

Energy-Saving Measure	Basic Specifications	Incentive
High-Efficiency Natural Gas Furnace ¹	95% + AFUE	\$250
High-Efficiency Natural Gas Hearth (Fireplace)	70% + FE (Fireplace Efficiency) ² 80% + AFUE (Annual Fuel Utilization Efficiency)	\$150 \$250
High-Efficiency Combination Domestic Hot Water and Hydronic Space Heating System using pre-approved Tankless Water Heater ³	90% + AFUE	\$825
Condensing High-Efficiency Natural Gas Tankless Water Heater	0.91 + EF	\$150
Conventional High-Efficiency Natural Gas Water Heater	0.67 + EF	\$45
High-Efficiency Exterior Door ¹	$U \leq 0.21$	\$50

Existing Homes Incentives

Energy-Saving Measure	Basic Specifications	Incentive
Floor Insulation ⁴	Equal to or greater than R-30 or to fill cavity ⁵ , prior condition must not exceed R-11	\$0.30/sq.ft.
Wall Insulation ⁴	Equal to or greater than R-11 or to fill cavity, prior condition must not exceed R-4	\$0.35/sq.ft.
Ceiling or Attic Insulation ⁴	Equal to or greater than R-38, prior condition must not exceed R-18	\$0.30/sq.ft.
Whole House Residential Air Sealing ⁴	Equal or less than 0.0003 Specific Leakage Area through pre and post blower door testing ⁶	\$100

Efficient New Home Packages

Energy-Saving Measure	Basic Specifications	Incentive
ENERGY STAR® Certified Home + U.30 Window Glazing ⁷	92% AFUE furnace + U.30 glazing	\$600
Upgrade to ENERGY STAR Premium High-Efficiency Natural Gas Furnace ⁸	95% + AFUE	\$250
Built Green Certified Home ⁷	Requires Built Green Certification	\$600

1. Home must be heated by natural gas.

2. Must use intermittent ignition device.

3. Water must be heated with a tankless system. Pre-approval from CNGC required. Boilers do not qualify.

4. All insulation and air sealing must be performed by a CNGC qualified Trade Ally in order to be eligible for a rebate through the Conservation Incentive Program. Attic insulation cannot be filled to cavity.

5. Minimum of R-19 or higher to fill cavity.

6. Requires WA Department of Commerce Combustion Safety Test Report Exhibit 5.3.1A. Whole House Residential Air Sealing must comply with Washington State Energy Code section 502.4.5

7. These incentives are only applicable to new homes, not available to existing homes.

8. Only eligible on ENERGY STAR Certified homes. These incentives are only applicable to new homes, not available to existing homes.



Cascade Natural Gas Conservation Incentive Program Existing & New Homes Incentives

Eligibility Requirements

- Qualifying measures must be purchased and installed by December 31 of the current calendar year and applications must be postmarked no later than March 1 of the following calendar year.
- Applicant must be a Washington customer of Cascade Natural Gas on residential rate schedule 503 (see your gas bill).
- Fuel for the home's primary heat source must be provided by Cascade Natural Gas for all heating incentives.
- Water-heating fuel must be provided by Cascade Natural Gas for all water-heating incentives.
- Customer **must not use a heat pump** for heating and/or cooling with a natural gas furnace back-up.
- Energy-saving measures must meet program requirements. Details at www.cngc.com/conservation.
- All equipment and service measures must be installed by a Washington-licensed contractor.
- All insulation and air sealing measures must be performed by a CNGC qualified Trade Ally in order to be eligible for a rebate through the Conservation Incentive Program. 1.866.626.4479 for a list of qualified Trade Allies in your area or visit <http://cngconserve.com/interactive-map>.
- Appliances and building materials specified by Washington state code are not eligible for Cascade Natural gas incentives.
- ENERGY STAR homes must be approved by an ENERGY STAR verifier.
- Built Green Homes must present Built Green Certification.
- Incentives may be subject to change and are only applicable for tariff approved measures in place at the time of installation.

How to qualify for Cascade Natural Gas incentives:

1. Establish your eligibility. Call 1.866.626.4479 or visit www.cngc.com/conservation for program requirements.
2. Install energy-efficient home improvements. Contact a participating Trade Ally contractor or Washington licensed contractor to install eligible measures. Please visit www.cngc.com/conservation for a list of qualified trade allies. Note: if installing insulation or air sealing you must use a CNGC qualified Trade Ally.
3. Acquire the appropriate incentive form online at www.cngc.com/conservation or call 1.866.626.4479.
4. Complete, sign and submit form along with a copy of your contractor's invoice marked "Paid in Full" to:



Mail: Cascade Natural Gas
Conservation Incentive Program
Rebate Processing Center
3800 Watt Ave., Suite 105
Sacramento, CA 95821



Fax: 1.800.506.9073

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



Home Energy Saver Kit

Water-saving shower heads and faucet aerators available upon request. Please call 1.866.626.4479 for details or apply online at: www.cngc.com/conservation.



For questions or more information, please visit us online at www.cngc.com/conservation or call 1.866.626.4479.

Cascade Natural Gas Conservation Incentive Program Commercial/Industrial Standard Incentives

Warm Air Furnaces - \$3.00/kBtu/hr High Efficiency Condensing Furnace—Min 91% AFUE	Ozone Injection Laundry³ - \$2,500 Venturi injection or bubble diffusion - Min 125 lb. total washer/extractor capacity. Pre-approval required.
HVAC Unit Heater - \$1.50/kBtu/hr High Efficiency Non-Condensing Min—86% AFUE	Motion Control Faucet³ - \$105 Maximum flow rate of 1.8 gpm WaterSense® Certified and Below Deck Mixing Valve
HVAC Unit Heater - \$3.00/kBtu/hr High Efficiency Condensing Min—92% AFUE	Clothes Washer³ - \$180 Commercial gas washer—1.8 MEF
Radiant Heating - \$6.95/kBtu/hr Direct fired radiant heating	Gas Convection Oven - \$450 ENERGY STAR® ≥42% Cooking Eff/ ≤13,000 Btu/hr Idle Rate
Boiler - \$4.00/kBtu/hr High Efficiency Condensing Boiler Min 90% Thermal Eff & 300 kBtu input	Gas Griddle - \$350 ENERGY STAR® ≥38% Cooking Eff/ ≤2650 Btu/hr sq ft Idle Rate
Boiler Vent Damper - \$1,000 Min 1,000 kBtu input	Gas Conveyor Oven - \$600 Greater than 42% tested baking efficiency
Boiler Steam Trap¹ - \$125 Min 300 kBtu in; steam pressure at 7psig or >	Connectionless 3 Pan Gas Steamer - \$850 ENERGY STAR® or CEE/FSTC Qualified ≥38% Cooking Eff / ≤2,083 Btu/hr/pan Idle Rate
Domestic Hot Water Tanks³ - \$2.50/kBtu/hr Condensing tank, Min 91% Thermal Eff	Connectionless 6 Pan Gas Steamer - \$1,200 ENERGY STAR® or CEE/FSTC Qualified ≥38% Cooking Eff / ≤2,083 Btu/hr/pan Idle Rate
Domestic Hot Water Tankless Water Heater³ - \$60/gpm ENERGY STAR® .82 EF	Double Rack Oven - \$2,000 FSTC Qualified ≥50% Cooking Eff/ ≤3,500 Btu/hr/Idle Rate D Rack
Attic Insulation - (retrofit only) Tier 1: Min R-30 - \$0.50/sq ft Tier 2: Min R-45 - \$0.65/sq ft	ENERGY STAR® Gas Fryer - \$600
Roof Insulation - (retrofit only) Tier 1: Min R-21 - \$0.60/sq ft Tier 2: Min R-30 - \$0.80/sq ft	Door Type Dishwasher Low Temp Gas³ - \$650 ENERGY STAR® ≤.6 kw Idle Rate/ ≤1.18 gallon/rack
Wall Insulation² - (retrofit only) Tier 1: Min R-11 - \$0.50/sq ft Tier 2: Min R-19 - \$0.56/sq ft	Multi-Tank Conveyor Low Temp Dishwasher³ - \$1,000 Gas Main w/Electric Booster ENERGY STAR® ≤2.0 kw Idle Rate; ≤ 0.50 gallons/rack
Energy Savings Kits³ - FREE A: Kitchen Pre Rinse Spray Valve & Bath Aerators B: Low Flow Showerhead	Recirculation Controls³ - \$100 Continuous Operation DHW Pump Pre-Approval required.

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

Mixed purpose facilities that include buildings on both Residential Rate Schedule 503 **and** qualifying Rate Schedules 504, 505, 511, 570, and 577 as part of the same Cascade Natural Gas customer account shall also be eligible for custom conservation incentives.

Please note: Standard incentives are available on the qualified measures above to Cascade Natural Gas Corporation (CNGC) customers on rate schedules 504, 505, 511, 570 and 577.

¹ This measure will only be allowed where the customer agrees to regular trap maintenance and replacement every seven (7) years.

² Minimum value of R-11 applies only where existing walls have no internal insulation cavities.

³ Incentive eligibility dependent on use of gas fired domestic hot water serving the specified measure equipment or fixture.



Who is eligible to participate?

- Must be a new or existing commercial or industrial customer of CNGC on one of five qualifying rate schedules: 504, 505, 511, 570 or 577.
- Incentives apply on qualified high-efficiency natural gas equipment such as heating, insulation, water heating systems, cooking equipment installed as replacement, retrofit as well as new installation in place of standard efficiency equipment. If the equipment installation, replacement, or retrofit provides significant increase over existing high-efficiency equipment, and is not listed here please contact program representative for potential custom incentive.
- Insulation measures must be installed in an existing building, heated by natural gas, without functional insulation.
- Eligible measures installed are subject to the available incentives coinciding with the date of the installation as outlined in CNGC's tariff.
- Customers requesting incentives for site-specific energy efficiency measures must submit estimated costs and natural gas savings associated with the project. Natural gas savings are to be calculated using standard engineering practices. CNGC will review the natural gas savings calculations, and reserves the right to modify energy savings estimates.

How to qualify for Cascade Natural Gas incentives

- 1 Establish your eligibility. Call 1.866.450.0005 or visit www.cngc.com/conservation for program requirements.
- 2 Install energy-efficient upgrades. Contact a participating Trade Ally contractor or licensed contractor to install eligible measures.
- 3 Acquire appropriate incentive form online at www.cngc.com/conservation.
- 4 Sign and submit the following forms:

[C&I Standard Incentive application](#) • [W9 form](#) • [Copy of recent CNGC gas bill](#) • [Quote for proposed equipment](#) • [Final invoice marked "paid"](#) • [Manufacturer's spec sheet](#).

Send forms to:

Mail: Cascade Natural Gas Corporation, c/o Lockheed Martin Energy and Environmental Services
22121 20th Avenue SE, Bothell, WA 98021

Fax: 1.877.671.2998

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

Get started today!

To apply for an incentive, download a C&I Standard Incentive application at www.cngc.com/conservation and return to us via email at conserve@cngc.com or by fax at 1.877.671.2998



Questions on food service, lodging or health care projects? Call Autumn Marks at 1.877.508.7116.

All measure assumptions were adjusted as appropriate based on Nexant's findings. All measures were run under the Company's 4.17% long term discount rate as per discussion with its Conservation Advisory Group. Additional scenarios have been screened under the UCT and utilized the 8.33% WACC discount rate recommended for residential measures weighed under the UCT per policy statement UG-121207 with bond rate used for the TRC under the residential scenarios and can be referenced in Appendix __. This was performed in the Company's standard program planning and cost-effectiveness assessment tool and became the final version approved by the CAG and forwarded to the WUTC for implementation in September.

At the time two main options were considered for the Residential sector and for the C&I sector. Each option presented the best possible outcomes under the WACC and Long Term discount rate scenarios. In this instance "Best Possible Outcome" resulted in a portfolio that:

1. Maximized the inclusiveness of viable, industry-acknowledged conservation measures
2. Did so while maintaining incentive levels that send a meaningful market signal to consumers to upgrade to high-efficiency equipment and measures
3. Remained cost effective at the Company's most recently acknowledged avoided costs, even if participation levels remained on par with prior year's achievements (for residential)

Residential Scenarios

As suggested above, residential offerings have been screened for cost-effectiveness and synchronized with the corresponding scenarios in TEAPOT. The TEAPOT model was built to include the Company's current portfolio measures so coordination between the Nexant model and the internal program planning tool was a straightforward process.

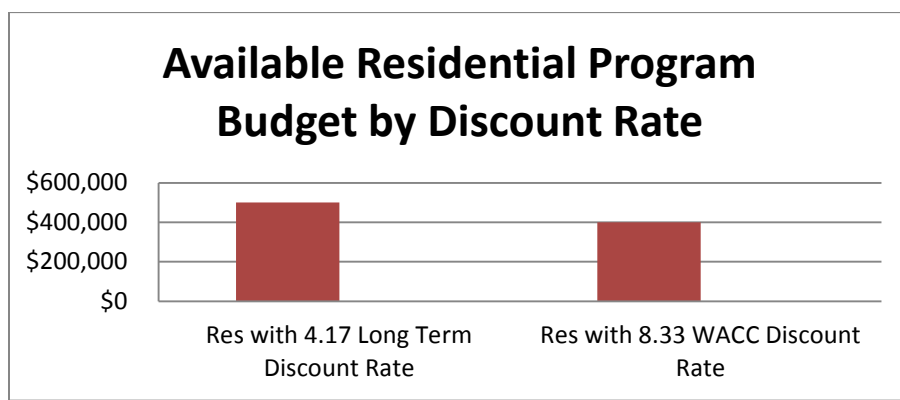
Scenarios were built from measures identified by Nexant and our program delivery team. The portfolios were then run through TEAPOT once more so generalized Achievable Potential targets could be set. This is described in more details in the sections below.

Portfolios were developed to maximize the number of rebates available to our customers— with rebates set at incentive levels attractive enough to encourage the desired conservation behavior. Administrative costs were set to levels commensurate with our 2014 budget, with downward adjustments made to minimize the sacrifice to program measures if forced to utilize the WACC as the discount rate. The WACC had not been used previously by the Company at the program planning and evaluation level because it artificially devalues the savings associated with long-term measures and reduces the pool of viable incentives.

We set an administrative budget in order to plan and operate programs. This budget must ensure an acceptable ratio of costs balanced with therm savings achievements. Since therm savings offset the costs of administrative investment, the greater the achievement, the more cost-effective our programs. If the budget or therm savings upon which the portfolio is built are unrealistic, we risk developing a scale-dependent portfolio doomed to failure.

Below is a chart comparing the “optimized” budget of \$500k (maximum) for our Residential programs against the upward threshold of \$400k under a scenario in which we must use the WACC. The \$500k reflects the estimated expense of a continued vendor/in-house approach to program offerings with a small buffer for unforeseen expenses.

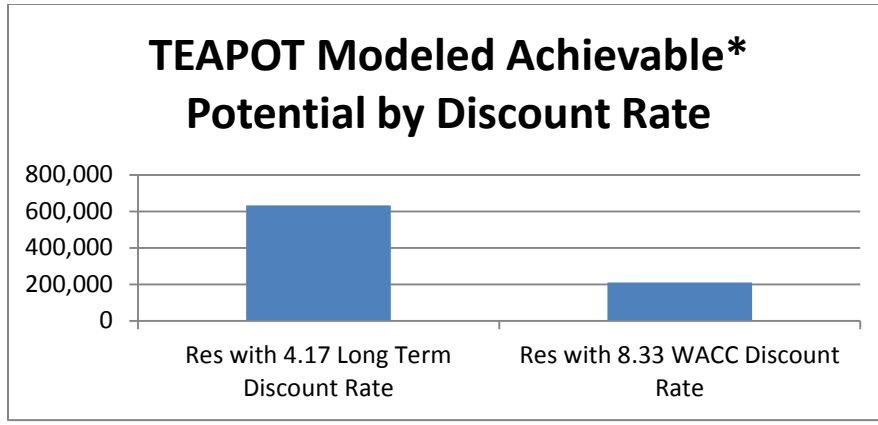
Figure 6 - 6



As described above, the budget by necessity must shrink if we were required to utilize the WACC discount rate. If the budget were to remain the same under both scenarios, more measures would have needed to be reduced or removed to maintain the balance necessary to maintain a levelized avoided cost of \$.31 or less under the UCT. If more measures had been removed, the overall potential would have been likewise reduced, creating a vicious cycle of cuts that would severely (and unnecessarily) handicap the Company’s conservation efforts.

Next, we will look at the overall Achievable Potential identified by Nexant’s TEAPOT model based on the portfolio of measures deemed cost effective under the Long Term vs. WACC discount rate scenarios.

Figure 6 - 7



***For program planning Achievable Potential means the likelihood of measure adoption under realistic market and societal conditions in the CNGC service territory. However, Achievable Potential should not be confused with Program Potential, which is influenced by Regulatory Policy and company budgets/tariffs. Cascade will aggressively strive towards Achievable Potential, but will build programs against the threshold of lower more Program-realistic targets in order to ensure maintained cost effectiveness.**

Under the 4.17% Long Term Discount Rate, Cascade was able to grow and maintain a portfolio of measures with a total Achievable Potential of 632,913 utilizing the UCT. Under the 8.33% WACC Discount Rate, the total Achievable Potential dropped to 209,752. This is because the total number of cost-effective measures plummets when the savings of long-lived measures are severely discounted.

In order to keep programs operating within a severe discounting scenario, costs needed to be reduced as well as incentive levels. Programs take first priority, so Step One was to reduce administrative costs to lowered levels without profoundly harming daily program operations. Setting the budget at \$400k should reasonably have achieved this goal. However, it was not enough to lower the budget and maintain the full portfolio available under the 4.17% long term discount rate. The UCT still exceeded the avoided levelized cost threshold. The TRC also remained prohibitive in its current state. So the next step was to reduce rebate levels. The first rebate levels lowered were those above the “.30 of cost” threshold, since Nexant indicated rebates at this level were adequate for incentivizing conservation behavior. Small downward adjustments were also made to measures that were significantly above .31 levelized cost under the UCT on an individual basis. If rebates needed to be significantly shrunk in order to maintain the portfolio, and could not be offset by other adjustments, they were removed. As measures were removed, the overall Achievable Potential dropped.

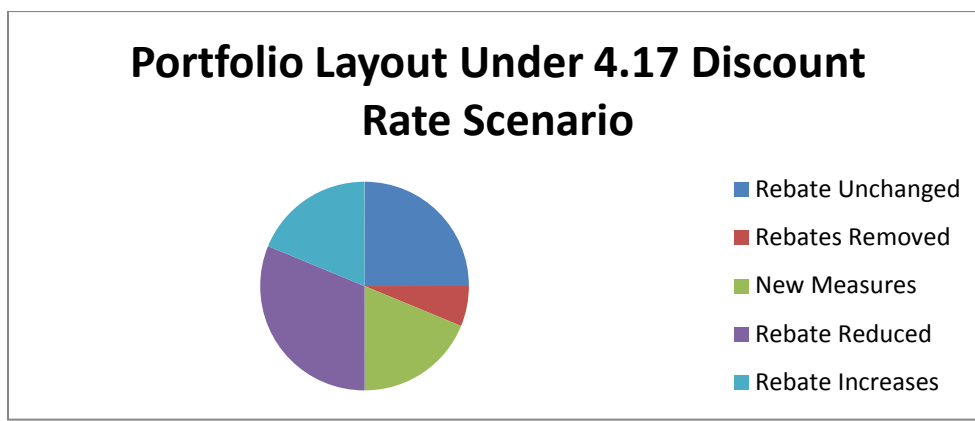
As a final note, therm savings targets were based from the TEAPOT tool and will be used for the purposes of IRP and Conservation Plan development. However for the

purposes of program development, we have narrowed the target to 138k therms (closer to 25% of Achievable base), reflecting a number within approximate range of our 2013 achievement. This was built this way in order to ensure any program portfolio built is not set up for failure if it cannot attain an unrealistic model-created target. Additional savings achieved beyond this figure will make the conservation programs even more cost effective, maximizing the value of participation for the Company and Ratepayers.

TEAPOT- generated targets will be acknowledged in the IRP and conservation plan as *aspirational* targets and those we will aggressively strive towards throughout the year. However, the programs will be built in a way that ensures cost-effectiveness can be maintained even if we fall short of that target.

Now that we have reviewed Residential program budgets and targets, here are the results of the Best Possible Outcomes under the 4.17% and 8.33% discount rate scenarios for our Residential Program.

Figure 6 - 8



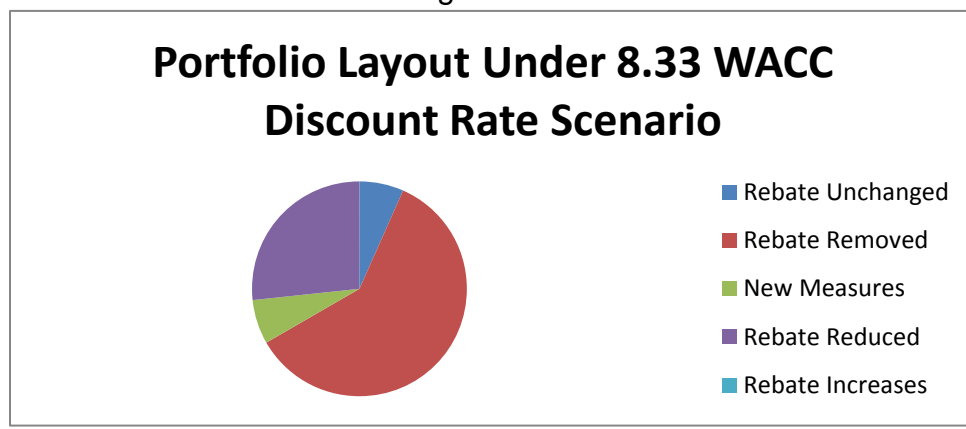
The above chart provides a high-level overview of the portfolio spread available to our customers under an optimized program planning scenario where we set rebate levels at as close to .30 of cost as possible in order to maintain attractive incentives.

Measures remained in the portfolio if they were able to maintain a benefit cost ratio of over 1 at a measure level, and a loaded levelized cost of under \$0.41 per therm at the portfolio level under the following conditions:

- (a) under the full spread of anticipated residential program expenses;
- (b) under a target based from prior year achievements;
- (c) Under an incentive level within reach of 30% of incremental costs, per Nexant guidance as reasonable threshold for encouraging update of conservation measure.

For the most part, outcomes were positive with only one measure removed from the portfolio due to strains to cost-effective under the current lowered cost of natural gas. The efficiency levels for two measures — .64 water heaters and 90% efficient furnaces were adjusted upwardly to .67 and 95% respectively, in order to reflect the market, and set the conservation bar higher for our customers to encourage deeper energy savings. Four measures remained unchanged from the current tariff. Three new measures were added, and three rebates were upwardly adjusted due to their extreme cost-effectiveness and in order to help them reach a threshold closer to .30 of measure cost. Five measures experienced downward adjustments in order to balance the portfolio and maintain cost effectiveness overall, but careful attention was paid to ensure the rebates were not reduced to levels that would make them unattractive to customers and thus become purposeless as incentives towards positive conservation behavior.

Figure 6 – 9



The above chart provides a high-level overview of the portfolio spread available to our customers under the Best Possible Outcome program planning scenario under the constraints of the 8.33% WACC discount rate, with rebate levels remaining set as close to .30 of cost as possible in order to maintain attractive incentives.

Measures remained in the portfolio if they were able to maintain a cost benefit ratio of over 1 at a measure level, and a loaded levelized cost of under \$0.41 per therm at the portfolio level under the following conditions:

- (a) under the full spread of anticipated residential program expenses;
- (b) under a target based from prior year achievements;
- (c) Under an incentive level within reach of 30% of incremental costs, per Nexant guidance as reasonable threshold for encouraging update of conservation measure.

Under this scenario, nine rebates needed to be removed since incentive levels and

administrative costs could not be balanced to adequately preserve them and still keep other more cost effective measures remaining in the portfolio. One new measure was added, and one remained unchanged. Four additional measures were decreased but careful attention was paid to ensure the rebates were not reduced to levels that would make them unattractive to customers and thus become purposeless as incentives towards positive conservation behavior. Under this scenario, no measure increases were viable since the portfolio was extremely tight and maintenance of cost-effectiveness precarious.

Again, it is important to emphasize that the Company ran multiple portfolio scenarios under the 8.33% WACC discount rate and the portfolio listing was the most viable, inclusive option available under these circumstances. Based on the reduced offerings the Company strongly recommended moving forward with a portfolio that utilizes the previously accepted 4.17% long term discount rate.

Commercial/Industrial Scenarios

The Nexant potential assessment and TEAPOT modeling tool have allowed the Company to identify viable measures for inclusion in a modified Commercial/Industrial Conservation Program portfolio. The purpose of this exercise was to design a program able to withstand fluctuations in avoided gas costs and maximize the spread of cost-effective and worthy measures for inclusion in the CNGC Conservation Incentive Program.

Savings levels were based from the TEAPOT model. The outcomes were developed by running multiple portfolio scenarios carved out from the master list of measures. Carve-out was based from Nexant's screened achievable cost-effectiveness, with a secondary review of this measure sub-set by the C&I program delivery team. The portfolio was screened in both TEAPOT and in the Company's internal valuation tool. For the purposes of program planning, a viable measure set was defined as one composed of measures identified by Nexant and the Company as viable through its initial measure screen *and* remained viable under the company's best estimates of program expenses and predicted energy savings.

It is important to note the screen conducted with the TEAPOT tool and internal valuation mechanism for the Commercial/Industrial sector was performed **strictly to assess viable prescriptive measures and potential**. TEAPOT can only provide estimated achievable potential based on known measures. However, program experience has clearly demonstrated the prescriptive portion of savings from the CNGC Conservation Program is fairly consistent, with an average of 65% of them savings coming from custom projects. Therefore the prescriptive portfolio is assumed to represent 35% of total program savings.

All measures identified as viable under Nexant from an Achievable Potential Standpoint were screened under the TRC and UCT utilizing the 8.33% WACC discount rate recommended for commercial programs through UG-121207 policy statement for program planning. An additional screen was run under the Company's 4.17% long term discount rate. This was performed in the Company's standard program planning and cost-effectiveness assessment tool.

Incentive levels had been set to one third of incremental costs as determined by Nexant or ground-level programmatic data. Keeping all incentives in the 30-33% range allowed us to clearly synchronize program offerings with the TEAPOT model which begins a base scenario of Achievable 1 at an assumption of a minimal viable rebate level of 33% of incremental costs, in order to avoid free ridership, or vestigial offerings.

Measures remained in the portfolio if they were able to maintain a benefit cost ratio of over 1 at a measure level, and a loaded levelized cost of less than \$0.41 per therm at the portfolio level under the following conditions:

- (a) under the full spread of anticipated C&I program expenses;
- (b) under a combined prescriptive + customer C&I target developed via TEAPOT (35% of total program savings) + additional proportion of custom savings (assumed at 65% of total C&I program savings). With the exception of the WACC scenario which assumed a greater dependence on C&I (75% C&I/25% prescriptive)
- (c) Under an incentive level at least 30% of incremental costs, per Nexant guidance as minimal threshold for encouraging update of conservation measure.

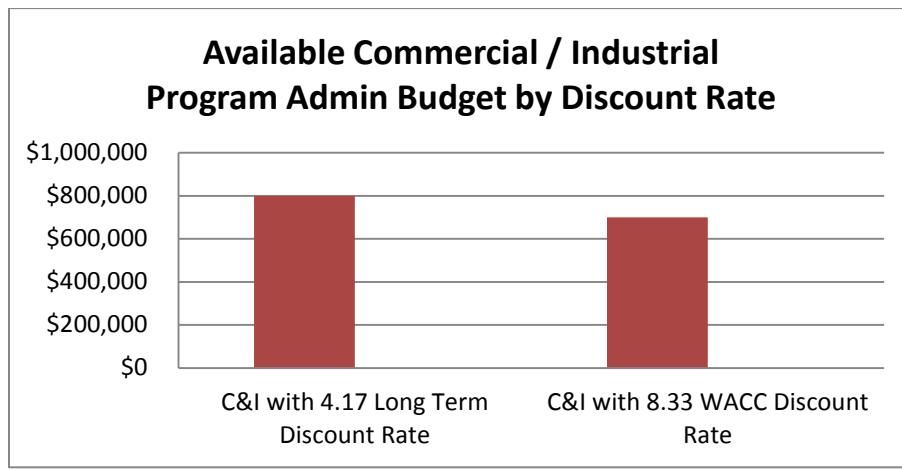
Cascade strives towards aggressive conservation achievements, but at the program development phase, it is essential that we balance optimism and realism. Program developers must set an administrative budget in order to plan and operate programs. This budget must ensure an acceptable ratio of costs balanced with therm savings achievements. Since therm savings offset the costs of administrative investment, the greater the achievement, the more cost-effective our programs. If the budget or therm savings upon which the portfolio is built are unrealistic, we risk developing a scale-dependent portfolio doomed to failure because we designed a program dependent on the savings levels we *hoped* we would achieve, based on abstract modeling, and not based on prior year accomplishments and ground level understanding.

As with the Residential program, the Company analyzed the Best Possible Outcomes for a portfolio designed under the parameters of the WUTC policy statement. The portfolios were optimized for rebate level, budget and measure mix. The following table

demonstrates the maximum viable budget under both a 4.17% Long Term and 8.33% WACC discount rate scenario. For the development of the CIP C&I portfolio, program costs were assumed at the fully budgeted amount for program development contractor, plus an additional buffer for internal administrative expenses and staff time. If at all possible, costs are managed at a level lower than this estimate, but significant cut-backs would require further aggressive administrative restructuring, and therefore would be imprudent to base from a more aspirational budget for the purposes of program planning.

Estimated administrative costs were assumed to be approximately \$800k, reflecting the estimated expense of the Lockheed Martin program delivery contract plus a buffer for CNGC staff time and expenses. However, they were lowered to \$700k under the WACC out of necessity.

Figure 6 - 10



The appropriate budget levels described previously were entered into the cost-effectiveness calculation tool. These costs were balanced against the targets and portfolio offerings available under the respective discount rate scenarios.

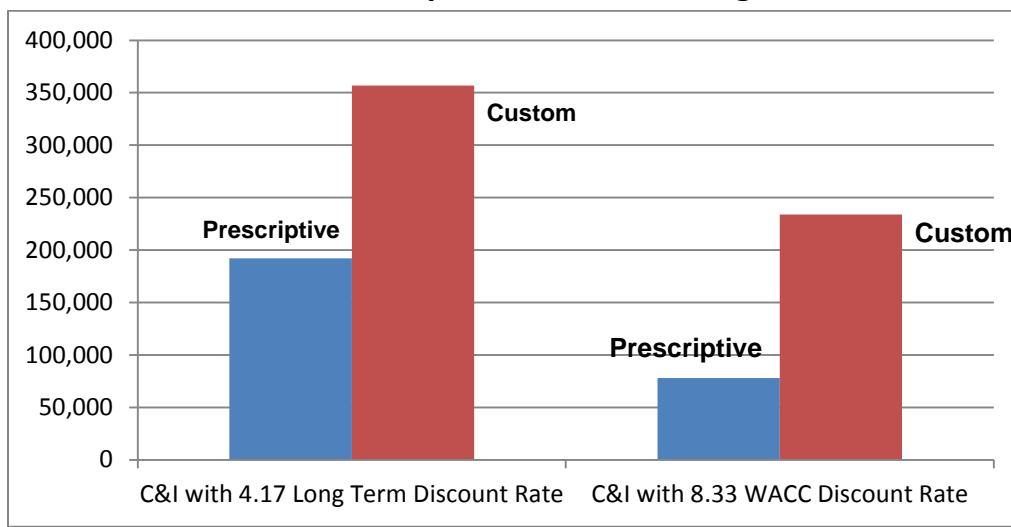
Budgets must balance out with a realistic, proportionate level of therm savings. The table below shows the anticipated level of Achievable Potential modeled from TEAPOT. Total achievable therm savings for the Company’s modified C&I programs were based from the TEAPOT tool in combination with a best estimate based on previous accomplishments and real experience with program implementation.

All targets and costs utilized in the internal valuation tool reflect the total assumed achievement and expenditure associated with the full program *including* the custom component, which was assumed at 65% of the total achieved savings for the year. However, under WACC scenario, we built in a 75% dependence on custom to

compensate for plummeting cost effectiveness for prescriptive measures.

Figure 6 - 11

TEAPOT Model Achievable* Potential Plus anticipated Custom Savings



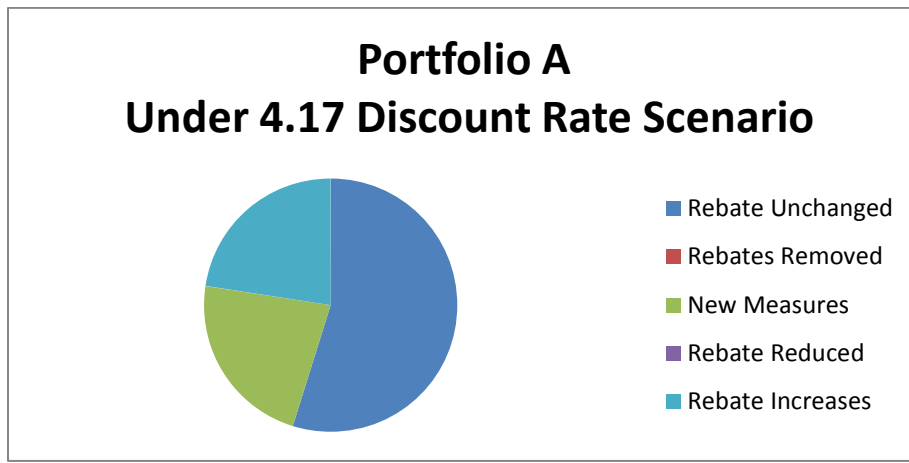
***For program planning Achievable Potential means the likelihood of measure adoption under realistic market and societal conditions in the CNGC service territory. However, Achievable Potential should not be confused with Program Potential, which is influenced by Regulatory Policy and company budgets/tariffs. Cascade aggressively strives towards Achievable Potential, but builds programs against the threshold of lower more Program-realistic targets in order to ensure maintained cost effectiveness.**

Under the Long Term discount rate scenario, total Achievable Potential was approximately 192,091 therms saved from prescriptive measures in an inclusive portfolio, with an additional 356,740 therms achieved through custom incentives. The WACC scenario offered an Achievable Potential threshold of 78,007 TEAPOT-identified therms, and an additional estimate of 234,021 therms saved through custom projects. The prescriptive savings were lower since most prescriptive measures were designed for commercial facilities, and the deepest (but least predictable) savings come from our core industrial customers who gravitate towards custom projects. Industrial measures are harder to standardize since there are a wide range of facility types, processes, and needs to be addressed for these customers.

That said, Achievable Potential identified through TEAPOT may still be overly inclusive as it does not reflect factors such as internal budgeting to meet cost-effectiveness thresholds and external policy impacts.

Thus, while the therm savings identified through TEAPOT (and through traditional custom-to-prescriptive ratios) will be used in the IRP as our aggressive aspirational targets that we strive towards, for the sake of portfolio development, we have adjusted targets to 75% in the 4.17% scenario to set a more realistic minimal threshold that must be met in order for the programs to remain cost-effective. To do otherwise would risk designing a program that buckles under the weight of its own administrative and rebate costs unless an overly optimistic level of savings were achieved.

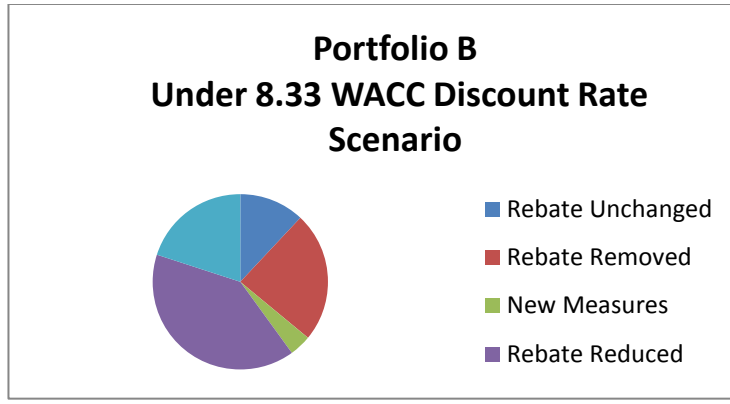
Figure 6 -12



The chart above provides a visualization of the optimized portfolio of measures developed from the TEAPOT model and screened against the avoided gas costs outlined in our most recently acknowledged Integrated Resources Plan. It is important to recognize the key variable driving the differences between the first and second pie chart is the discount rate.

Under the Long Term discount rate scenario, the Company was able to maintain a robust portfolio of prescriptive conservation incentives, retaining 17 measures at their current levels, and increasing the rebate level for 7 measures without negatively impacting program cost-effectiveness. In addition, 7 new measures were added to the list of prescriptive rebates, opening up expanded conservation opportunities. These measures were identified in the Nexant study and by our program delivery team as having a high-likelihood of adaptation if incentives were provided to drive purchase behavior.

Figure 6 -13



Utilizing the 8.33% WACC discount rate artificially diminishes the perceived value/cost effectiveness of commercial gas conservation measures. The same portfolio that maintained a levelized cost at less than .31 under the long-term discount rate, crumbles under the WACC—all other factors being identical. Therefore, as the previous charts demonstrate, budgets were reduced out of necessity to lower the levelized cost of the portfolio.

Under the WACC scenario, 10 rebates were reduced, 6 removed, and 3 remained unchanged. Five measures were increased and 1 new measure was added.

Additional Scenarios by Incentive Levels

Combined Total Conservation Forecast Comparison - Short & Long Term						
Year	75% Incentive Level		50% Incentive Level		30% Incentive Level	
	Achievable 75	Programmatic 75	Achievable 50	Programmatic 50	Achievable 30	Programmatic 30
2015	424,476	467,314	882,210	650,990	712,388	526,475
2016	464,676	511,435	929,472	701,882	749,717	561,121
2017	1,399,972	1,275,935	1,941,374	1,466,008	1,616,912	1,310,096
2018	1,500,984	1,378,663	2,040,500	1,559,152	1,687,252	1,381,032
2019	1,614,415	1,493,059	2,154,910	1,669,176	1,770,096	1,464,315
2020	1,749,150	1,630,865	2,292,094	1,799,919	1,875,323	1,571,083
2021	1,873,135	1,761,406	2,414,609	1,922,241	1,974,528	1,676,560
2022	2,002,953	1,898,882	2,546,661	2,053,015	2,088,447	1,796,302
2023	2,134,216	2,042,992	2,676,838	2,182,600	2,209,512	1,927,200
2024	2,253,869	2,167,236	2,806,623	2,310,546	2,329,649	2,049,503
2025	2,350,934	2,279,609	2,900,665	2,408,227	2,428,799	2,161,307
2026	2,435,572	2,367,174	2,994,090	2,501,812	2,520,295	2,254,276
2027	2,510,727	2,447,422	3,073,616	2,578,984	2,602,617	2,339,690
2028	2,585,673	2,528,329	3,155,658	2,657,778	2,685,243	2,424,615
2029	2,632,883	2,583,124	3,201,639	2,703,235	2,737,445	2,482,687
2030	2,676,311	2,622,904	3,255,419	2,753,683	2,786,260	2,526,278
2031	2,725,224	2,679,819	3,303,143	2,796,649	2,838,512	2,583,638
2032	2,770,992	2,719,320	3,362,550	2,848,819	2,898,961	2,636,950
2033	2,806,655	2,759,370	3,395,277	2,881,197	2,927,512	2,666,414
2034	2,843,302	2,795,376	3,438,957	2,919,238	2,962,415	2,698,170

Numbers of Measures Passing Cost-Effectiveness by Incentive Level*

Incentive Level	Residential		
	30%	50%	75%
Nexant Measures (903)	686	537	392
Effect on 30% Current Portfolio Measures	-17%	-17%	-33%
Cascade Portfolio Measures (228)	210	171	108
Effect on 30% Current Portfolio Measures	-17%	-17%	-45%

Incentive Level	Commercial		
	30%	50%	75%
Nexant Measures (1350)	629	495	395
Effect on 30% Current Portfolio Measures	-10%	-10%	-18%
Cascade Portfolio Measures (585)	332	281	234
Effect on 30% Current Portfolio Measures	-9%	-9%	-17%

Incentive Level	Industrial		
	30%	50%	75%
Nexant Measures (621)	324	263	206
Effect on 30% Current Portfolio Measures	-10%	-10%	-19%
Cascade Portfolio Measures (144)	42	36	12
Effect on 30% Current Portfolio Measures	-4%	-4%	-17%

*NOTE:

"Nexant Measures" refers to the list of potential measures reviewed in the Nexant Conservation Potential Study, provided in Appendix B of Volume III, available in Appendix D of the 2014 IRP.

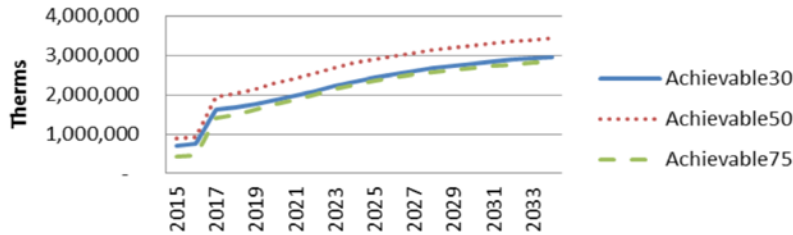
"Cascade Portfolio Measures" refers to the present portfolio of measures being offered. The current portfolio aims to operate at or near the 30% incentive level.

The cost effective measures by incentive levels reflect the total number of measures passing cost effectiveness (greater than or equal to 0.90) out of the total number of measures, either included in the Nexant study or under the program's current portfolio offerings.

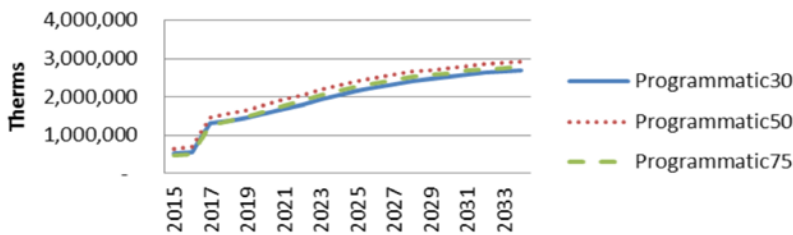
The "Effect on 30% Current Portfolio Measures" rows show the decreases, as a percentage, of cost-effective measures that would be able to be offered if the incentive level changed.

This page does not include Low Income.

Total Conservation Achievable Potential Combined Forecast Comparison by Incentive Level

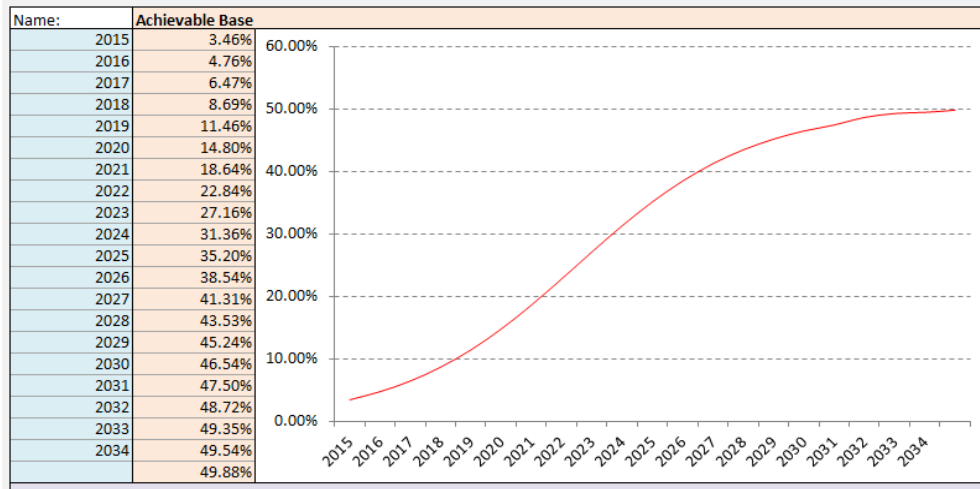


Total Conservation Program Potential Combined Forecast Comparison by Incentive Level

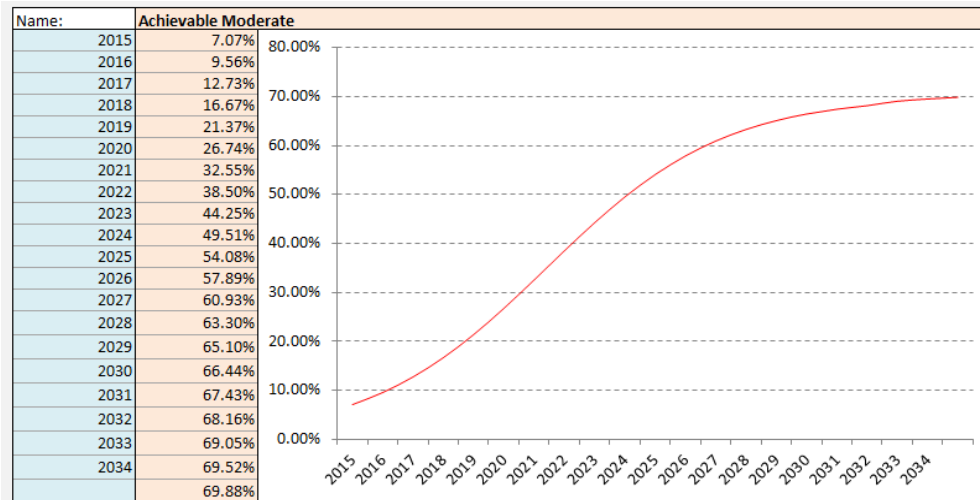


Adoption Curve for Each Achievable Scenario and Incentive Level

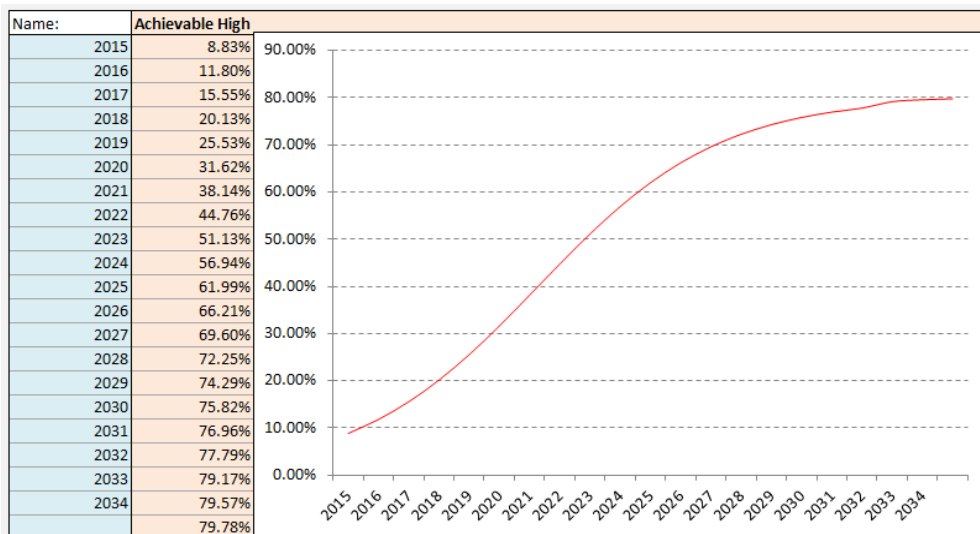
Achievable 1 - Adoption Curve for 30% Incentive Level



Achievable 2 - Adoption Curve for 50% Incentive Level



Achievable 3 - Adoption Curve for 75% Incentive Level



Cascade Natural Gas Corporation Assessment of Achievable Potential & Program Evaluation Volume 1: Executive Summary

Submitted to Cascade Natural Gas Corporation
Submitted by Nexant, Inc.

February 25, 2014

The Nexant logo features a stylized blue icon of a flame or gas drop to the left of the word "Nexant" in a bold, blue, sans-serif font. The logo is set against a large, light blue, semi-transparent graphic of a flame or gas drop that serves as a background for the text.

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1 INTRODUCTION

1.1 OVERVIEW

Cascade Natural Gas Corporation (“Cascade”) has offered energy efficiency programs to its customers since the 1990s with expanded programs beginning in 2008. In light of significant changes to codes, costs, technologies, and gas prices that have taken effect in the past four years, Cascade has contracted with Nexant, Inc. (“Nexant”) to perform a comprehensive assessment of the technical and achievable natural gas conservation potential within Cascade’s Washington service territory for residential, commercial and industrial sectors. This assessment references Cascade’s potential assessment conducted in 2006 by the Energy Trust of Oregon, which in turn was refined in 2009 to include Cascade’s Washington conservation potential. The assessment conducted in 2006 and refined in 2009 included all of the Cascade Natural Gas service territory in Washington and Oregon. This assessment does not directly build on those reports; and thus represents a new assessment of Cascade’s energy efficiency potential. This assessment stands apart from previous studies as a potential assessment for Cascade Natural Gas Washington State service territory only. The findings of this assessment will help inform the development of Cascade’s Integrated Resource Planning (IRP) process as well as provide guidance for future program planning and development efforts. In addition to providing potential assessment, Cascade also requested Nexant evaluate energy savings associated with measures installed by participants in Cascade’s Conservation Incentive Program during 2011/12.

This report presents results of the technical, economic, and achievable potential for natural gas energy efficiency savings in Cascade’s Washington service territory over the next 21 years (2014-2035). Program potential was not included in the study scope, but could be developed by Cascade using the findings of this study and based on regulatory/budgetary parameters, cost-effective thresholds, policy considerations, and decisions on which subset of cost-effective measures to offer to customers going forward. Nexant assessed therm savings realized through Cascade’s program to-date, researched natural gas energy efficiency measures to estimate measure-specific savings, costs and lifetimes, and conducted a detailed bottom-up assessment of the Cascade market to provide a credible and transparent estimation of the technical and achievable energy efficiency potential.

1.2 STUDY GOALS

The primary goal of this assessment was to develop a comprehensive assessment of technical and achievable potential for natural gas energy efficiency within Cascade’s Washington service territory for customers on Rate Schedules 503, 504, 505, 511, 570 & 577 (residential, commercial and non-transport sales industrial customers). This objective analysis illustrates the remaining savings potential by sector, segment and end use as a means to inform future program design given the declining cost of natural gas. The study also integrated a detailed evaluation and measure savings review of Cascade’s conservation portfolio. Key objectives of this study include:

- Provide credible and transparent estimation of the technical and achievable energy efficiency potential by year over the next 21 (2014-2034) years within Cascade’s Washington service territory;
- Assess and validate therm savings associated with key measures that qualified for, and received, a conservation incentive in the 2012 program year, and apply findings to determine realistic therm savings potential in Cascade’s Washington Service area;
- Provide a user friendly, executable dynamic model that will support the potential assessment and allow for testing of sensitivity of all model inputs and assumptions;
- Develop a final report including summary data tables and graphs reporting incremental and cumulative potential by year from 2014 through 2034.

1.3 DEFINITIONS OF POTENTIAL

This study estimated energy efficiency savings developed into three types of potential: technical potential, economic potential, and achievable potential. Market penetration rates associated with each potential were estimated and included in this assessment. While technical and economic potential are both theoretical limits to efficiency savings, achievable potential embodies a set of assumptions about the decisions consumers make regarding the efficiency of the equipment they purchase. Relevant factors to Cascade’s stimulus program were included in the Achievable Potential to simulate a realistic estimate of real-life conditions. Program potential (i.e. the subset of achievable potential attainable given constraints on program budget and implemented measures) is not presented in this report. Volume II, Section 2, details each potential definition.

1.4 COST EFFECTIVENESS SCREENING

Industry standard cost effectiveness tests were performed to gauge the economic merits of the portfolio. Each test compares the benefits of the energy efficiency metric to their costs defined in terms of net present value of future cash flows. The definitions for the two standard tests used in this analysis are described below.

Total Resource Cost test (TRC). The benefits in this test are the lifetime avoided energy costs and avoided capacity costs. The costs in this test are the incremental measure costs plus all administrative costs spent by the program administrator.

Utility Cost Test (UCT). The benefits in this test are the lifetime avoided energy costs and avoided capacity costs, the same as the TRC benefits. The costs in this test are the program administrator’s incentive costs and administrative costs.

Detailed findings are presented in this report using the UCT as the cost-effectiveness screen for economic and achievable potential. As is shown in **Section 6** and **Section 7**, total natural gas savings potential is considerably higher using the UCT when compared with the TRC. This occurs because the

UCT allows more measures to pass the cost-effectiveness threshold of 0.90¹ when compared to the TRC (because it considers only the incentivized portion of a measure’s incremental cost). To illustrate this effect, **Table 1-1** below summarizes the number of measures evaluated and the number of measures to pass the UCT and TRC cost-effectiveness test under the base-case scenario of Cascade’s current avoided costs, and an incentive rate of 30%.

Table 1-1: Summary of count of measures passing each cost test

	<i>Total Measures</i>	<i>Passing Measures</i>	
		<i>TRC</i>	<i>UCT</i>
Total All Sectors	143	51	96
<i>Residential Sector</i>	<i>46</i>	<i>16</i>	<i>36</i>
<i>Commercial Sector</i>	<i>63</i>	<i>31</i>	<i>47</i>
<i>Industrial Sector</i>	<i>34</i>	<i>4</i>	<i>13</i>

1.5 REPORT ORGANIZATION

This report is organized into three volumes as follows:

- **Volume I: Executive Summary** provides an overview of initial findings from the potential study and outlines the remainder of the report. This document represents Volume 1: Executive Summary.
- **Volume II: Report** provides detailed explanation of methodology, results and findings.
- **Volume III: Appendices** provide detailed tables of data and assumptions utilized in the analyses summarized in this assessment.

2 ANALYTICAL APPROACH

Energy efficiency potential studies involve a number of analytical steps to produce estimates of each type of energy efficiency potential: technical, economic, and achievable. This study utilizes Nexant’s in-house developed Microsoft Excel-based modeling tool, TEA-POT (T**Technical**/E**Economic**/A**Achievable** P**Potential**). This modeling tool is built on a platform that provides the ability to run multiple scenarios and re-calculate potential savings based on variable inputs such as sales/load forecasts, natural gas

¹ A cost-effectiveness threshold of 0.90 was used to account for the non-quantifiable environmental benefits of reduced natural gas consumption. This approach aligns with that used by many utilities in the Pacific Northwest.

prices, discount rates, and actual program savings. This model provides Cascade with the utmost transparency into the assumptions and calculations for estimating market potential. TEA-POT has been consistently upgraded and refined over the past several years, with the most recent upgrade occurring in 2012. The major analytical steps are summarized below and specific changes in methodology from one sector to another have been noted throughout this section. The major analytical steps utilized in both the potential study and measure savings review are explained throughout **Volume II, Section 2**.

3 MEASURE SAVINGS REVIEW FINDINGS

The goal of the measure savings review was to provide a high level assessment of Cascade's process for collecting, organizing program participant data and estimating the associated savings for four key measures in the time period June 1, 2011 – May 31, 2012. This was broken up into three tasks: 1) a desk review of program applications, 2) a telephone call to program participants to verify measure installation and key savings metrics, and 3) a billing analysis of a statistical sample of installed furnace, boiler and water heater installed measures. The findings of these assessments are provided below.

3.1 DESK & TELEPHONE REVIEW FINDINGS

The telephone review verified all participation data and **no errors were found** in the reviewed measures. One of the key findings of the measure savings review is regarding Cascade's methodology for estimating natural gas savings. While utilizing a deemed savings value approach for each measure can be a cost-effective and appropriate approach to estimating savings, it can over or underestimate actual savings.

With the data provided in this analysis – specifically measure savings algorithms used in the potential assessment – Cascade will have the option to refine projected savings estimates with increased specificity by calculating premise-specific natural gas savings for each installed measure. While Cascade is already collecting some of the key savings parameters on its participant application forms (such as house square footage and efficiency of installed measure), Nexant recommends including some additional parameters on the application forms to enable premise-specific calculation estimates of natural gas savings. The following desk review findings may have an impact on reporting of savings:

1. The Cascade participant database documented the efficiency of the replacement measure as the incentivized amount (such as a 0.62 EF water heater), whereas often the efficiency of the installed measure as listed on the application was greater than the incentivized efficiency level. That is, while the application form always listed the actual efficiency of the installed equipment (e.g. EF=0.67), the efficiency of that particular measure would be set to a default value (e.g. EF=0.62) in the Cascade participant database. This implies deemed values were used to project savings, as opposed to premise-specific values, which were often more efficient than the incentivized efficiency level. This practice would conservatively estimate savings. Recording the

actual efficiency value of installed equipment, as opposed to the incentivized efficiency value, would be less conservative but could increase the accuracy of projections and data analysis.

2. The efficiency level of original equipment was not always recorded on the application form, nor whether or not the original equipment was replaced due to failure or for another reason prior to the end of expected equipment life. Savings calculations are dependent upon the efficiency of the base equipment, as well as whether or not the customer replaced the equipment early or upon burn-out. Nexant recommends collecting data on these two factors in the rebate application, and tracking them in the participant database, for inclusion in savings calculations (see **Section** Error! Reference source not found. below).
3. The cost category in the customer database varied in inclusions per measure. Categories included equipment, labor, old equipment disposal, and/or additional work performed. Standardized entries of “equipment costs” and “labor costs”, in addition to “extraneous costs” will ensure accurate comparison of measure and installation costs.
4. While Cascade collects participant square footage for its weatherization measures, importing commercial participant facility square footage information into the participant database will facilitate comparative analysis between commercial customers, as facility sizes and types can vary dramatically in the commercial sector.

3.2 BILLING ANALYSIS FINDINGS

In an effort to estimate realized savings associated with Cascade’s program offerings, Nexant conducted a billing analysis for four key residential and commercial measure offerings. The measures are residential high efficiency furnaces and hot water heaters, and commercial/industrial high efficiency furnaces and boilers. Savings from the final qualified accounts assessed in the billing analysis were compared to estimates from Cascade’s deemed measure savings. The findings of this analysis are summarized in **Table 3-1** below.

Table 3-1: Total Participant vs. Billing Analysis Subsample Summary

Source	Metric	Residential		Commercial ²	
		DHW	Furnace	Furnace	Boiler
Cascade Participant Database	Participants	83	833	18 (Census)	23 (Census)
	Equipment Eff. Installed	65%	90%	Assumed 91%	Assumed 90%
	Cascade Deemed Savings (Therms per Measure)	24	86	272	2644
Qualified Billing Analysis Participants	# of samples	50	53	8	5 ³
	Confidence / Precision	90/8	90/11	90/20	90/30
	Avg. Equipment Eff. Installed	67%	95%	95%	91%
	Average Savings (Therms per Measure)	33	111	349 ⁴	1566
Actual as a % of Deemed Savings		138%	129%	128%	59%

4 MARKET SEGMENTATION FINDINGS

An important first step in calculating Cascade’s energy efficiency potential estimates is to establish baseline energy usage characteristics and disaggregate the market by sector, segment, and end use. The findings of this section represent the control totals to which all energy usage is calibrated in the base year of the study and then forecasted. Further details and assumptions are described in **Volume, 2, Section 4**. Below is a summary of findings.

Total natural gas consumption by eligible residential, commercial and industrial customers for 2012 in Cascade’s Washington service territory was 12,256,153 dekatherms⁵. **Table 4-1** shows the overview of

² While some commercial participant numbers are too low to obtain statistical accuracy on the results, this is a census of the installed measures therefore this is a summary of the entire sample size for the commercial sector.

³ This small sample resulted in a 90/30 confidence precision, which decreases the ability to make meaningful conclusions about savings projections for commercial boilers

⁴ Premise savings were divided by number of installed units to develop a therms saved per installed unit value. The three other measures were not standardized by installed units and the therms saved values are per premise.

natural gas sales and premises by sector for Cascade in calendar year 2012. While the industrial sales number totals 2,651,868 dekatherms, this number includes only non-transport industrial gas customers and represents only 4% of total industrial natural gas sales.

Table 4-1: Cascade 2012 Natural Gas Consumption & Premise Counts by Sector

Sector	2012 Sales (annual dekatherms)	Premise Count
Residential	11,203,608	171,991
Commercial	7,873,584	23,609
Industrial	2,651,868	10,639
Total	12,256,153	206,239

4.1 RESIDENTIAL SECTOR

Table 4-2 shows the breakdown of energy consumption and building stock by residential segment. Single family homes dominate consumption with an 86% share, with multi-family dwellings at 14% of total residential consumption. Manufactured home (such as mobile home) dwellings comprise less than 1% of total residential consumption.

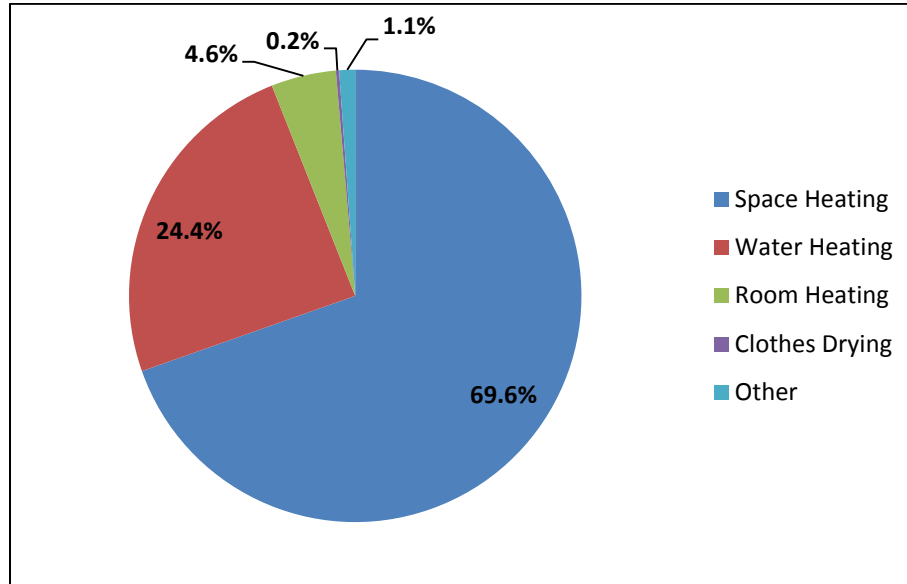
Table 4-2: Residential 2012 Natural Gas Consumption & Premise Counts by Segment

Sector	Energy Consumption (annual therms)	Energy Use Share	No. of Premises	Energy Use per Premise (dth)
Single Family	9,657,510	86.2%	143,058	67.5
Multifamily	1,523,691	13.6%	28,542	53.4
Manufactured	11,204	0.1%	391	28.7
Total	11,203,608	100%	171,991	65.1

Nexant further disaggregated Cascade’s residential load by end use. **Figure 4-1** shows the distribution of natural gas consumption by end use for all residential households in Cascade’s territory.

⁵ Note: Nexant utilized the definition of premise for this study which removes non-building customer accounts, and other miscellaneous loads from its findings. The number of premises, therefore, and the associated natural gas consumption is less than the number of accounts and top-line natural gas sales that Cascade utilizes in its IRP documents. Furthermore, the number of eligible industrial premises and sales is significantly less due to the large share of transport sales – which were removed because they are ineligible for energy efficiency programs.

Figure 4-1: 2012 Residential Natural Gas Consumption by End Use⁶



4.2 COMMERCIAL SECTOR

Table 4-3 shows the distribution of consumption by commercial segment for all eligible premises. The office and retail segments represent the largest share of consumption at 29.6% and 24.2% respectively.

Table 4-3: Commercial 2012 Natural Gas Consumption & Premise Counts by Segment

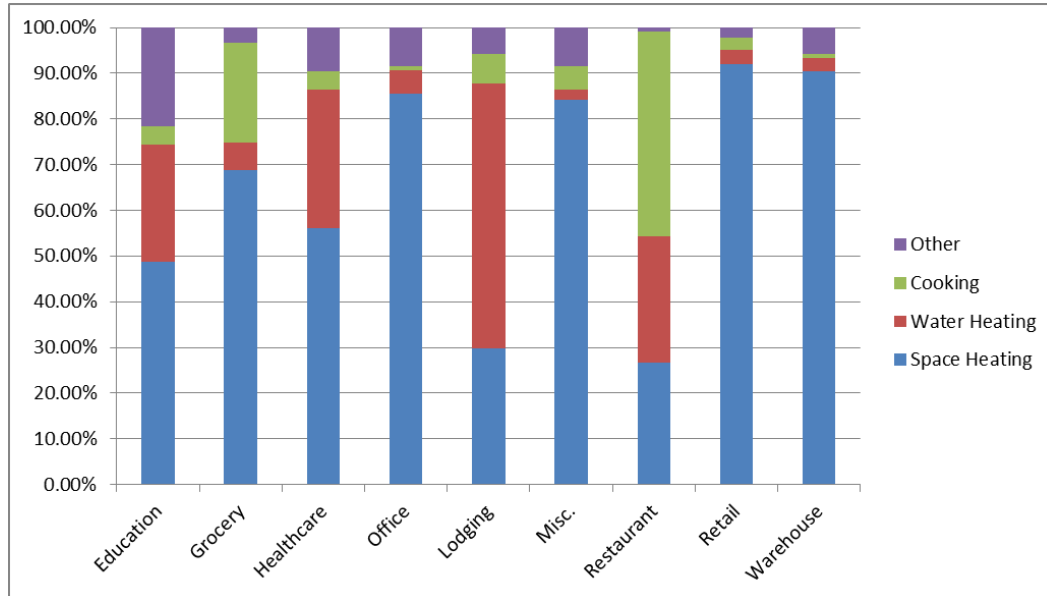
Segment	Energy Consumption (annual dth)	Energy Use Share	No. of Premises	Energy Use per Premise (dth)
Education	1,191,963	15.1%	994	1,199
Grocery	590,930	7.5%	1,020	579
Healthcare	312,585	4.0%	512	611
Office	2,329,730	29.6%	8,401	277
Lodging	304,013	3.9%	266	1,143
Misc.	386,424	4.9%	2,470	156
Restaurant	650,618	8.3%	1,318	494
Retail	1,904,289	24.2%	7,152	266
Warehouse	203,032	2.6%	936	217
Total	7,873,584	100.0%	23,069	341

Nexant further disaggregated Cascade’s commercial load by end use. **Figure 4-2** shows the distribution of natural gas consumption by end use by segment. Space heating represents the largest share for most

⁶ Space Heating refers to central heating equipment end uses, such as furnaces and boilers. Room Heating refers to gas hearths / fireplaces.

segments at 71.9% on average; however certain segments such as lodging and restaurants have a higher share of water heating and cooking load respectively.

Figure 4-2: Commercial 2012 Natural Gas Consumption Shares by Segment, by End Use



4.3 INDUSTRIAL SECTOR

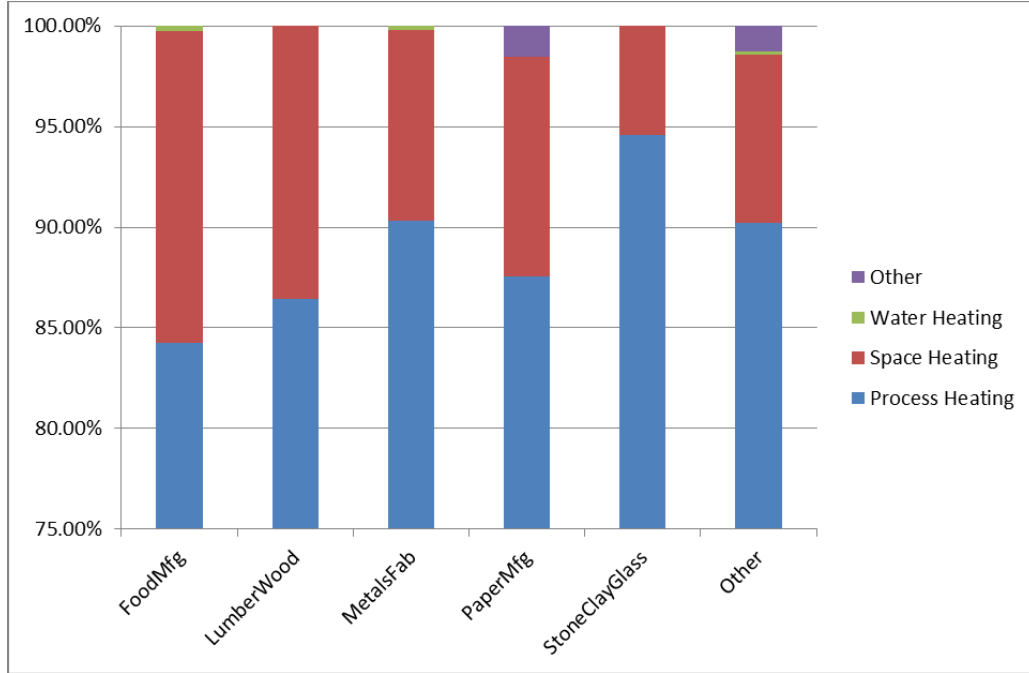
Table 4-4 shows the distribution of consumption by industrial segment for all eligible premises. The food manufacturing segment represents the largest share of energy use at 28.3%, with paper manufacturing representing the smallest share at 2.6% of consumption.

Table 4-4: Industrial 2012 Natural Gas Consumption & Premise Counts by Segment

Segment	Energy Consumption (annual dth)	Energy Use Share	No. of Premises	Energy Use per Premise (dth)
Food Manufacturing	749,223	28.3%	465	1,611
Lumber, Wood Products	90,689	3.4%	340	267
Primary Metals Manufacturing	509,712	19.2%	1,081	472
Paper Manufacturing	69,240	2.6%	62	1,117
Stone, Clay, Glass Production	276,950	10.4%	446	621
Other	956,055	36.1%	8,245	116
Total	2,651,868	100.0%	10,639	249

Nexant further disaggregated Cascade’s industrial load by end use. Figure 4-3 shows the distribution of natural gas consumption by segment by end use. Process heating represents the largest share of end use consumption across all segments at 87.1% on average.

Figure 4-3: 2012 Industrial Natural Gas Consumption by Segment, by End Use



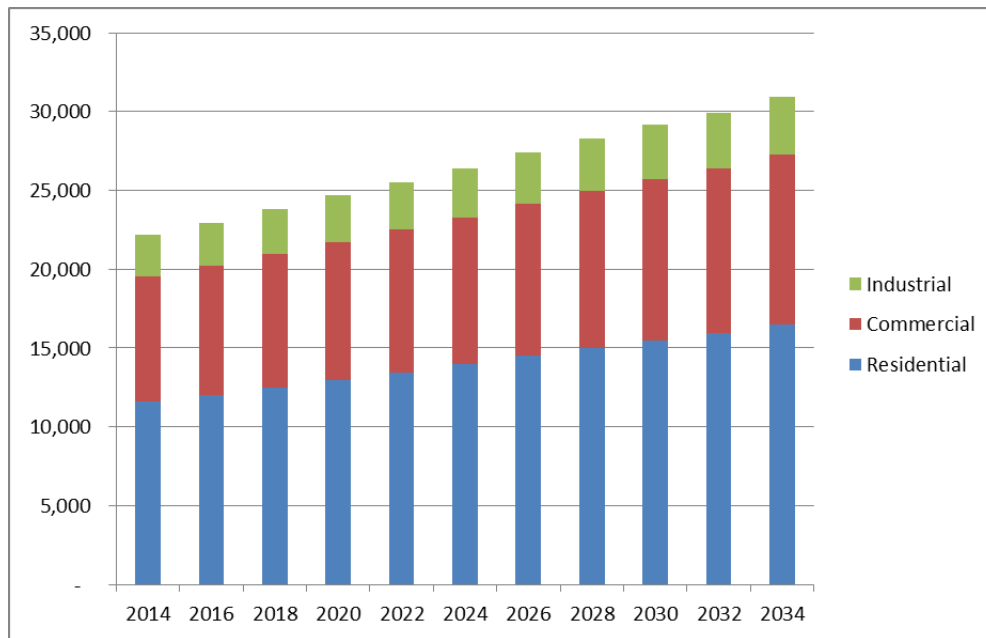
5 BASELINE FORECAST DISAGGREGATION

Table 5-1 and **Figure 5-1** summarize the baseline natural gas sales forecast by sector of eligible DSM sales for Cascade’s Washington service territory.

Table 5-1: Natural Gas Consumption by Sector, by Year ('000 dth)

Sector	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034
Residential	11,609	12,023	12,508	12,986	13,454	13,951	14,505	15,001	15,475	15,935	16,506
Commercial	7,919	8,175	8,472	8,757	9,043	9,330	9,672	9,969	10,247	10,463	10,792
Industrial	2,663	2,749	2,849	2,945	3,041	3,138	3,253	3,353	3,446	3,519	3,630
Total	22,191	22,948	23,830	24,688	25,539	26,419	27,430	28,322	29,169	29,917	30,927

Figure 5-1: Natural Gas Consumption by Sector, by Year ('000 dth)



5.1 DISAGGREGATED FORECAST BY SECTOR

Error! Reference source not found. through **Table 5-4** summarize the residential, commercial and industrial I baseline natural gas sales forecast by end use for Cascade’s Washington service territory.

Table 5-2: Residential Baseline Natural Gas Consumption by End Use by Year (dth)

End Use	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032
Space Heating	8,079,947	8,368,484	8,706,184	9,038,434	9,364,609	9,710,519	10,096,080	10,440,921	10,771,067	11,091,194
Water Heating	2,831,426	2,932,537	3,050,876	3,167,305	3,281,605	3,402,821	3,537,932	3,658,773	3,774,465	3,886,646
Room Heating	538,556	557,788	580,297	602,443	624,184	647,240	672,939	695,924	717,929	739,267
Clothes Dyer	26,917	27,879	29,004	30,111	31,197	32,350	33,634	34,783	35,883	36,949
Other	131,767	136,473	141,980	147,398	152,718	158,359	164,646	170,270	175,654	180,875
Total	11,608,614	12,023,160	12,508,341	12,985,691	13,454,313	13,951,288	14,505,232	15,000,670	15,474,997	15,934,930

Table 5-3: Commercial Natural Gas Baseline Forecast by End Use by Year (dth)

End Use	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034
Space Heating	5,693,885	5,878,143	6,091,708	6,296,486	6,502,141	6,708,487	6,954,140	7,167,620	7,367,969	7,523,039	7,759,600
Water Heating	990,435.79	1,022,487	1,059,636	1,095,257	1,131,030	1,166,923	1,209,654	1,246,788	1,281,638	1,308,612	1,349,761
Cooking	575,922.22	594,559	616,161	636,874	657,675	678,547	703,394	724,987	745,252	760,937	784,864
Other	658,847.40	680,168	704,880	728,575	752,372	776,249	804,673	829,375	852,558	870,501	897,874
Total	7,919,090	8,175,357	8,472,386	8,757,191	9,043,218	9,330,206	9,671,861	9,968,771	10,247,417	10,463,089	10,792,100

Table 5-4: Industrial Natural Gas Consumption Baseline Forecast by End Use by Year (dth)

End Use	2014	2016	2018	2020	2022	2024	2026	2028	2032	2034	2014
Space Heating	40,749	42,067	43,596	45,061	46,533	48,010	49,768	51,296	52,729	53,839	55,532
Water Heating	9,322	9,623	9,973	10,308	10,645	10,983	11,385	11,734	12,062	12,316	12,703
Process Heating	2,319,212	2,394,264	2,481,252	2,564,661	2,648,428	2,732,476	2,832,535	2,919,489	3,001,094	3,064,257	3,160,612
Other	294,030	303,545	314,573	325,148	335,768	346,423	359,109	370,133	380,479	388,486	400,702
Total	2,663,312	2,749,499	2,849,394	2,945,178	3,041,373	3,137,892	3,252,796	3,352,651	3,446,364	3,518,898	3,629,549

6 PORTFOLIO ENERGY EFFICIENCY POTENTIAL

This section provides an overview of the findings for the entire portfolio of natural gas customers in Cascade’s Washington service territory. Natural gas energy efficiency findings for technical, economic and achievable potential are presented in two parts. At the beginning of each section, detailed findings are presented for the “base-case” technical, economic, and achievable scenarios. Where findings are broken out by segment (building type) or end use, they are done so under the achievable base case scenario (for appropriate numbering see Error! Reference source not found.). All base case scenarios were run under the following main assumptions:

- Measure cost effectiveness screen: Utility Cost Test (UCT)
- Incentive percentage of incremental cost (for achievable scenarios): 30%, 50% or 75%
- Avoided Costs: Current avoided costs as provided in Appendix H of Cascade’s 2012 IRP
- Discount Rate: 8.55%

Findings are then presented under each cost-effectiveness test (UCT vs. TRC). Additional summary findings on each of the 66 scenarios conducted for this study can be found in **Volume 2, Section 6 and Section 7**.

6.1 BASE CASE PORTFOLIO FINDINGS

Table 6-1 and



Figure 6-1 present the estimated technical, economic and achievable savings potential for Cascade’s Washington service territory under the Utility Cost Test. First year (2014) natural gas conservation achievable base potential under the UCT screen for all sectors is 139,859 dth, representing 0.63% of baseline sales. It should also be noted that the achievable base savings potential is slightly greater than the achievable moderate savings potential (even though the moderate has a more aggressive adoption curve). This occurs because the measure cost used in the cost-effectiveness test under the achievable moderate scenario (50% of incremental cost) compared to the achievable moderate scenario (30% of incremental) causes more measures to fail cost-effectiveness. The fewer measures passing cost effectiveness has a greater impact on potential than the increased adoption of those measures. **Figure 6-2** shows the changes in Cascade’s baseline sales forecast under each of the base case potential scenarios, screened with the UCT.

Table 6-1: Portfolio Energy Efficiency Potential Savings by Base Case Scenario under UCT Screen

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	22,191,016	22,948,017	24,688,061	26,974,698	30,927,487
Cumulative Savings (dth)					
Technical Potential	744,155	2,337,526	5,667,873	9,931,037	16,585,195
Economic Potential	476,641	1,494,793	3,606,967	6,314,915	10,434,394
Achievable - Base	139,859	437,581	1,130,474	2,243,553	4,448,248
Achievable - Moderate	137,844	441,098	1,180,749	2,384,769	4,677,603
Achievable - High	141,599	446,575	1,153,137	2,239,052	4,160,771
Energy Savings (% of baseline sales)					
Technical Potential	3.35%	10.19%	22.96%	36.82%	53.63%
Economic Potential	2.15%	6.51%	14.61%	23.41%	33.74%
Achievable - Base	0.63%	1.91%	4.58%	8.32%	14.38%
Achievable - Moderate	0.62%	1.92%	4.78%	8.84%	15.12%
Achievable - High	0.64%	1.95%	4.67%	8.30%	13.45%

Figure 6-1: Portfolio Energy Efficiency Potential Savings (% Sales) by Base Case Scenario under UCT Screen

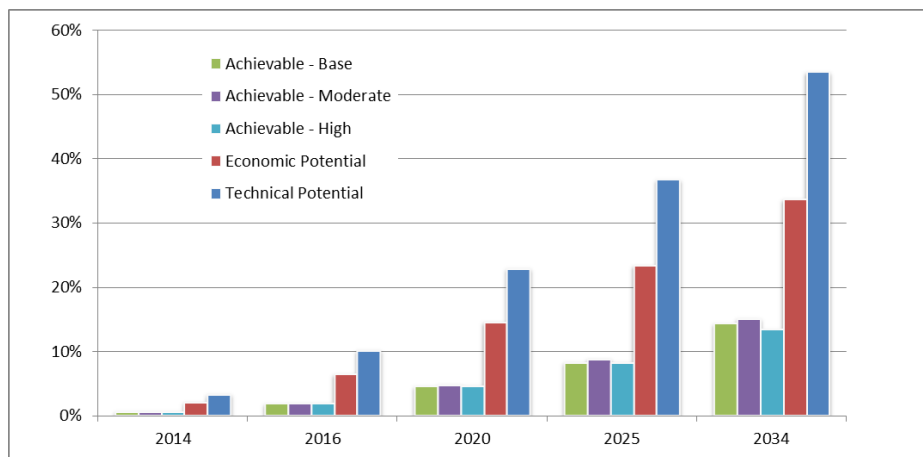
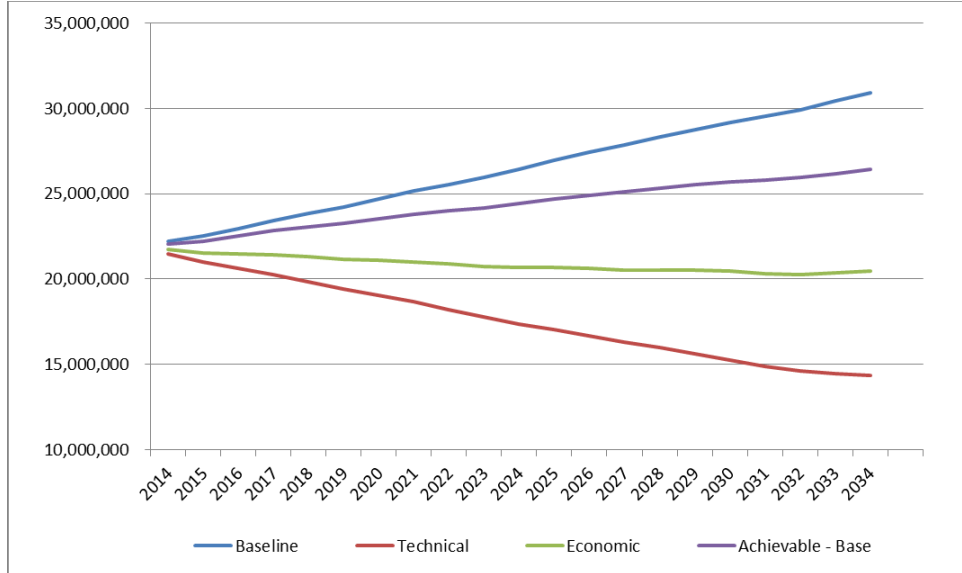


Figure 6-2: 21-year Portfolio Sales Forecast (dth) by Base Case Scenario under UCT Screen



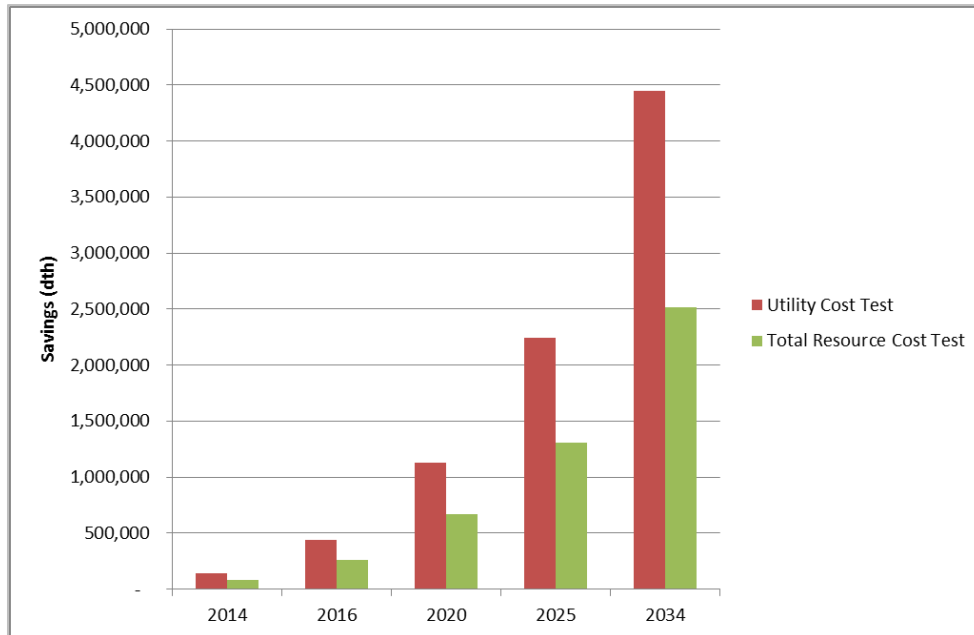
6.2 PORTFOLIO FINDINGS BY COST-EFFECTIVENESS TEST

Table 6-2 and **Figure 6-3** below illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. As can be seen there is approximately 40% more savings potential under the achievable base scenario in 2014 under the UCT screen (139,859dth) compared to the TRC screen (83,674 dth). This occurs because the UCT only considers the incentivized portion of the measure cost, thus allowing more measures to pass cost-effectiveness when compared with the TRC screen. It can also be seen that unlike the UCT findings, savings potential increases from achievable base to achievable moderate under the TRC screen because the measure cost is the full incremental cost under all scenarios so the same number of measures are considered under each scenario.

Table 6-2: Portfolio Savings Potential by Base-Case Scenario, by Cost-Effectiveness Screen

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential (6+28+50)	744,155	2,337,526	5,667,873	9,931,037	16,585,195
Economic Potential (7+29+51)	476,641	1,494,793	3,606,967	6,314,915	10,434,394
Achievable - Base (8+30+52)	139,859	437,581	1,130,474	2,243,553	4,448,248
Achievable - Moderate (9+31+53)	137,844	441,098	1,180,749	2,384,769	4,677,603
Achievable - High (10+32+54)	141,599	446,575	1,153,137	2,239,052	4,160,771
Cumulative Savings (dth) based on TRC Screen					
Technical Potential (1+23+45)	744,155	2,337,526	5,667,873	9,931,037	16,585,195
Economic Potential (2+24+46)	280,661	890,127	2,146,790	3,738,374	5,994,207
Achievable - Base (3+25+47)	83,674	261,580	668,838	1,310,576	2,512,861
Achievable - Moderate (4+26+48)	107,728	341,487	891,790	1,754,511	3,321,079
Achievable - High (5+27+49)	142,755	450,536	1,160,443	2,234,333	4,103,135

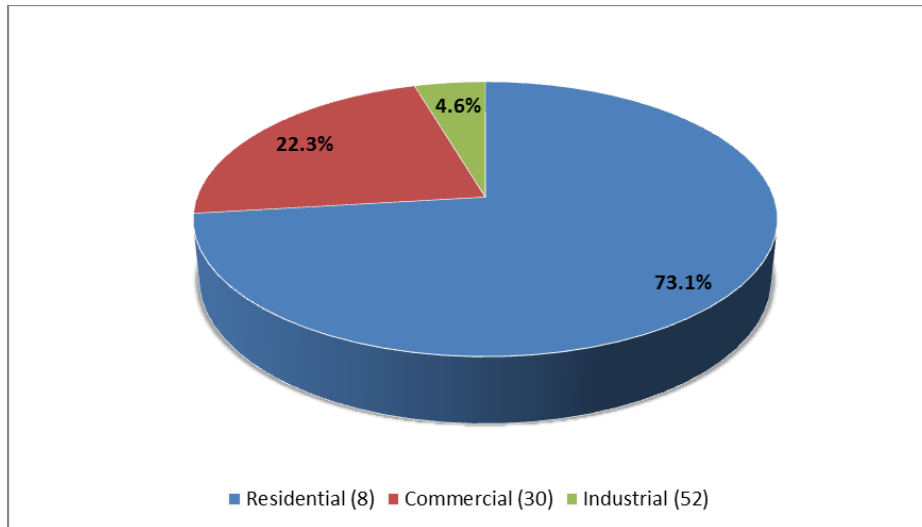
Figure 6-3: Portfolio Achievable Base Potential by Cost-Effectiveness Screen



7 ACHIEVABLE POTENTIAL BY SECTOR

Figure 7-1 shows the distribution of savings by sector for the achievable base scenario. Residential shows the largest potential at 73% of the total, with Commercial representing 22% and Industrial just under 5%.

Figure 7-1: 2014 Achievable Base Savings Potential by Sector under UCT Screen



7.1 RESIDENTIAL POTENTIAL FINDINGS

7.1.1 Base Case Residential Findings

Table 7-1 and Figure 7-2 present the estimated cumulative technical, economic and achievable savings potential for the residential sector in Cascade’s Washington service territory under the Utility Cost Test (UCT). Cascade’s 2014 achievable-base savings potential is estimated at 102,231 dekatherms, reaching 3.1M dekatherms in 2034, representing 0.9% and 18.9% of current year sales respectively.

Table 7-1 Residential Cumulative Natural Gas Savings Potential by Base Case Scenario under the UCT

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	11,608,614	12,023,160	12,985,691	14,246,171	16,505,838
Cumulative Savings (dth)					
Technical Potential	463,954	1,483,179	3,607,978	6,460,296	10,928,515
Economic Potential	317,391	1,008,519	2,431,359	4,323,971	7,216,991
Achievable - Base	102,231	318,717	809,252	1,601,762	3,115,143
Achievable - Moderate	94,517	302,284	795,012	1,613,675	3,120,243
Achievable - High	94,522	297,154	749,820	1,479,572	2,735,363
Energy Savings (% of baseline sales)					
Technical Potential	4.00%	12.34%	27.78%	45.35%	66.21%
Economic Potential	2.73%	8.39%	18.72%	30.35%	43.72%
Achievable - Base	0.88%	2.65%	6.23%	11.24%	18.87%
Achievable - Moderate	0.81%	2.51%	6.12%	11.33%	18.90%
Achievable - High	0.81%	2.47%	5.77%	10.39%	16.57%

Figure 7-2: Residential Energy Efficiency Potential Savings (% of Sales) by Base Case Scenario (UCT)

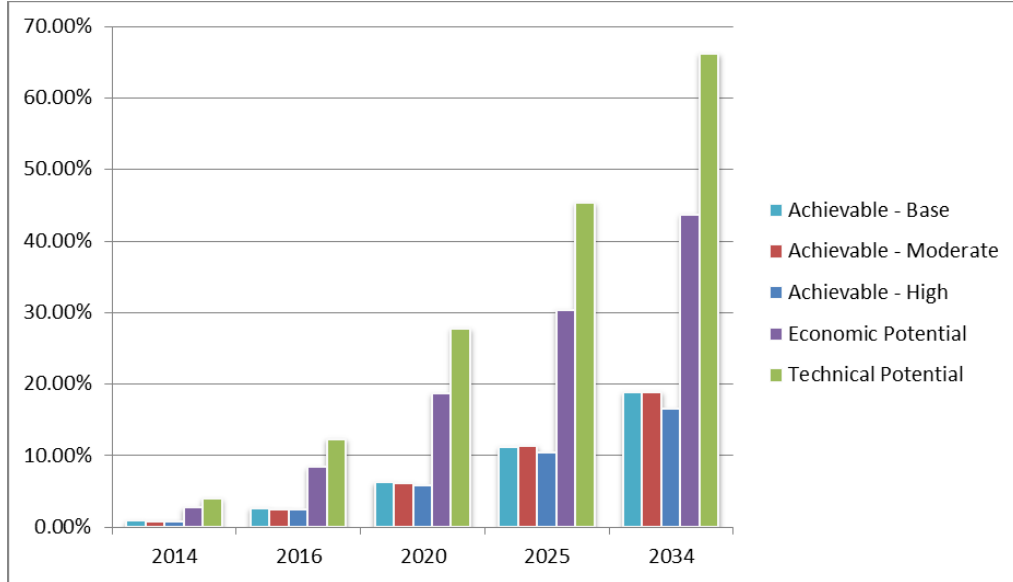


Table 7-2 shows the achievable savings potential when screened at various levelized cost/therm under the UCT test. Given its current program funding threshold of \$0.42/levelized cost per therm, Cascade could potentially realize 73,677 dth of savings in 2014 were it to implement all cost-effective residential measures⁷.

Table 7-2: 2014 Residential Achievable Potential (dth) Screened by Levelized Cost (\$/therm) under UCT

	Screened at Levelized Cost of:						
	\$0.12	\$0.22	\$0.32	\$0.42	\$0.53	\$0.64	\$0.75
Space Heating	17,041	25,794	31,093	44,256	55,419	71,748	72,808
Room Heating	2	2	2	2	2	2	2
Water Heating	29,419	29,419	29,419	29,419	29,419	29,419	29,419
Clothes Drying	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	46,462	55,215	60,514	73,677	84,840	101,169	102,229

Figure 7-3 and Table 7-3 summarizes the savings potential in the residential sector under the achievable-base scenario by segment and by end use. The single family segment shows the most potential for savings both on a total terms basis, and as a percentage of segment sales, while the space heating end use represents the largest share of end use savings at approximately 62% of total savings.

⁷ This estimate also precludes other program potential constraints such as available budget, realization of administrative costs, regulatory considerations, among others.

Figure 7-3: Residential 2014 Achievable Base Potential Savings by Segment (UCT)

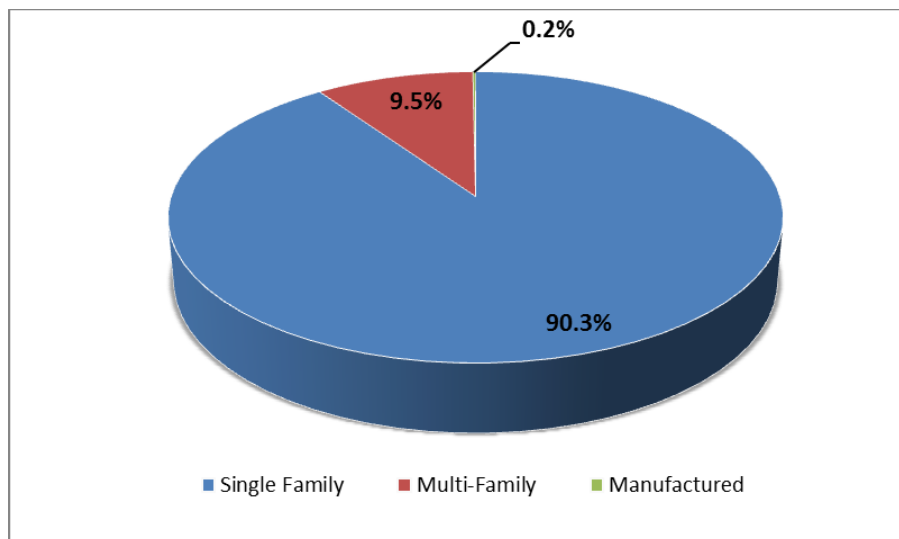


Table 7-3: Residential 2014 Cumulative Achievable Base Savings by Segment, by End Use (UCT)

End Use	Single Family		Multi-Family		Manufactured		TOTAL
	Dekatherms	% of Total	Dekatherms	% of Total	Dekatherms	% of Total	
Space Heating	228,139	62.8%	26,924	61.9%	409	61.1%	255,472
Room Heating	50	0.01%	14	0.03%	0	0.01%	64
Water Heating	133,727	36.8%	16,398	37.7%	259	38.6%	150,384
Clothes Drying	1,266	0.35%	178	0.41%	1	0.22%	1,445
% of Sales		3.7%		2.5%		3.2%	3.5%

7.1.2 Residential Findings by Cost-Effectiveness Screen

Table 7-4 below illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. There is more achievable potential under the UCT test due to its more favorable cost-effectiveness screening methodology with achievable base savings of 102,231 dekatherms in 2014 (compared to 58,075 dekatherms under the TRC). For the Economic and Achievable Base scenarios UCT savings are higher than TRC savings by about 40%. UCT is also higher than TRC in the Achievable Moderate scenario by about 20%, whereas in the Achievable High scenario TRC savings are greater than UCT by about 5%.

Table 7-4: Residential Savings Potential by Base-Case Scenario, by Cost-Effectiveness Screen

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential	463,954	1,483,179	3,607,978	6,460,296	10,928,515
Economic Potential	317,391	1,008,519	2,431,359	4,323,971	7,216,991
Achievable - Base	102,231	318,717	809,252	1,601,762	3,115,143
Achievable - Moderate	94,517	302,284	795,012	1,613,675	3,120,243
Achievable - High	94,522	297,154	749,820	1,479,572	2,735,363
Cumulative Savings (dth) based on TRC Screen					
Technical Potential	463,954	1,483,179	3,607,978	6,460,296	10,928,515
Economic Potential	192,917	622,511	1,498,814	2,686,147	4,412,650
Achievable - Base	58,075	181,825	461,307	934,496	1,824,239
Achievable - Moderate	74,639	237,393	616,349	1,253,558	2,419,570
Achievable - High	98,949	313,235	801,824	1,596,849	2,992,451

7.2 COMMERCIAL POTENTIAL FINDINGS

7.2.1 Base Case Commercial Findings

Table 7-5 and

Figure 7-4 present the estimated technical, economic and achievable savings potential for the commercial sector in Cascade’s Washington service territory under the Utility Cost Test. 2014 savings potential in the commercial sector under the achievable base scenario is 31.229 dth, representing 0.39% of current year sales. Under a higher incentive rate of 75%, the 2014 savings potential in the commercial sector under the achievable high scenario increases to 37,461 dth, representing 0.47% of sales.

Table 7-5: Commercial Energy Efficiency Potential by Scenario under UCT Screen (dth)

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	7,919,090	8,175,358	8,757,191	9,525,092	10,792,100
Cumulative Savings (dth)					
Technical Potential (28)	245,635	749,691	1,811,603	1,811,603	4,919,046
Economic Potential (29)	138,153	422,290	1,023,921	1,023,921	2,774,773
Achievable - Base (30)	31,228	99,116	272,356	272,356	1,157,574
Achievable - Moderate (31)	35,705	115,110	324,650	324,650	1,332,303
Achievable - High (32)	37,461	120,085	332,083	332,083	1,214,167
Energy Savings (% of baseline sales)					
Technical Potential	3.10%	9.17%	20.69%	19.02%	45.58%
Economic Potential	1.74%	5.17%	11.69%	10.75%	25.71%
Achievable - Base	0.39%	1.21%	3.11%	2.86%	10.73%
Achievable - Moderate	0.45%	1.41%	3.71%	3.41%	12.35%
Achievable - High	0.47%	1.47%	3.79%	3.49%	11.25%

Figure 7-4: Commercial Energy Efficiency Potential by Scenario under Utility Cost Test

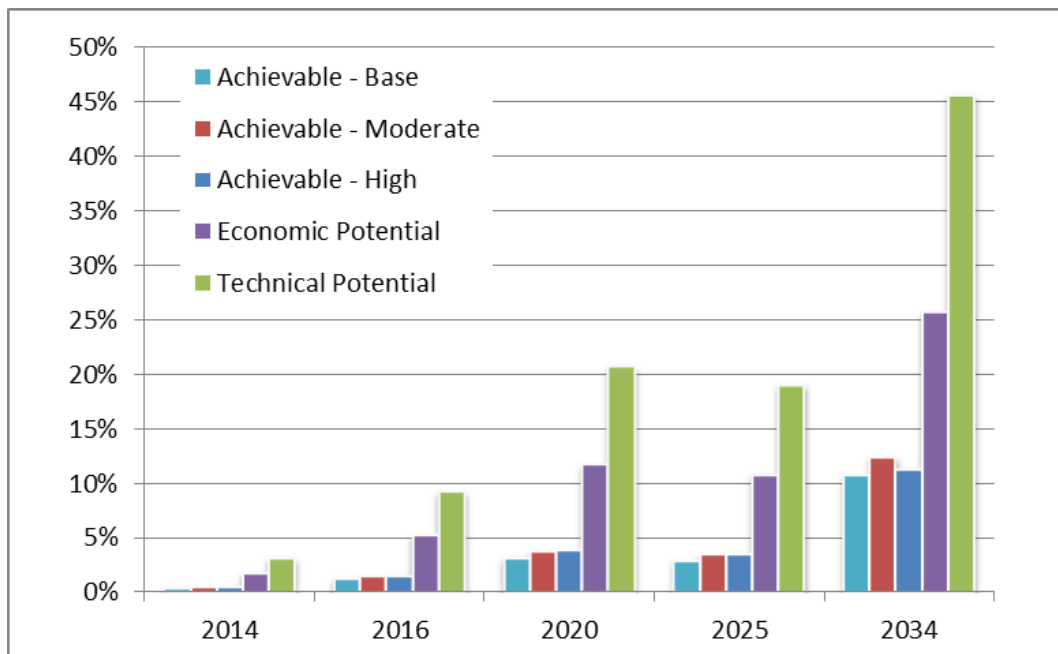


Table 7-6 shows the achievable base savings when screened at various levelized cost/therm under the UCT test. Given its current program threshold of \$0.42/levelized cost per therm, it's possible to achieve 27,201 dth in the commercial sector assuming all cost effective measures are pursued.

Table 7-6: Commercial 2014 Achievable Potential (dth) Screened by Levelized Cost (\$/therm) under UCT

	Screened at Levelized Cost of:						
	\$0.15	\$0.25	\$0.35	\$0.42	\$0.55	\$0.65	\$0.85
Space Heating	1,534	6,998	8,520	10,758	11,955	12,807	14,133
Water Heating	12,101	13,512	13,736	14,678	14,924	15,339	16,058
Cooking	234	250	254	254	274	274	274
Other	-	515	515	711	711	711	763
TOTAL	13,870	21,274	23,024	27,201	27,864	29,131	31,228

Figure 7-5 and Table 7-7 show the achievable base potential by commercial segment by end use. Achievable base savings is fairly evenly distributed among the various segments with the most residing in education (25%) and the least in warehouses (0.9%). Again, these savings potential align closely with baseline sales. The majority of 2014 savings also reside in space heating (51%) and water heating (45%) across all segments. However, some segments such as restaurants see a higher share of savings potential in the cooking end use (4.3%).

Figure 7-5: 2014 Achievable Base Savings Potential by Commercial Segment (UCT)

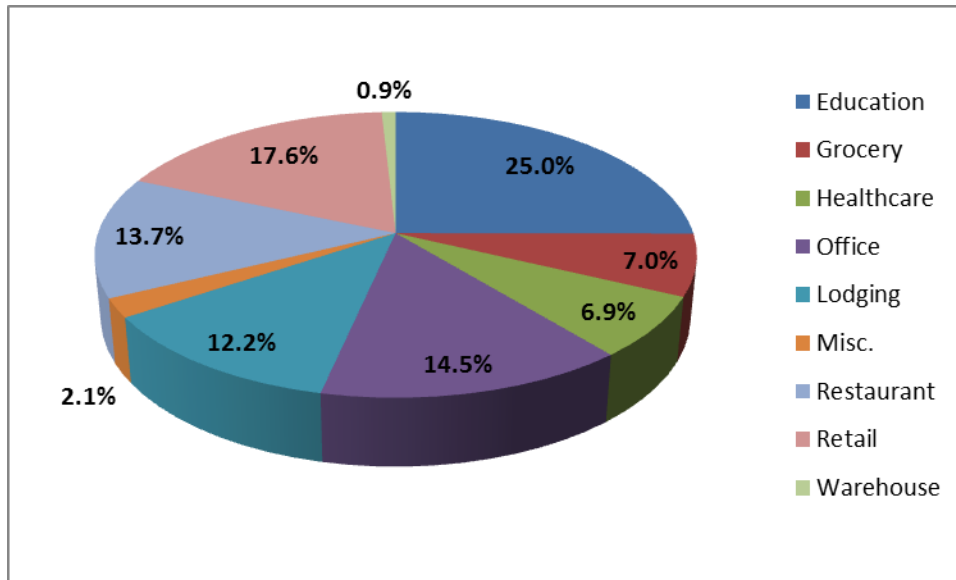


Table 7-7: Commercial 2014 Achievable Base Savings by Commercial Segment, by End Use (dekatherms and % of Total)

End Use	Education		Grocery		Healthcare		Office		Lodging		Misc.		Restaurant		Retail		Warehouse		TOTAL
	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	
Space Heating	1,333	17.0%	1,660	76.1%	335	15.5%	3,705	82.0%	191	5.0%	606	90.5%	957	22.4%	5,116	92.9%	231	85.5%	14,133
Water Heating	5,760	73.6%	455	20.9%	1,829	84.3%	813	18.0%	3,567	93.6%	64	9.5%	3,139	73.3%	393	7.1%	39	14.5%	16,058
Cooking	19	0.2%	67	3.1%	4	0.2%	-	0.0%	-	0.0%	-	0.0%	184	4.3%	-	0.0%	-	0.0%	274
Other	711	9.1%	-	0.0%	-	0.0%	-	0.0%	52	1.4%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	763
% of Sales	0.6%		0.4%		0.7%		0.2%		1.2%		0.2%		0.6%		0.3%		0.1%		0.4%

7.2.2 Commercial Findings by Cost Effectiveness Screen

As noted above, Nexant examined savings potential under both the TRC and UCT screen to comply with WUTC’s October 9, 2013 Policy Statement regarding cost screening. **Table 7-8** below illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. . Similar to the residential sector, significantly more savings potential is realized under the UCT screen with 31,228 dth in 2014 compared to 20,408 dth under the TRC screen.

Table 7-8: Commercial Savings Potential by Scenario, by Cost-Effectiveness Screen (dth)

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential (28)	245,635	749,691	1,811,603	1,811,603	4,919,046
Economic Potential (29)	138,153	422,290	1,023,921	1,023,921	2,774,773
Achievable - Base (30)	31,228	99,116	272,356	272,356	1,157,574
Achievable - Moderate (31)	35,705	115,110	324,650	324,650	1,332,303
Achievable - High (32)	37,461	120,085	332,083	332,083	1,214,167
Cumulative Savings (dth) based on TRC Screen					
Technical Potential (23)	245,635	749,691	1,811,603	3,036,629	4,919,046
Economic Potential (24)	74,703	227,948	552,393	881,742	1,300,918
Achievable - Base (25)	20,408	63,925	169,113	306,647	571,900
Achievable - Moderate (26)	26,581	84,226	227,098	413,413	754,225
Achievable - High (27)	35,136	110,840	294,314	521,315	915,961

7.3 INDUSTRIAL POTENTIAL FINDINGS

7.3.1 Base Case Industrial Findings

Table 7-9, and

Figure 7-6 present the estimated technical, economic and achievable savings potential for the industrial sector in Cascade’s Washington service territory under the Utility Cost Test. Cumulative savings by the

year 2034 are projected at 20% of baseline sales for Technical Potential, and this savings potential reduces to 4.8% over the 20 year study horizon for the Achievable Base scenario. As is the case with each sector, the Achievable scenario’s projected savings are not necessarily linear with the ‘base’, ‘moderate’, and ‘high’ designations.

Table 7-9: Industrial Energy Efficiency Potential Savings by Base Case Scenario (UCT)

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	2,663,312	2,749,499	2,945,178	3,203,435	3,629,550
Cumulative Savings (dth)					
Technical Potential	34,565	104,656	248,293	434,112	737,634
Economic Potential	21,097	63,985	151,686	268,511	442,629
Achievable - Base	6,400	19,748	48,866	93,998	175,531
Achievable - Moderate	7,621	23,704	61,087	120,160	225,057
Achievable - High	9,616	29,337	71,234	128,528	211,241
Energy Savings (% of baseline sales)					
Technical Potential	1.30%	3.81%	8.43%	13.55%	20.32%
Economic Potential	0.79%	2.33%	5.15%	8.38%	12.20%
Achievable - Base	0.24%	0.72%	1.66%	2.93%	4.84%
Achievable - Moderate	0.29%	0.86%	2.07%	3.75%	6.20%
Achievable - High	0.36%	1.07%	2.42%	4.01%	5.82%

Figure 7-6: Industrial Energy Efficiency Potential Savings (% Sales) by Base Case Scenario (UCT)

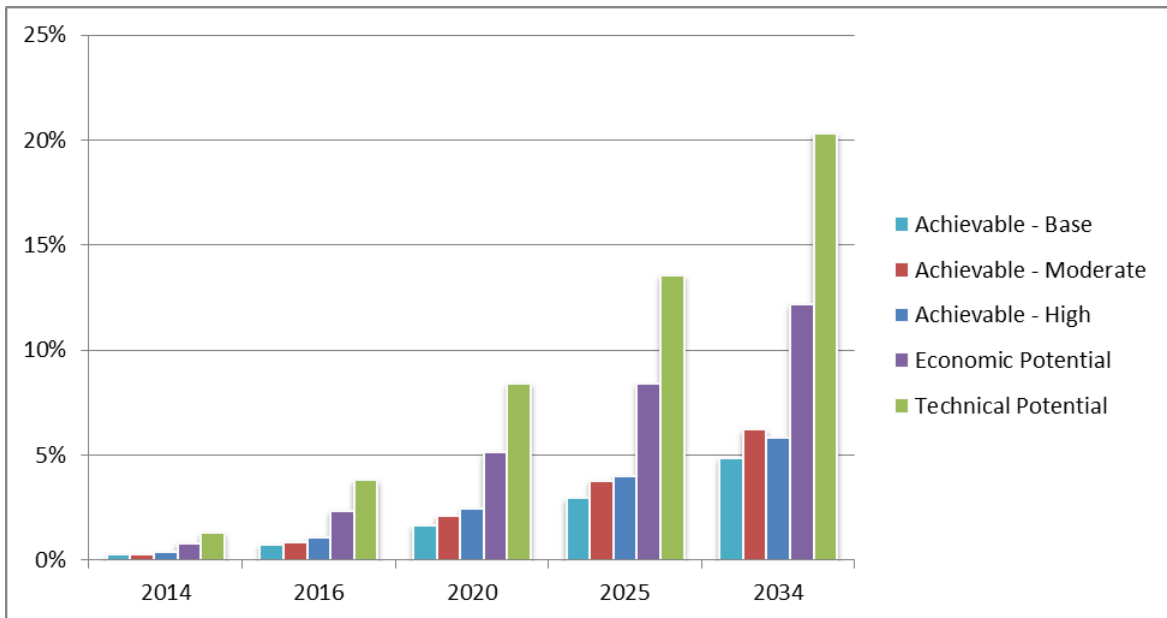


Table 7-10 shows the achievable base savings potential when screened at various levelized cost/therm under the UCT test. When screened at Cascade’s current levelized cost threshold of \$0.42/therm, it’s possible to achieve up to 5,762 dth in the industrial market assuming all cost-effective measures are pursued.

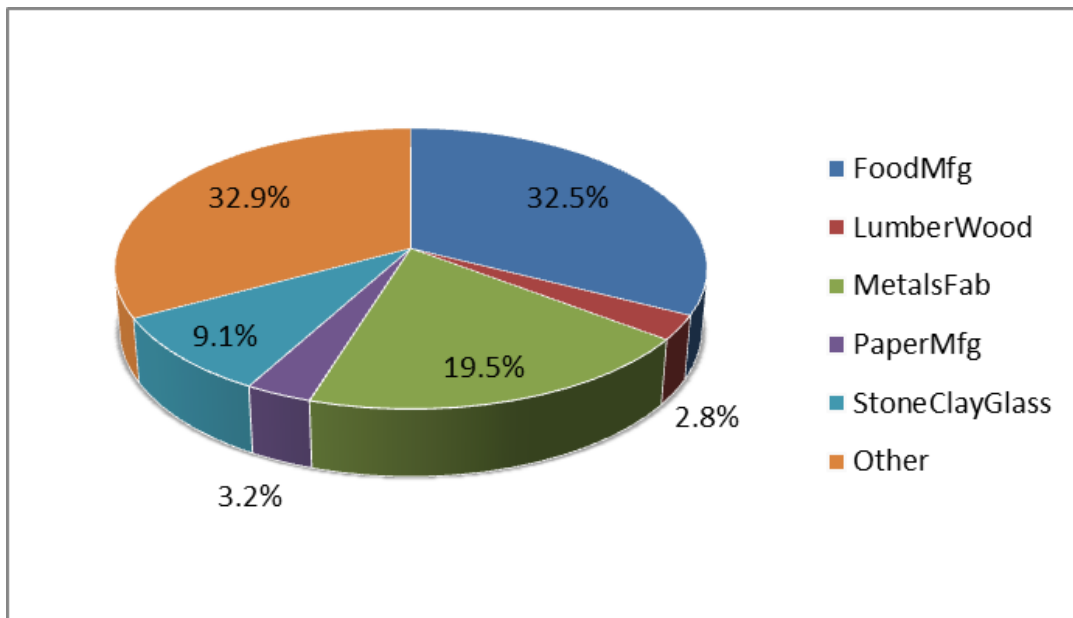
Table 7-10: Industrial 2014 Achievable Potential (dth) Screened by Levelized Cost (\$/therm) under UCT

	Screened at Levelized Cost of:						
	\$0.15	\$0.25	\$0.35	\$0.42	\$0.55	\$0.60	\$0.65
Process Heating	5,161	5,161	5,161	5,161	5,340	5,340	5,340
Space Heating	29	594	596	600	985	1,005	1,060
Water Heating	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	5,191	5,755	5,757	5,762	6,325	6,345	6,400

Figure 7-7 and

Table 7-11 below summarize the cumulative industrial savings potential by segment by end use. By segment under the achievable base savings scenario, Food Manufacturing and the “Other”⁸ category are projected to make up roughly 33% each of total potential savings, while Metals Fabrication makes up the third largest potential savings at 19.5% of the total potential. Process Heating End Use represents the majority of the savings opportunity in all industrial segments. No water heating or “other” end use measures passed cost-effectiveness, and therefore have no achievable potential in the industrial sector.

Figure 7-7: 2014 Achievable Base Savings Potential by Industrial Segment (UCT)



⁸ The “Other” industrial segment includes various industries including textiles, petroleum and allied products, printing, chemicals and allied products, leather manufacturing, electronic manufacturing, forestry, among other many other industrial industry facility types.

Table 7-11: 2014 Achievable Base Savings by Industrial Segment, by End Use (UCT)

End Use	FoodMfg		LumberWood		MetalsFab		PaperMfg		StoneClayGlass		Other		TOTAL
	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	
Process Heating	1,642	78.9%	1,061	85.3%	527	90.3%	176	86.0%	527	90.3%	1,800	85.5%	5,732
Space Heating	440	21.1%	183	14.7%	57	9.7%	29	14.0%	57	9.7%	304	14.5%	1,070
Water Heating	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-
Other	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-
% of Sales	0.27%		1.35%		0.11%		0.29%		0.21%		0.22%		0.25%

7.3.2 Industrial Findings by Cost Effectiveness Test

Table 7-12 below illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. As with the other sectors, UCT potential is consistently larger than TRC potential by amounts varying from 8%-37% higher, with 21 year UCT savings ranging from 175,531 dth under the Achievable Base scenario, to 225,057 dth under the Achievable moderate scenario.

Table 7-12: Industrial Savings Potential by Scenario, by Cost-Effectiveness Screen

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential (50)	34,565	104,656	248,293	434,112	737,634
Economic Potential (51)	21,097	63,985	151,686	268,511	442,629
Achievable - Base (52)	6,400	19,748	48,866	93,998	175,531
Achievable - Moderate (53)	7,621	23,704	61,087	120,160	225,057
Achievable - High (54)	9,616	29,337	71,234	128,528	211,241
Cumulative Savings (dth) based on TRC Screen					
Technical Potential (45)	34,565	104,656	248,293	434,112	737,634
Economic Potential (46)	13,042	39,667	95,583	170,485	280,638
Achievable - Base (47)	5,191	15,830	38,418	69,433	116,722
Achievable - Moderate (48)	6,508	19,868	48,343	87,540	147,284
Achievable - High (49)	8,671	26,461	64,305	116,170	194,724

8 CONCLUSIONS

The results of this study reveal that considerable natural gas energy efficiency opportunities exist for Cascade Natural Gas Corporation in its Washington service territory, despite recent declines in the cost of natural gas, the savings achieved to-date by Cascade’s DSM programs, and increasing building standards due to the 2012 Washington State Energy Codes for buildings. Our analysis shows that 137,844 dth of natural gas savings are achievable in 2014 across all sectors when measures are screened using the UCT, increasing to 4.5M dth of cumulative natural gas savings by 2034. These findings should be viewed with the following considerations in mind:

- The natural gas savings potential highlighted in this report does not reflect “program potential”, but rather achievable potential which assumes all cost-effective measures are pursued and implemented.
- The achievable potential findings also assume no limitations on program spending to achieve all cost-effective measure savings.
- Administrative costs were not included when screening measures for cost-effectiveness.
- The approach of using the UCT as the cost-effectiveness screen departs from prior potential studies conducted for Cascade. Prior studies for Cascade utilized the TRC cost-effectiveness screen which typically results in less saving potential when compared to the UCT. Nexant has run various scenarios to illustrate the difference in savings potential under both the UCT and TRC cost-effectiveness screen.
- The measure costs utilized for the purposes of the potential assessment are lower resolution than those that would be available by the company for program planning. For program planning purposes the costs may be refined by the company to better reflect costs in their specific service territory.
- This report (**Volume I**) provides summary findings of the base-case and cost-effectiveness screen scenarios. Detailed cumulative natural gas savings potential by sector, by segment, by end use and by year are presented for all 66 scenarios modeled by Nexant in **Vol. III, Appendix B**.

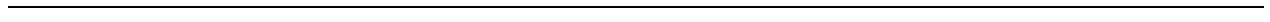
Cascade Natural Gas Corporation

Volume 2: Assessment of Achievable Potential & Program Evaluation

Submitted to Cascade Natural Gas Corporation
Submitted by Nexant, Inc.

February 25, 2014

The Nexant logo features a stylized blue icon of a flame or a gas burner on the left, followed by the word "Nexant" in a bold, blue, sans-serif font. The logo is set against a light blue, semi-transparent background that resembles a flame or a gas burner.



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1 INTRODUCTION

1.1 OVERVIEW

Cascade Natural Gas Corporation (“Cascade”) has offered energy efficiency programs to its customers since the 1990s with expanded programs beginning in 2008. In light of significant changes to codes, costs, technologies, and gas prices that have taken effect in the past four years, Cascade has contracted with Nexant, Inc. (“Nexant”) to perform a comprehensive assessment of the technical and achievable natural gas conservation potential within Cascade’s Washington service territory for residential, commercial and industrial sectors. This assessment references Cascade’s potential assessment conducted in 2006 by the Energy Trust of Oregon, which in turn was refined in 2009 to include Cascade’s Washington conservation potential. The assessment conducted in 2006 and refined in 2009 included all of the Cascade Natural Gas service territory in Washington and Oregon. This assessment does not directly build on those reports; and thus represents a new assessment of Cascade’s energy efficiency potential. This assessment stands apart from previous studies as a potential assessment for Cascade Natural Gas Washington State service territory only. The findings of this assessment will help inform the development of Cascade’s Integrated Resource Planning (IRP) process as well as provide guidance for future program planning and development efforts. In addition to providing potential assessment, Cascade also requested Nexant evaluate energy savings associated with measures installed by participants in Cascade’s Conservation Incentive Program during 2011/12.

This report presents results of the technical, economic, and achievable potential for natural gas energy efficiency savings in Cascade’s Washington service territory over the next 21 years (2014-2035). Program potential was not included in the study scope, but could be developed by Cascade using the findings of this study and based on regulatory/budgetary parameters, cost-effective thresholds, policy considerations, and decisions on which subset of cost-effective measures to offer to customers going forward. Nexant assessed therm savings realized through Cascade’s program to-date, researched natural gas energy efficiency measures to estimate measure-specific savings, costs and lifetimes, and conducted a detailed bottom-up assessment of the Cascade market to provide a credible and transparent estimation of the technical and achievable energy efficiency potential.

1.2 STUDY GOALS

The primary goal of this assessment was to develop a comprehensive assessment of technical and achievable potential for natural gas energy efficiency within Cascade’s Washington service territory for customers on Rate Schedules 503, 504, 505, 511, 570 & 577 (residential, commercial and non-transport sales industrial customers). This objective analysis illustrates the remaining savings potential by sector, segment and end use as a means to inform future program design given the declining cost of natural gas. The study also integrated a detailed evaluation and measure savings review of Cascade’s conservation portfolio. Key objectives of this study include:

-
- Provide credible and transparent estimation of the technical and achievable energy efficiency potential by year over the next 21 (2014-2034) years within Cascade’s Washington service territory;
 - Assess and validate therm savings associated with key measures that qualified for, and received, a conservation incentive in the 2012 program year, and apply findings to determine realistic therm savings potential in Cascade’s Washington Service area;
 - Provide a user friendly, executable dynamic model that will support the potential assessment and allow for testing of sensitivity of all model inputs and assumptions;
 - Develop a final report including summary data tables and graphs reporting incremental and cumulative potential by year from 2014 through 2034.

1.3 REPORT ORGANIZATION

This report is presented in three volumes as outlined below. This document represents **Volume 2: Assessment of Achievable Potential and Program Evaluation**.

- Volume 1: Executive Summary
- Volume 2: Assessment of Achievable Potential and Program Evaluation
- Volume 3: Detailed Appendices

2 METHODOLOGY

Energy efficiency potential studies involve a number of analytical steps to produce estimates of each type of energy efficiency potential: technical, economic, and achievable. This study utilizes Nexant's in-house developed Microsoft Excel-based modeling tool, TEA-POT (Technical/Economic/Achievable Potential). This modeling tool is built on a platform that provides the ability to run multiple scenarios and re-calculate potential savings based on variable inputs such as sales/load forecasts, natural gas prices, discount rates, and actual program savings. This model provides Cascade with the utmost transparency into the assumptions and calculations for estimating market potential. TEA-POT has been consistently upgraded and refined over the past several years, with the most recent upgrade occurring in 2012. The major analytical steps are summarized below and specific changes in methodology from one sector to another have been noted throughout this section.

2.1 MEASURE SAVINGS REVIEW

A thorough review of Cascade's past evaluated therm savings associated with its DSM programs not only provided critical feedback to Cascade DSM program managers, but also helped provide important baseline savings and participation data that informed both remaining potential as well as the market adoption curves discussed in **Section 2.2.5.4**. Nexant developed a three-pronged approach to review the energy savings for Cascade's current portfolio of natural gas measures for the 2011/2012 program year: 1) A detailed desk review of submitted application forms, 2) Telephone surveys to verify proper measure documentation, installation and savings parameters, and 3) Billing analysis to evaluate pre and post installation energy consumption for relevant measures. The approach is outlined below.

2.1.1 Sample Selection

As a first step in evaluating Cascade's program, Nexant reviewed Cascade's DSM residential and commercial/industrial participation database to design a cost effective sample frame that would provide statistically meaningful findings. The sample was divided into a desk/telephone review sample frame and a billing analysis sample frame for both the residential and commercial sector. Program participants from the period June 1, 2011 through May 31, 2012 were identified as the eligible sample population¹.

The desk/telephone review sample was drawn from all measure categories within each sector. The number of sample points for each stratum is illustrated in **Table 2-1** below along with the estimated confidence/precision of Nexant's findings, assuming a coefficient of variance (Cv) of 0.5 and the available population during the evaluation period. Within each substratum of participants (e.g. residential furnace participants), accounts were selected using a simple random sampling method, except for the

¹ This guaranteed that Nexant has one full year of billing data available pre and post measure installation for the billing analysis discussed in Section 3.1.3.

commercial furnace and boiler participants where all (i.e. census) of the eligible participants were chosen from the evaluation time period.

Table 2-1: Sample Frame for Telephone/Desk Review

Sector	Cascade Sampling Approach	Sample Points	Confidence / Precision ²	Measure Type
Residential	Desk Reviews	31	90/15	All
	Telephone Reviews	18	90/20	All
Commercial	Desk Reviews	27	90/8	All
	Telephone Reviews	19	90/11	All

2.1.2 Verifying Proper Measure Documentation

As a means to provide additional validity into the saving values reported by Cascade, Nexant conducted a spot-check desk review of a statistical sample of the completed projects in 2012 to ensure the savings methodologies were consistently applied and key parameters were correctly recorded into Cascade’s participant database. In total 58 projects were randomly selected for desk review. A sub-sample of 37 participants was then called and a telephone survey conducted to verify installation and savings metrics.

The detailed review for the sample projects aimed to determine 1) if the data files of sampled projects are complete, well-documented, and adequate for calculation and reporting of the savings; and 2) whether the calculation methods used were correctly applied, appropriate, and accurate, and whether or not all necessary fields were properly populated.

Any inconsistencies found during this review are documented (see **Section 3:**

Measure Savings Review Findings). Based on these findings, recommendations are provided on changes to future program documentation approaches, if necessary.

² The confidence interval indicates a range within which one can be certain of the outcome. For example, using a 90/15 confidence/precision, indicates that 90% of the time, the results would occur within 15% of the reported value. While a higher ‘confidence’ infers higher actual confidence in the result, a lower ‘precision’ infers higher confidence.

2.1.3 Billing Analysis

The billing analysis assessed Furnace and Domestic Hot Water measure installations for residential participants and Furnace and Boiler measure installations for commercial/industrial participants³. The actual number of sample points for each stratum is shown in **Table 2-2** along with the estimated confidence/precision, assuming a coefficient of variance (Cv) of 0.5 and the given sample population during the evaluation period. Within each substratum of participants (e.g. residential furnace participants), accounts were selected using a simple random sampling method, except for the commercial furnace and boiler participants where all of the eligible participants were chosen from the evaluation time period.

Table 2-2: Sample Frame for Billing Analysis

Sector	Sample Points	Confidence / Precision	Measure Type
Residential	50	90/8	Water Heater
	53	90/11	Furnace
Commercial	8	90/20	Furnace
	5	90/30	Boiler

Nexant conducted a regression analysis of a sample of 116 projects to evaluate pre- and post-installation energy consumption using customer billing data from the period June 1, 2010 through May 31, 2013. Participants were initially screened to ensure 12 months of consistent billing data and occupancy prior to and after the measure was installed. For example, if there was a change in occupancy during the analysis period, Nexant removed that account from the analysis. For accounts where the billing data looked unusual compared to predictions, Nexant contacted the participants to ask a series of adjusted baseline questions. These questions aimed to determine if there were any notable changes to the baseline inputs for a given measure. For example, a change in the number of occupants⁴ or the installation of additional major efficiency measures would deem that customer ineligible for the billing analysis. While Nexant initially targeted a census (i.e. all) commercial participants that received a rebate for a furnace or boiler in the study period, only 13 of the 39 participants were deemed eligible for the evaluation due to reasons listed above.

³ These measure categories were chosen for the billing analysis not only given their high impact on portfolio savings, but also because they are the most appropriate measures for this type of analysis.

⁴ With a different number of people in the household, various occupancy factors such as the amount of water consumed would change by an unknown amount, making the regressions analysis unreliable in predicting energy savings.

Due to limitations in data reporting, all measures were assumed to be replacements when the equipment reached the end of its useful life⁵, with the baseline condition considered to be a new standard efficiency measure (2009 WA Code, **Table 2-3**). Measure efficiency inputs were pulled from available data provided in the rebate application form.

Table 2-3: Billing Analysis Baseline Efficiency Assumptions

Sector	Measure Type	Assumed Baseline Efficiency
Residential	Water Heater	58%
	Furnace	80%
Commercial	Furnace	78%
	Boiler	80%

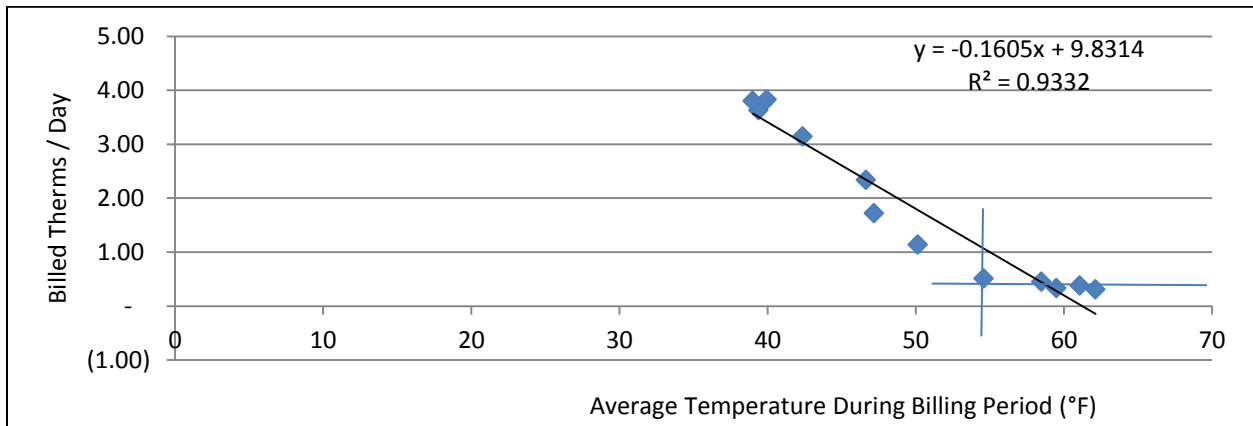
The following method was used to analyze each participant’s billing data: Collect gas usage and meter read dates:

1. Collect gas usage and meter read dates.
2. Conduct initial screen to determine the appropriate billing history (12 months pre- and post-retrofit).
3. Determine climate zone specific heating degree days (HDDs) and reference heating temperature as applicable to each utility bill.
 - (1) Heating degree days were calculated in the conventional manner. For each day in the observation period (i.e., billing period), the average daily temperature is first computed as the average between the minimum and maximum temperatures over the 24 hours of that day. The number of degree days for a specific day is the difference between the temperature chosen as the reference and the observed mean temperature. For heating, if the mean temperature is higher than the reference temperature, HDD is zero. The HDD for each day is summed across the number of days in the observation period to form the variable in **Equation 2-1**. Typical Mean Year (TMY) temperature values were used for projections.
 - (2) As applied in a statistically based analytical framework, the reference temperature (Trc) is defined as the temperature that maximized the explanatory power of the model above (i.e., minimizes sum of squared residuals). Physically, Trc approximates the outdoor temperature above which the heating system must operate to maintain a constant indoor air temperature (D. Belzer, 2007). In this approach, the measure of degree days varies by household, derived from the pattern of actual consumption

⁵ A reasonable assumption given that virtually all residential measure adoptions are completed at the end of the equipment’s useful life.

rather than being based on some fixed temperature (e.g., 65°F, as a commonly published value)⁶. **Figure 2-1** below demonstrates the x-axis temperature values begin leveling out at the building-specific balance temperature (see blue crosshairs), which is 54° in this instance.

Figure 2-1: Illustration of Project-Specific HDD Threshold



4. Use linear regression of gas usage vs. HDDs to determine the heating load of each residence. The model is formulated as outlined in the equation below:

Equation 2-1: Billing Analysis Linear Regression Formula

$E = a + bHDD(T_{rc}) + e$ where:

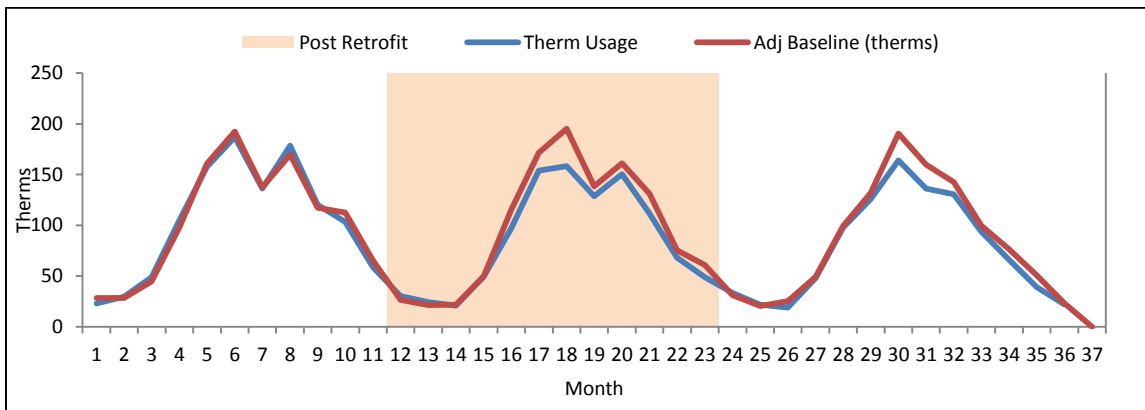
- i. E= Energy consumption
- ii. a, b = regression-model coefficients
- iii. HDD = Heating Degree Days
- iv. T_{rc} =reference temperature for heating
- v. e=error term

In this equation, the b coefficient indicates the magnitude of the response of heating energy to changes in outside temperature. It incorporates both the thermal integrity of the structure as well as the efficiency of the heating equipment. Energy consumption for non-space conditioning (base level consumption) is represented by coefficient a . If monthly data is used in the equation, then a would represent average monthly non-space conditioning energy use. For homes using natural gas for space and water heating, this base-level use primarily results from water heating and cooking.

⁶ This premise-specific approach was used for the billing analysis only. For the measure research component of the market potential study, Nexant utilized a fixed temperature of 65°F when estimating therm savings for weather-dependent residential measures. The fixed 65°F building balance temperature aligns with Cascade’s IRP methodology.

Following this initial screen, a linear regression of the billing data was compared to projected therms consumption for the account. Should the r^2 values of this linear regression be less than 0.80, the account behavior was considered anomalous and disqualified from the final summary. **Figure 2-2** shows a sample output of the actual and adjusted energy consumption of one of the project analyzed, with an R^2 value of 0.987.

Figure 2-2: Sample Modeled Baseline and Adjusted Energy Consumption.



4. Calculate baseline gas consumption using a ratio of code efficiency to installed efficiency (as described in the rebate application).
5. Verified savings = Baseline gas consumption – Post-retrofit gas consumption.

The final step in the billing analysis compared average determined savings values to Cascade’s reported savings values. This data is reported in **Section 3**:

Measure Savings Review Findings.

2.2 ENERGY EFFICIENCY POTENTIAL METHODOLOGY

The energy efficiency potential in the Cascade’s territory can be characterized by levels of opportunity. The ceiling or theoretical maximum is based on commercialized and emerging technologies and behavior measures, whereas the realistic savings that may be achieved through DSM programs reflects real world market constraints such as cost-benefit considerations, market barriers such as regional

economic conditions and customer perspectives, and finally budget and planning constraints. This analysis defines these levels of energy efficiency potential according to the Environmental Protection Agency’s (EPA) National Action Plan for Energy Efficiency (NAPEE) ⁷ as illustrated in **Table 2-4**.

Table 2-4: Energy Efficiency Potential

Not Technically Feasible	Technical Potential			
Not Technically Feasible	Not Cost-Effective	Economic Potential		
Not Technically Feasible	Not Cost-Effective	Market Barriers	Achievable Potential	
Not Technically Feasible	Not Cost-Effective	Market Barriers	Budget & Planning Constraints	Program Potential

EPA – National Guide for Resource Planning

- Technical Potential** is the theoretical maximum amount of energy and capacity that could be displaced by efficiency, regardless of cost and other barriers that may prevent the installation or adoption of an energy-efficiency measure. Technical potential is only constrained by factors such as technical feasibility and applicability of measures.
- Economic Potential** is the amount of energy and capacity that could be reduced by efficiency by measures that pass a cost-effectiveness test. It is at this screen, that utility discount rates and avoided costs are considered when valuing the costs and benefits of saved energy. The Total Resource Cost (TRC) Test estimates the measure costs to both the utility and customer, while the Utility Cost Test (UCT) estimates the measure costs to the utility. Like Technical Potential, Economic Potential is a theoretical number that assumes immediate implementation of efficiency measures, with no regard for the gradual “ramping up” process of real-life programs. Market barriers are ignored, and only the costs of the efficiency measures themselves are considered.
- Achievable Potential** is the energy savings that can feasibly be achieved with cost-effective measures through program and policy interventions. For this analysis, Nexant assessed the achievable savings potential given various utility-provided incentive levels of an energy efficient measure’s incremental cost. Real-world barriers are also taken into account, such as convincing end-users to adopt energy efficiency measures and the capability of programs and administrators to ramp up program activity over time. Taken together, the incentive level corresponds to a market adoption curve for all applicable measures.

⁷ The EPA National Action Plan for Energy Efficiency: http://www.epa.gov/cleanenergy/documents/suca/napee_report.pdf

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- **Program Potential** reflects the realistic quantity of energy savings the utility can realize through DSM programs during the horizon defined in the study. Savings delivered by program potential is often less than achievable potential, due to real-world constraints, such as program utility program budgets, cost-effectiveness thresholds, regulatory and policy statements, and decisions on which subset of cost-effective measures a utility ultimately decides to include in its portfolio.

The quantification of these four levels of energy efficiency potential is an iterative process reflecting assumptions on cost effectiveness that drill down the opportunity from the theoretical maximum to realistic program savings. This study explores technical, economic, and achievable conservation potential (program potential is not included in this assessment). That is, this study did not consider budget constraints nor did it consider the actual portfolio of measures offered through Cascade's DSM programs today or in the future. Achievable potential, therefore, reflects the savings potential given an unlimited utility budget to implement all cost-effective measures. It is from this upper-bound, from which Cascade can analyze the program potential given its limited resources to pay for and implement a sub-set of cost-effective measures. Data summarized in each section's supply curve (for example, see *Error! Reference source not found.* and **Table 7-3** for the residential sector), will help Cascade set its internal efficiency goals given the levelized cost of measure savings.

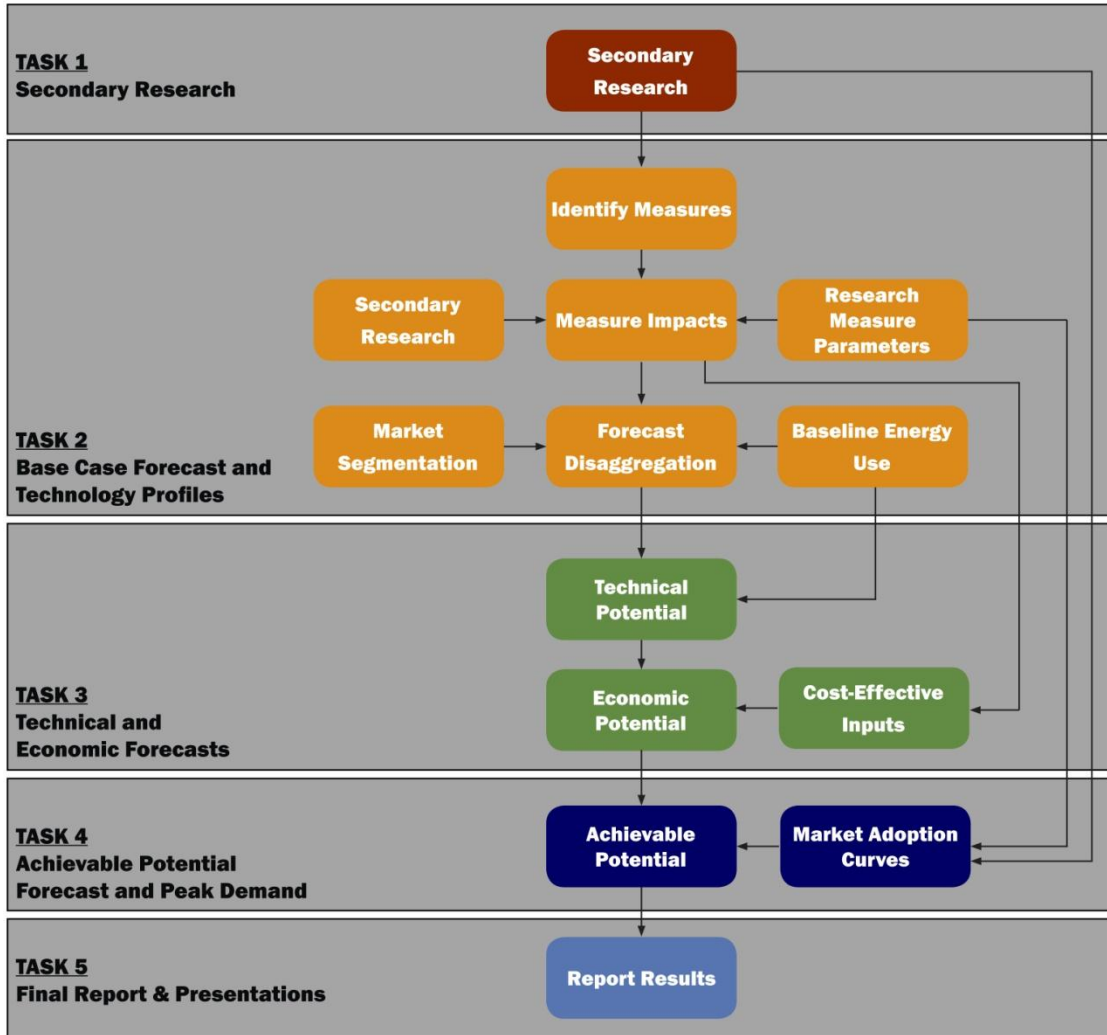
The California Standard Practice Manual⁸ provides the methodology for estimating cost effectiveness of energy efficiency measures, bundles, programs or portfolios based on a series of tests representing the perspectives of the utility, customers, and stakeholders. In this potential study, individual measures were screened and bundles were analyzed for cost-effectiveness using the Total Resource Cost (TRC) and Utility Cost Test (UCT) from the Standard Practice Manual.

2.2.1 Quantifying Energy Efficiency Potential

A high level overview of the approach executed for the assessment of the energy saving potential for natural gas in Cascade's Washington service territory is illustrated in **Figure 2-3** and is further detailed throughout the remainder of this section.

⁸ California Standard Practice Manual: http://www.energy.ca.gov/greenbuilding/documents/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF

Figure 2-3: Approach to Work



2.2.2 End-Use Baseline Sales Forecast

A critical first step in estimating energy efficiency potential is establishing a realistic energy use baseline and end-use saturation numbers from which a 10-year “business as usual” forecast can be built upon. The approach described below outlines this process and is followed by a discussion of the approach to defining the existing energy savings baseline for energy-efficiency measures.

The team utilized a compiled database of information on utility loads and sales forecasts, market data (fuel shares, energy system saturations, and structural characteristics), end-uses (unit energy consumption (UEC), energy use intensities (EUI) and load shapes), technology shares, and measure characteristics (technologies, costs, life, and savings) from existing primary and secondary data sources. The data collection and mining effort involves a search of available secondary sources including:

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- Data and policy statements directly applicable to Cascade’s Washington service territory, including:
 - 2009 Cascade Gas energy-efficiency potential assessment
 - Cascade’s 2012 IRP document
 - Cascade’s program participation database
 - Washington Utilities and Transportation Commission’s “Policy Statement on the Evaluation of the Cost-effectiveness of Natural Gas Conservation Programs (Docket UG-121207)
 - Regional studies, including:
 - Northwest Energy Efficiency Alliance (NEEA) Residential Building Stock Assessment (RBSA)
 - NEEA Commercial Building Stock Assessment (CBSA)
 - Washington-specific and pacific northwest sections of National studies, examples including:
 - Residential Energy Consumption Study (RECS, with household characteristics data tables)
 - Commercial Buildings Energy Consumption Study (CBECS)
 - Manufacturing Energy Consumption Study (MECS)
 - Energy market characterization and energy-efficiency potential assessments conducted for other natural gas utilities, including:
 - NorthWestern Energy End-Use and Load Profile Study, 2009
 - Ontario Energy Board 2009 Measures and Assumptions for DSM planning
 - CA Database for Energy Efficient Resources (DEER)
 - Illinois Statewide Technical Reference Manual (TRM) 2013
 - Wisconsin Focus on Energy TRM 2012
 - Puget Sound Energy’s 2013 IRP document

2.2.3 Load Disaggregation and Forecast Study

After the collection of applicable secondary data sources, the next step is to disaggregate the most recent year of completed sales (2012) into a baseline year. In this study, the team disaggregated end-use loads and technologies and applied them across the study horizon by:

- Determining energy consumption per customer class and segment in baseline year.
- Disaggregating customer class loads into end-use loads, such as space heating.
- Segmenting end-uses loads into technologies, such as furnaces.
- Analyzing and calibrating data to 2012.

- Forecasting the 21-year end-use energy consumption through 2034.

2.2.3.1 Determine Energy Consumption per Customer Class and Segment in Baseline Year

The first step in the forecast disaggregation is to analyze energy loads for the residential, commercial and industrial customer classes. Separate models were developed for the residential, commercial and industrial sector. Segmentation was developed per market segment as follows:

- **Residential:** Single-family, multi-family home, and manufactured home.
- **Commercial:** Education, Grocery, Healthcare, Office, Lodging, Restaurant, Retail, Warehouse, Misc.
- **Industrial:** Food Manufacturing, Lumber/Wood Products, Primary Metal Manufacturing & Fabrication, Paper Manufacturing, Stone/Clay/Glass Production, Misc.

2.2.3.2 End-Use Load Classification

The next step in the forecast disaggregation analysis is to establish the end-use loads within the residential, commercial and industrial market segments. A sample of the types of end-use loads to be analyzed is found in

Table 2-5.

Table 2-5: End-Use Loads by Sector

Residential	Commercial	Industrial
Space Heating	Space Heating	Space Heating
Water Heating	Water Heating	Water Heating
Cooking	Cooking	Process Heating
Room Heating (Gas Fireplace/Hearth)	Other	Other
Clothes Drying	-	-
Other	-	-

2.2.4 Measure List Research

Once the baseline forecast is disaggregated, the next step to assessing market potential was to accurately detail the universe of efficiency measures and their savings, costs and lifetimes. Measures that are currently implemented in Cascade’s Gas programs, as well as those measures found in other adjacent utility DSM programs, received careful consideration since these measures have a historical record and vendors have proven processes for implementation. Additionally the Nexant team, through its previous assignments, compiled one of the most comprehensive sets of energy efficiency measures available today. The list of measures can be found in **Section 9**. This list includes measures from Cascade’s current portfolio of programs, measures evaluated in the Cascade’s 2009 potential study, the California Database for Energy Efficiency Resources (DEER), various technical reference manuals (TRMs),

like those used for the State of Illinois, Wisconsin and the province of Ontario, as well as other measures the Nexant team has characterized in similar studies. From these databases measures that are commonly available, based on well-understood technology, and applicable to the buildings and end-uses, were selected for the measure list. Consideration was also be given to measures that show promise for future viability but have not yet gained a foothold in the market.

Energy efficiency potential adoption in the marketplace can be captured over time through three principal processes:

- **Turnover:** Replacements are made normally in the market when a piece of equipment is at the end of its effective useful life (also referred to as “replace-on-burnout”)
- **Early Retirement:** Replacements are made before the end of an equipment’s expected useful life(also referred to as “retrofit”).
- **New:** When a measures is installed in a newly constructed home or building.

Upon finalization of the energy efficiency measure list data on energy savings, costs, lifetime, and applicability was collected to determine potential measure impacts. This work was performed through a four step process outlined below.

Step 1: Define market classes for application of measures

In line with the disaggregated load forecast, the team defined the applicability of the appropriate fuel type, sectors, market segments, vintages, and end-uses to each of the measures. These classes are defined as follows:

- **Customer Sectors:** Residential, commercial and industrial.
- **Market Segments:**
 - *Residential:* Single-family, multi-family home, and manufactured home.
 - *Commercial:* Education, Grocery, Healthcare, Office, Lodging, Restaurant, Retail, Warehouse, Misc.
 - *Industrial:* Food Manufacturing, Lumber/Wood Products, Primary Metal Manufacturing & Fabrication, Paper Manufacturing, Stone/Clay/Glass Production, Misc.
- **Measure Type:** Equipment, Non-equipment ⁹
- **Vintages:** Equipment – Turnover, Retrofit, New
Non-equipment – Existing, New

⁹ Equipment measures are units that actually consume natural gas, such as a furnace. Non-equipment measures do not consume natural gas directly, such as windows or insulation.

Step 2: Screen sectors, segments, and end-uses for eligibility

The Nexant team screened market segments and end-uses for applicability of specific energy efficient strategies. For example, certain commercial end-uses, such as cooking loads, may not be appropriate for segments such as offices and warehouses, and were analyzed only in limited market sectors.

Step 3: Develop base case impacts and costs

For each of the energy efficiency measures on the final list, base case equipment and practices was determined. A description of all base case equipment and practices was documented, along with a description of why that particular base case was the best representation. All base case assumptions and data, such as Washington state building codes and federal standards, were included. Base case assumptions included projected future shifts in the base, such as the upcoming 2015 Federal Standards' impact on water heater code minimums.

Step 4: Develop energy efficiency measure impacts and costs

A description of all energy efficiency (or "change case") measure equipment and practices were also developed. All measure energy savings assumptions and calculation parameters, such as equivalent full load hours (EFLH), were provided and documented for transparency. For each measure, energy savings were estimated as a percentage of base equipment and/or end-use consumption.

In addition to energy savings, incremental measure costs were collected from retailer research, RSMMeans (a construction cost database) or calls to local contractors, when appropriate. It should be noted that the measure costs utilized for the purposes of this potential assessment reflect average installation costs across various implementation scenarios and therefore may be at a lower resolution than costs available to Cascade for program planning. For program planning purposes Cascade may opt to refine costs to better reflect costs in their specific service territory. Research was also performed to determine the measure life for each energy efficiency measure based on available datasets.

Limited non-energy benefits will also be assessed as part of the study in the context of both incremental costs and savings. Other measures, such as clothes washers and pre-rinse spray valves, offer water savings in addition to energy savings.

2.2.5 Estimating Energy Savings Potential and Determine Market Potential

Drawing on the previous data compilation, organization, and market analysis tasks, the estimation of market potential is conceptually a straightforward exercise.

2.2.5.1 Develop Baseline Forecast

The baseline forecast is created by combining all of the inputs compiled in prior tasks to obtain average consumption estimates by customer segment, construction vintage and end use, and summing these up to the sector level. The disaggregated forecast data provides the foundation. For example, in the residential sector, the general equation for the DSM baseline forecast is:

Equation 2-2:
$$Forecast_{BL} = \sum_{i,j,t} HH_{i,t} \times EUS_{i,j,t} \times UEC_{i,j,t}$$

Where: $HH_{i,t}$ = the number of households of type i in year t

$EUS_{i,j,t}$ = the saturation of end use type j in household type i in year t

$UEC_{i,j,t}$ = the unit energy consumption of end use j in household type i in year t

2.2.5.2 Estimate Technical Potential

The measure-level inputs were used to estimate technical potential over the planning horizon. This is accomplished by creating an alternate forecast where consumption is reduced by the installation of all technically feasible measures. For technical potential, which represents substitution of all technically feasible measures at the end use level (and following the residential example above), the general equation is:

Equation 2-3:
$$Forecast_{TP} = \sum_{i,j,t} HH_{i,t} \times EUS_{i,j,t} \times UEC_{i,j',t}$$

Where: $HH_{i,t}$ = the number of households of type i in year t

$EUS_{i,j,t}$ = the saturation of end use type j in household type i in year t

$UEC_{i,j',t}$ = the unit energy consumption of end use j' (the most efficient end use technology configuration) in household type i in year t

The technical potential for DSM is simply the difference between Equation 2-2 and Equation 2-3. Because measures anticipated to be installed in the absence of utility intervention are included in the baseline forecast in Equation 2-2 (and, thus, the technical potential forecast), savings due to already occurring conservation were removed from the technical potential estimates.

Addressing Naturally Occurring Energy Efficiency

As noted above, one of the first steps in the potential study is to disaggregate utility sales forecasts, as all estimates of potential are ultimately calibrated back to these forecasts. Therefore, getting the forecasts correct is critical. It is also in the sales forecasts where we incorporate naturally occurring adoption, which is the savings estimated to occur as a result of normal market forces. The analysis team worked with forecasters at Cascade Gas to understand how the baseline sales forecasts incorporate two known sources of naturally occurring adoption:

- Codes and standards
- Efficiency measure baseline penetration

By properly accounting for these factors the potential study estimates the net penetration rates, which represent the difference between the anticipated adoption rates of the efficiency measures after intervention and the “business as usual” adoption rates absent efficiency intervention.¹⁰ This is true even in the technical and economic scenarios, where the efficiency-case penetration will approach 100 percent, and particularly important in the achievable potential analysis, where we estimate the percentage of eligible measures (and associated savings) that can be expected to occur net of baseline penetration rates (people who would buy the efficient technology in the absence of any program intervention).

2.2.5.3 Estimate Economic Potential

The next step is to create an alternative forecast of “economic” DSM potential (i.e., considering the most efficient measures that pass economic screening tests), specifically the Total Resource Cost (TRC) and Utility Cost Test (UCT)¹¹ were utilized to screen individual measures. Again following the residential example, the general equation is:

Equation 2-4:
$$Forecast_{EP} = \sum_{i,j,t} HH_{i,t} \times EUS_{i,j,t} \times UEC_{i,j'',t}$$

Where: $HH_{i,t}$ = the number of households of type i in year t

$EUS_{i,j,t}$ = the saturation of end use type j in household type i in year t

$UEC_{i,j'',t}$ = the unit energy consumption of end use j'' (the most efficient end use technology configuration *that is also economic*) in household type i in year t

Similar to the calculation of technical potential, the economic potential for DSM is the difference between **Equation 2-2** and **Equation 2-4**.

Calculating Cost Effectiveness

Nexant determined measure cost-effectiveness using accepted industry-standard cost-effectiveness tests, described below, to gauge the economic merits of the portfolio. Each test compares the benefits of the energy efficiency measures to their costs using its own unique perspectives and definitions in terms of net present value of future cash flows. The two standard tests are:

- **Total Resource Cost test (TRC).** The benefits in this test are the lifetime avoided energy costs. The costs in this test are the incremental measure costs.

¹⁰ As defined in the “Guide for Conducting Energy Efficiency Potential Studies: A Resource for the National Action Plan for Energy Efficiency (NAPEE)”, November 2007.

¹¹ Utility Cost Test is also known as Program Administrator Cost (PAC) Test per the California Standard Practice Manual

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- **Utility Cost Test (UCT)**, also called the **program administrator cost test (PACT)**. The benefits in this test are the lifetime avoided energy costs. The costs in this test are the utility's cost of providing the incentives for the measures.

Administrative costs were not included in either cost-effectiveness test, nor were capacity benefits. The cost component of the analysis consists of incremental measure costs and utility program costs. The research team utilized a cost-effectiveness screen of 0.90 to account for a 10% environmental benefit adder as is the general practice in the Pacific Northwest¹². This taken directly from Docket UG-121207: "The Northwest Power act requires the Washington Utilities Transportation Commission (WUTC) to use a 10 percent adder. 16 U.S.C. § 839a(4)(D). The Energy Dependence Act, RCW 19.285.040(1), requires electric utilities to evaluate cost-effectiveness using the WUTC methodology, so electric utilities in Washington apply a 10 percent conservation adder to Total Resource Cost calculations. WUTC is not aware of an authority that currently allows the use of a 10 percent adder in the natural gas sector."

Nexant then produced estimates of levelized cost-of-conserved-energy (CCE) for each measure by integrating resource data (per-unit costs, savings, and measure life) with baseline building stock data (base-case fuel and end-use saturations, measure applicability factors, and current measure saturations) and baseline energy usage data. Cascade-specific data on avoided costs, distribution losses, discount rates¹³, and inflation rates were incorporated for the economic and achievable potential assessments to perform a full cost-benefit analysis for every rate class, sector, customer segment, vintage, end use, and measure combination. These Cascade-specific data assumptions are detailed in **Volume III, Appendix B**.

2.2.5.4 Estimate Achievable Potential

The assessment of realistically achievable energy efficiency potential requires estimating, among other parameters, the rate at which cost-effective measures can be adopted over time. Because program implementation scenarios have a direct influence over such market penetration rates, calculating achievable potential typically incorporates individually developed sets of market penetration curves corresponding to implementation scenarios. These scenarios may be correlated to differing levels of urgency in program implementation, tolerance for rate impacts, macroeconomic conditions, or other situations.

There are important components in the determination of achievable potential:

- **Customers' willingness to participate.** The likelihood that customers will participate in energy efficiency programs is a function of several factors, most notably incentive level. Achievable potential was estimated for three different incentive-level scenarios (30%, 50%, and 75% of incremental cost) to examine the variance in expected savings.

¹² Nexant took care in not unilaterally screening out all measures with a TRC below 0.9, as some measures may be included as part of a cost-effective measure bundle.

¹³ Cascade's weighted average cost of capital (WACC) of 8.55% was used for all measures in all sectors when screened under UCT, and the U.S. treasury note interest rate of 3.4% was used for residential measures when screened under the TRC.

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- **Uncertainty.** Filing and planning requirements often necessitate a point-estimate of potential; however, this is not an accurate reflection of the reality of DSM programs. It is preferred to think of achievable potential as a range, or probability distribution, where the point-estimate is the most likely outcome. This distribution defines the lower and upper bounds of expected savings, as well as the most likely value.

2.2.6 Scenarios Evaluated

This assessment of energy efficiency potential for Cascade’s Washington service territory considered specific scenarios to understand how variation in several key input parameters would impact the assessment outcomes, including the following parameters:

- Cost-Benefit Test (TRC vs. UCT)
- Avoided Costs
- Incentive Level (30%, 50% and 75% of incremental cost)
- Discount Rate (Cascade’s WACC of 8.55% for all measures in all sectors when screened under UCT, and the U.S. treasury note interest rate of 3.4% for residential measures when screened under the TRC)

Table 2-6 summarizes the 22 scenarios that were assessed per sector (66 total for residential, commercial and industrial) for this project.

Table 2-6: Scenarios addressed for each Sector

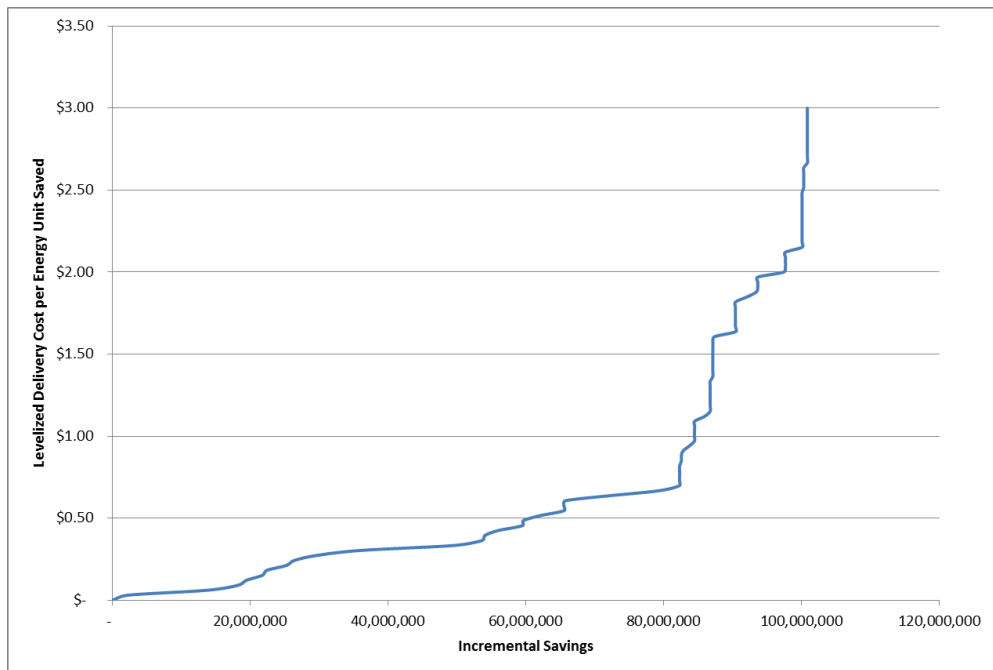
Potential Category	Scenario	Scenario # Res/Com/Ind	Avoided Costs	Incentivized %	Discount Rate	
					Residential	Comm./Industrial
Base Case – Technical/Economic/Achievable Potential Scenarios under TRC						
Technical	Technical – Base	1 / 23 / 45	Current	n/a	3.40%	8.55%
Economic	Economic – Base	2 / 24 / 46	Current	n/a	3.40%	8.55%
Achievable Potential	Achievable – Base	3 / 25 / 47	Current	30%	3.40%	8.55%
	Achievable – Moderate	4 / 26 / 48	Current	50%	3.40%	8.55%
	Achievable – High	5 / 27 / 49	Current	75%	3.40%	8.55%
Base Case – Technical/Economic/Achievable Scenarios under UCT						
Technical	Technical – Base	6 / 28 / 50	Current	n/a	8.55%	8.55%
Economic	Economic – Base	7 / 29 / 51	Current	n/a	8.55%	8.55%
Achievable Potential	Achievable – Base	8 / 30 / 52	Current	30%	8.55%	8.55%
	Achievable – Moderate	9 / 31 / 53	Current	50%	8.55%	8.55%
	Achievable – High	10 / 32 / 54	Current	75%	8.55%	8.55%
Alternate Base Achievable Scenarios under TRC						
Achievable Potential	Achievable – Base	11 / 33 / 55	+25%	30%	3.40%	8.55%
	Achievable – Base	12 / 34 / 56	+50%	30%	3.40%	8.55%
	Achievable – Base	13 / 35 / 57	+100%	30%	3.40%	8.55%
	Achievable – Base	14 / 36 / 58	-25%	30%	3.40%	8.55%
	Achievable – Base	15 / 37 / 59	-50%	30%	3.40%	8.55%
	Achievable – Base	21 / 43 / 65	Current	30%	4.17%	4.17%
Alternate Base Achievable Scenarios under UCT						
Achievable Potential	Achievable – Base	16 / 38 / 60	+25%	30%	8.55%	8.55%
	Achievable – Base	17 / 39 / 61	+50%	30%	8.55%	8.55%
	Achievable – Base	18 / 40 / 62	+100%	30%	8.55%	8.55%
	Achievable – Base	19 / 41 / 63	-25%	30%	8.55%	8.55%
	Achievable – Base	20 / 42 / 64	-50%	30%	8.55%	8.55%
	Achievable – Base	22 / 44 / 66	Current	30%	4.17%	4.17%

2.2.7 Supply Curves

Finally, a supply curve was developed to show the amount of energy efficiency savings available at different cost levels. A supply curve typically consists of two axes; one that captures the cost per unit of saving a resource (e.g., dollars per lifetime therms saved) and another that shows the amount of savings

that could be achieved at each level of cost. The curve is typically built up across individual measures that are applied to specific base-case practices or technologies by market segment. Savings measures are sorted based on a metric of cost. Total savings available at various levels of cost are calculated incrementally with respect to measures that precede them. Supply curves typically, but not always, end up reflecting diminishing returns, i.e., costs increase rapidly and savings decrease significantly at the end of the curve. **Figure 2-4** shows a sample supply curve demonstrating this effect.

Figure 2-4: Sample Supply Curve



3 MEASURE SAVINGS REVIEW FINDINGS

The goal of the measure savings review was to provide a high level assessment of Cascade’s process for collecting, organizing program participant data and estimating the associated savings for four key measures in the time period June 1, 2011 – May 31, 2012. This was broken up into three tasks: 1) a desk review of program applications, 2) a telephone call to program participants to verify measure installation and key savings metrics, and 3) a billing analysis of a statistical sample of installed furnace, boiler and water heater installed measures. The findings of these two assessments are provided below.

3.1 DESK & TELEPHONE MEASURE REVIEW FINDINGS

The desk review compared the participant application to the Cascade participant database in an effort to determine the quality of Cascade’s data collection processes and its ability to accurately estimate realized natural gas energy efficiency savings. **Table 3-1** summarizes the actual number of desk and telephone reviews completed.

Table 3-1: Desk and Telephone Review Sample Completion

CASCADE Sampling Approach	Residential Sector			Commercial Sector		
	Sample Points	Confidence/Precision	Measure Type	Sample Points	Confidence/Precision	Measure Type
Desk Reviews	31	90/15	All	27	90/8	All
Telephone Reviews	18	90/20	All	19	90/11	All

One of the key findings of the measure savings review is regarding Cascade’s methodology for estimating natural gas savings. While utilizing a deemed savings value approach for each measure can be a cost-effective and appropriate approach to estimating savings, it can over or underestimate actual savings. With the data provided in this analysis – specifically measure savings algorithms used in the potential assessment – Cascade will have the option to refine projected savings estimates with increased specificity by calculating premise-specific natural gas savings for each installed measure. While Cascade is already collecting some of the key savings parameters on its participant application forms (such as house square footage and efficiency of installed measure), Nexant recommends including some additional parameters on the application forms to enable premise-specific calculation estimates of natural gas savings. The following desk review findings may have an impact on reporting of savings:

1. The Cascade participant database documented the efficiency of the replacement measure as the incentivized amount (such as a 0.62 EF water heater), whereas often the efficiency of the installed measure as listed on the application was greater than the incentivized efficiency level. That is, while the application form always listed the actual efficiency of the installed equipment

(e.g. EF=0.67), the efficiency of that particular measure would be set to a default value (e.g. EF=0.62) in the Cascade participant database. This implies deemed values were used to project savings, as opposed to premise-specific values, which were often more efficient than the incentivized efficiency level. This practice would conservatively estimate savings. Recording the actual efficiency value of installed equipment, as opposed to the incentivized efficiency value, would be less conservative but could increase the accuracy of projections and data analysis.

2. The efficiency level of original equipment was not always recorded on the application form, nor whether or not the original equipment was replaced due to failure or for another reason prior to the end of expected equipment life. Savings calculations are dependent upon the efficiency of the base equipment, as well as whether or not the customer replaced the equipment early or upon burn-out. Nexant recommends collecting data on these two factors in the rebate application, and tracking them in the participant database, for inclusion in savings calculations (see **Section 3.1.1** below).
3. The cost category in the customer database varied in inclusions per measure. Categories included equipment, labor, old equipment disposal, and/or additional work performed. Standardized entries of “equipment costs” and “labor costs”, in addition to “extraneous costs” will ensure accurate comparison of measure and installation costs.
4. While Cascade collects participant square footage for its weatherization measures, importing commercial participant facility square footage information for all measures into the participant database will facilitate comparative analysis between commercial customers, as facility sizes and types can vary dramatically in the commercial sector.

The telephone review verified all participation data and **no errors were found** in the reviewed measures. Additional useful information not requested in the rebate application was gleaned from customers during the telephone review, including:

- **39% of commercial rebate customers were new construction.** Savings algorithms change depending on the age of the installed equipment and the assumed base case. New construction base case is code, but for other circumstances the base case may be an existing unit.
- **11% of commercial rebate customers replaced equipment prior to burn-out.** To be as accurate as possible, equipment replaced prior to burn-out is typically compared to a base-case of the prior unit, not code.
- **24% of residential customers installed multiple gas efficiency measures at once.** As multiple efficiency measures would affect projected savings, this is important information to document for inclusion in analysis.
- **6% of residential customers installed an additional gas efficiency measure** after receiving the rebate for the initial gas efficiency measure. Again, installing additional measures might also impact savings and alter the results of savings calculations for previously installed measures.

3.1.1 Measure Savings Algorithms

As noted above, reporting measure savings on a project-specific basis can significantly increase accuracy. The suggested algorithms below were derived from various Technical Reference Manuals (TRMs) from around the U.S. and were utilized in the potential assessment to estimate savings for applicable measures. The same algorithms can be used by Cascade when estimating project-specific measure savings.

Equation 3-1: Furnace Measure Algorithm¹⁴

$$\Delta \text{ Therms} = (\text{FLHheat} * (\text{Capacity}/\text{AFUEbase} - \text{Capacity}/\text{AFUEee})) / (100,000\text{Btu/therm}) * \text{DF}$$

- Assumptions:
 - FLHheat = Full Load Heating Hours
 - Capacity = Furnace Capacity
 - AFUE = Furnace Efficiency
 - DF = EFLH derate factor (engineering adjustment to account for equipment oversizing)

Equation 3-2: Duct Sealing Algorithm¹⁵

$$\Delta \text{ Therms} = ((\text{DEafter} - \text{DEbefore}) / \text{DEafter}) * \text{FLHheat} * \text{Capacity} / (100,000\text{Btu/therm}) / \eta \text{Heat}$$

- Assumptions:
 - DE = Duct system distribution efficiency
 - FLHheat = Full Load Heating Hours
 - Capacity = Furnace Capacity
 - ηHeat = Average net heating system efficiency (Equipment Efficiency * Distribution Efficiency)

Equation 3-3: Insulation Measure Algorithm¹⁵

$$\Delta \text{ Therms} = (((1/\text{R}_{\text{old}} - 1/\text{R}_{\text{new}}) * \text{A}_{\text{insulated}} * (1 - \text{F}/2)) * 24 * \text{HDD}) / (\eta \text{Heat} * 100,000 \text{ Btu/therm})$$

- Assumptions:
 - R = insulation R-value
 - A = insulated area
 - F = framing factor to account for area of framing
 - HDD = Heating Degree Days
 - ηHeat = Average net heating system efficiency (Equipment Efficiency * Distribution Efficiency)

Equation 3-4: Water Heater Measure Algorithm¹⁶

$$\Delta \text{ Therms} = \text{W} * \text{ECw} * \Delta \text{T} * (1/\text{EFbase} - 1/\text{EFeff}) * (100,000 \text{ Btu/therm})$$

- Assumptions:

¹⁴ Based on the Delaware TRM algorithm (Opinion Dynamics Corporation, 2012)

¹⁵ Based on the Illinois TRM algorithm (State of Illinois, 2012)

¹⁶ Based on Ontario Energy Board algorithm (Navigant Consulting, 2009)

- W = daily household hot water use (gallons)
- ECw = Energy content of water, 8.33 Btu/gallon-°F
- ΔT = Average water heater set point temperature minus incoming water temperature (assumed to be mean ground temperature below frost line)
- EF = water heater efficiency factor

Equation 3-5: Water Flow Restriction Devices Algorithms¹⁶

Step 1. Calculate Water Consumption Savings

Water Consumption (W) = $FuPpl * 365 * Fp * (Flbase - Fl_{eff} / Flbase) * DR$

Step 2. Calculate Therms Savings

Therm Consumption = $W * 8.33 * (\Delta T) * (1 / EF) / 100,000$ Btu/therm

- Assumptions:
 - FuPpl = Faucet use per capita per day
 - Fp = faucet water consumption as % of total water consumption
 - Fl = Flow rate (gpm)
 - Dr = % water that goes down drain
 - W = Water Savings (gallons)
 - ECw = Energy content of water, 8.33 Btu/gallon-°F
 - ΔT = Average water heater set point temperature minus incoming water temperature (assumed to be mean ground temperature below frost line)
 - EF = water heater efficiency factor

3.2 BILLING ANALYSIS FINDINGS

In an effort to estimate realized savings associated with Cascade’s program offerings, Nexant conducted a billing analysis for four key residential and commercial measure offerings. The measures are residential high efficiency furnaces and hot water heaters, and commercial/industrial high efficiency furnaces and boilers. Savings from the final qualified accounts assessed in the billing analysis were compared to estimates from Cascade’s deemed measure savings. The findings of this analysis are summarized in **Table 3-2** below.

Table 3-2: Total Participant vs. Billing Analysis Subsample Summary

Source	Metric	Residential		Commercial ¹⁷	
		DHW	Furnace	Furnace	Boiler
Cascade Participant Database	Participants	83	833	18 (Census)	23 (Census)
	Equipment Eff. Installed	65%	90%	Assumed 91%	Assumed 90%
	Average Savings (Therms per Measure)	24	86	272	2644
Qualified Billing Analysis Participants	# of participants	50	53	8	5
	Confidence / Precision	90/8	90/11	90/20	90/30
	Avg. Equipment Eff. Installed	67%	95%	95%	91%
	Average Savings (Therms per Measure)	33	111	349 ¹⁸	1566
Actual Savings vs. Projected		39%	29%	28%	-41%

Nexant found that, on average, actual natural gas savings as assessed from the billing analysis were higher than the estimates provided through Cascade’s deemed measures savings. The residential billing analysis of water heater retrofit savings was 39% greater than Cascade projections. This variance is in line with comments from Cascade staff indicating its deemed savings are intentionally conservative estimates. It should be noted that the average projected installed efficiency value of the water heaters used by Cascade was 65%; while actual installed average water efficiency rating was 67%, with several water heaters having efficiency ratings of greater than 90%. This reinforces the need to collect actual installed efficiency values of equipment as discussed in **Section 2.1.2**.

Residential furnace savings were 30% greater than projected. Similar to water heaters, it appears Cascade is using a base level equipment efficiency value of 90% in savings projections, whereas the actual average efficiency of new furnaces installed was 95%. The larger actual savings versus projected likely reflects this conservative assumption.

¹⁷ While some commercial participant numbers are too low to obtain statistical accuracy on the results, this is a census of the installed measures therefore this is a summary of the entire sample size for the commercial sector.

¹⁸ Premise savings were divided by number of installed units to develop a therms saved per installed unit value. The three other measures were not standardized by installed units and the therms saved values are per premise.

Commercial furnace savings were calculated on a per-furnace, per-premise basis, as the number of furnaces installed varied per premise (from 1 to 8 furnaces in the subsample). Nexant billing analysis savings results averaged 28% greater than projected by Cascade's deemed savings estimates. Again, average efficiency values were 95% and it appears Cascade calculations were using the incentivized 91% efficiency value in their assumptions. This conservative assumption and the small sample size could account for the variance.

Commercial boiler savings were 40% less than projected. Several boiler measures didn't qualify for billing analysis due to either billing history disqualifications (such as not having 12 months of utility billing history before and after the installation, or a change in tenants during the required 24 month spread) or excessive variance in consumption behavior from model prediction, creating a small qualified sample size of 5 premises. This small number resulted in a 90/30 confidence precision, which decreases the ability to make meaningful conclusions about savings projections.

4 MARKET SEGMENTATION FINDINGS

An important first step in calculating Cascade's energy efficiency potential estimates is to establish baseline energy usage characteristics and disaggregate the market by sector, segment, and end use. The findings of this section represent the control totals to which all energy usage is calibrated in the base year of the study and then forecasted. Furthermore, the market segmentation findings provide the foundation of the forecast disaggregation (as described in **Section 5**) which identifies the allocated shares of natural gas sales upon which each energy efficiency measure savings values are applied to.

This section summarizes the market segmentation findings from Nexant's review of 2012 energy (therms) consumption by residential, commercial, and industrial Cascade customers, using the 2012 customer billing database received from Cascade. Residential customer accounts were categorized based on the given premise type. Commercial and Industrial customer accounts were first categorized by the customer class and premise type, then further refined as follows:

- An initial screen based on the standard industrial classification (SIC) code provided in the database.
- Additional analysis was performed to verify, and in many cases, correct the mapping. For example, roughly 18,000 accounts (or 52% of the records) with no SIC code or a code that mapped to an incorrect category were manually reassigned based on other database fields including customer name, premise type, and premise address.
- Only accounts with the following rate codes are included in the below summary: 504, 505, 511, 570, and 577.

Because this analysis presents findings on building premises, findings presented below do not include transmission, substation, telecommunication, or utility rate classes. Finally, consumption thresholds

(Residential: 50 therms, Commercial: 100 therms, Industrial 100 therms) were developed. Consumers below this threshold were assumed to be non-premises (i.e. not eligible for energy efficiency measures) and removed from the summary below. The average premise consumption values (therms per year) for each sector were compared to EIA data for the State of Washington, and found to be in reasonable agreement. Through analysis of Cascade’s customer billing data and secondary research, Nexant was able to break out the energy usage by sector, segment and end use.

4.1 2012 NATURAL GAS SALES SUMMARY

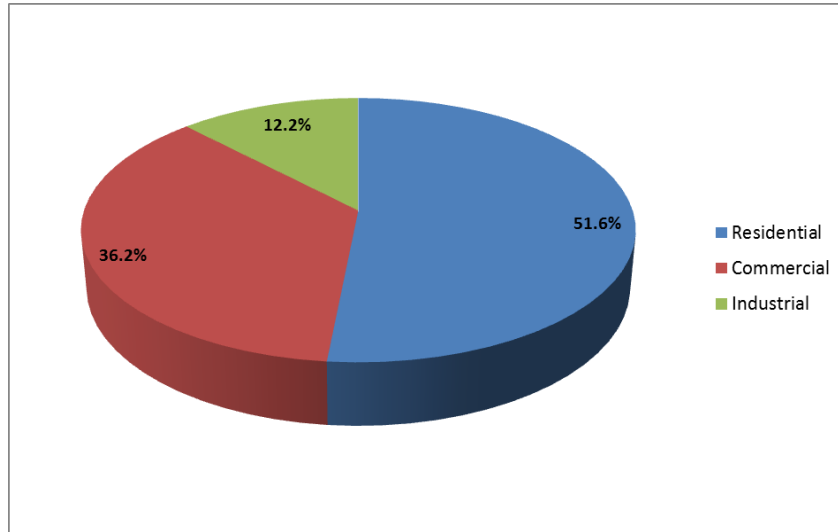
Total natural gas consumption by eligible residential, commercial and industrial customers for 2012 in Cascade’s Washington service territory was 14,642,834 dekatherms¹⁹. **Table 4-1** and **Figure 4-1** show the overview of natural gas sales and premises by sector for Cascade in calendar year 2012. While the industrial sales number totals 2,651,868 dekatherms, this number includes only non-transport industrial gas customers and represents only 4% of total industrial natural gas sales.

Table 4-1: Cascade 2012 Natural Gas Consumption & Premise Counts by Sector

Sector	2012 Sales (annual dekatherms)	Premise Count
Residential	11,203,608	171,991
Commercial	7,873,584	23,609
Industrial	2,651,868	10,639
Total	12,256,153	206,239

¹⁹ Note: Nexant utilized the definition of premise for this study which removes non-building customer accounts, and other miscellaneous loads from its findings. The number of premises, therefore, and the associated natural gas consumption is less than the number of accounts and top-line natural gas sales that Cascade utilizes in its IRP documents. Furthermore, the number of eligible industrial premises and sales is significantly less due to the large share of transport sales – which were removed because they are ineligible for energy efficiency programs.

Figure 4-1: 2012 Natural Gas Consumption by Sector



4.2 RESIDENTIAL SECTOR NATURAL GAS CONSUMPTION

Table 4-2 shows the breakdown of energy consumption and building stock by residential segment. Single family homes dominate consumption with an 86% share, with multi-family dwellings at 14% of total residential consumption. Manufactured home (such as mobile home) dwellings comprise less than 1% of total residential consumption.

Table 4-2: Residential 2012 Natural Gas Consumption & Premise Counts by Segment

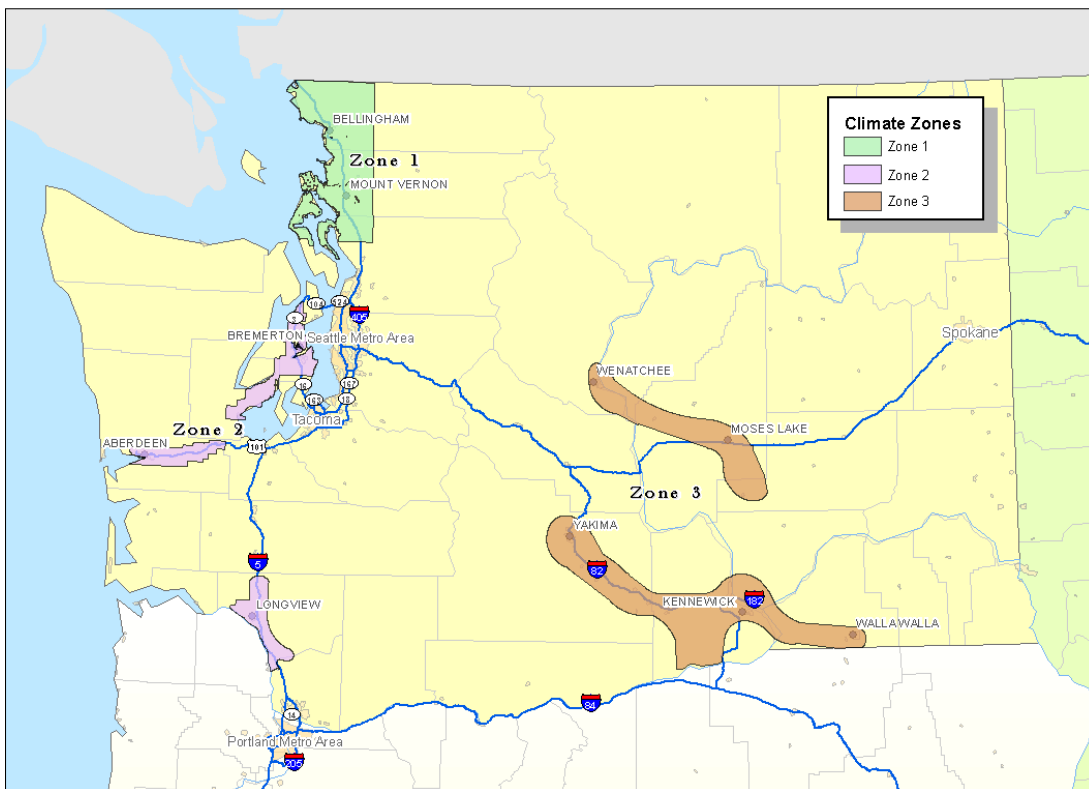
Sector	Energy Consumption (annual therms)	Energy Use Share	No. of Premises	Energy Use per Premise (dth)
Single Family	9,657,510	86.2%	143,058	67.5
Multifamily	1,523,691	13.6%	28,542	53.4
Manufactured	11,204	0.1%	391	28.7
Total	11,203,608	100%	171,991	65.1

For the residential sector, Nexant also assessed energy efficiency potential by climate zone, and thus it was necessary to parse out energy consumption for each of the three climate zones in Cascade’s service territory. The residential natural gas consumption by climate zone is presented in **Table 4-3 and Figure 4-2** shows a map of Cascade’s Washington service territory broken out by these climate zones. Climate Zone 2 represents nearly half of all residential energy consumption (47%).

Table 4-3: Residential 2012 Natural Gas Consumption & Premise Counts by Climate Zone

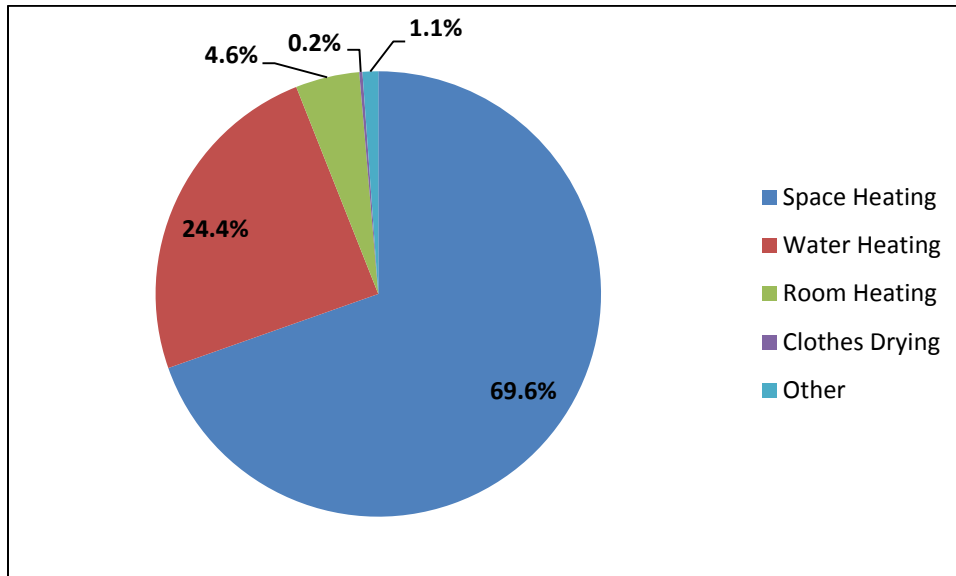
Climate Zone	Energy Consumption (annual therms)	Energy Use Share	No. of Premises	Energy Use per Premise (dth)
Climate Zone 1	2,912,938	26.0%	40,996	71.1
Climate Zone 2	5,265,696	47.0%	72,241	72.9
Climate Zone 3	3,024,974	27.0%	58,754	51.5
Total	11,203,608	100%	171,991	65.1

Figure 4-2: Climate Zone Map of Cascade’s Washington Service Territory



Nexant further disaggregated Cascade’s residential load by end use. **Figure 4-3** shows the distribution of natural gas consumption by end use for all residential households in Cascade’s territory.

Figure 4-3: 2012 Residential Natural Gas Consumption by End Use*



*Space Heating refers to central heating equipment end uses, such as furnaces and boilers. Room Heating refers to gas hearths / fireplaces.

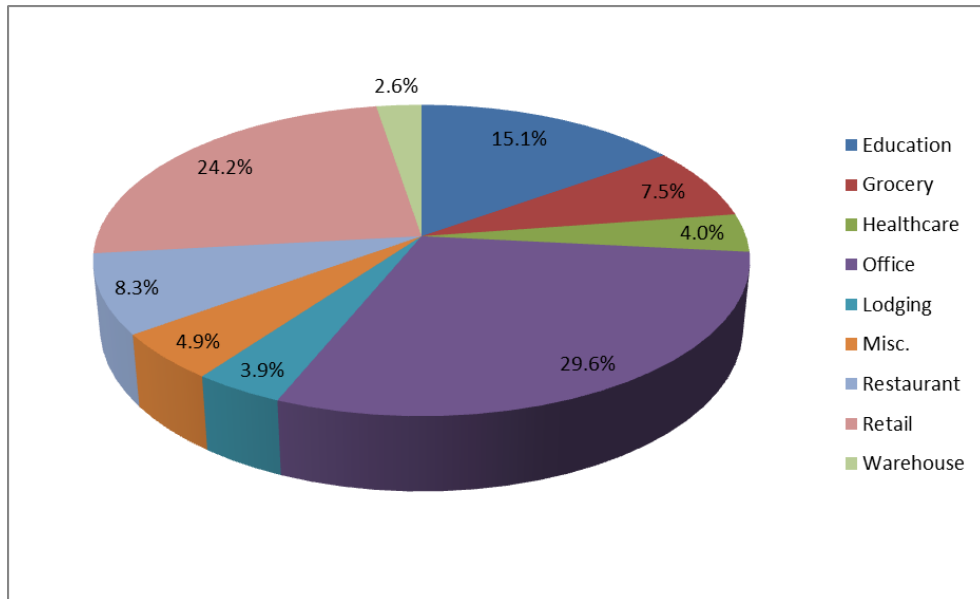
4.3 COMMERCIAL SECTOR NATURAL GAS CONSUMPTION

Table 4-4 and Figure 4-4 show the distribution of consumption by commercial segment for all eligible premises. The office and retail segments represent the largest share of consumption at 29.6% and 24.2% respectively.

Table 4-4: Commercial 2012 Natural Gas Consumption & Premise Counts by Segment

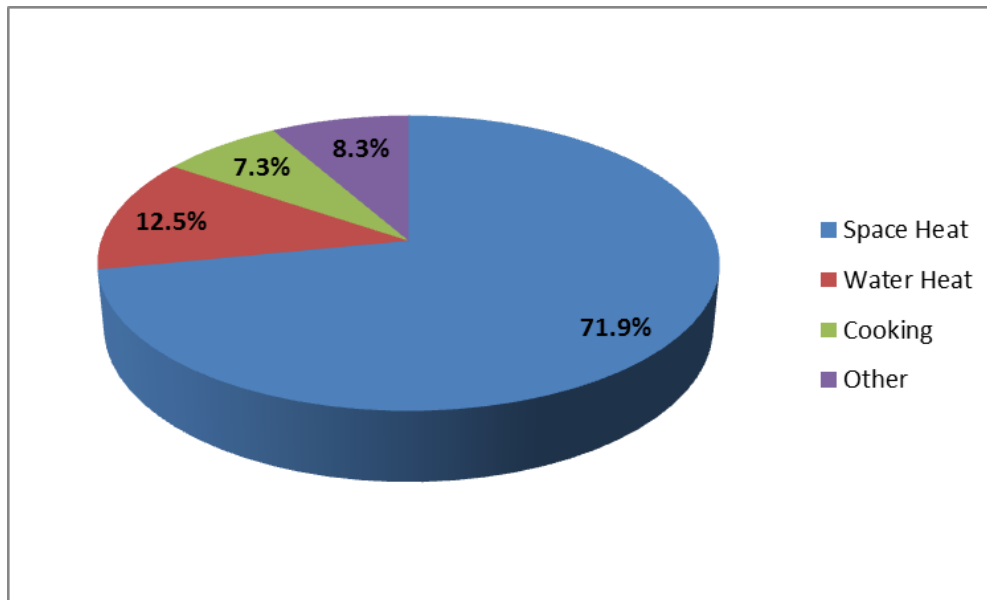
Segment	Energy Consumption (annual dth)	Energy Use Share	No. of Premises	Energy Use per Premise (dth)
Education	1,191,963	15.1%	994	1,199
Grocery	590,930	7.5%	1,020	579
Healthcare	312,585	4.0%	512	611
Office	2,329,730	29.6%	8,401	277
Lodging	304,013	3.9%	266	1,143
Misc.	386,424	4.9%	2,470	156
Restaurant	650,618	8.3%	1,318	494
Retail	1,904,289	24.2%	7,152	266
Warehouse	203,032	2.6%	936	217
Total	7,873,584	100.0%	23,069	341

Figure 4-4: Commercial 2012 Natural Gas Consumption by Segment



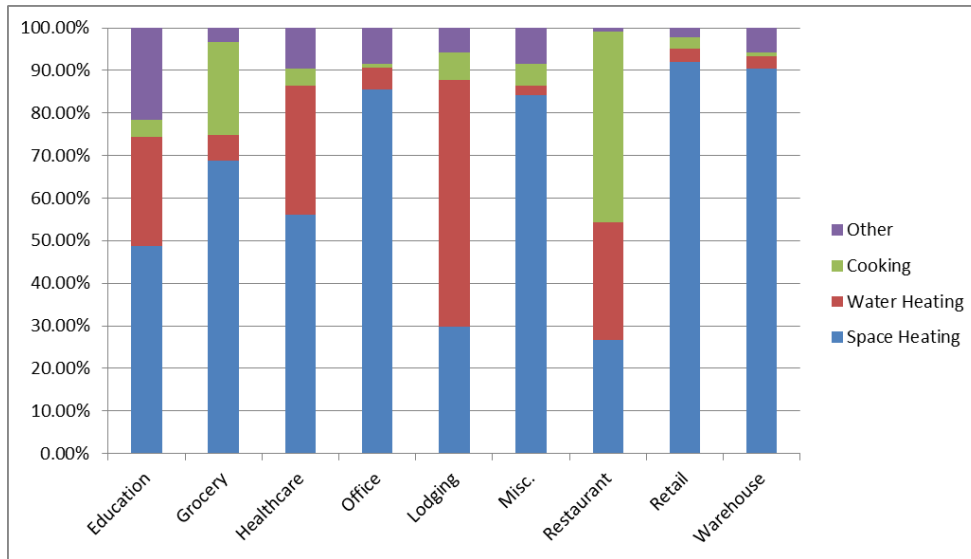
Nexant further disaggregated Cascade’s commercial load by end use. **Figure 4-5** and **Figure 4-6** show the distribution of natural gas consumption by end use for all commercial premises and each segment respectively. Space heating represents the largest share at 71.9% of all consumption.

Figure 4-5: Commercial 2012 Natural Gas Consumption by End Use*



*Space Heating refers to central heating equipment end uses, such as furnaces and boilers. Room Heating refers to gas hearths / fireplaces.

Figure 4-6: Commercial 2012 Natural Gas Consumption Shares by Segment, by End Use



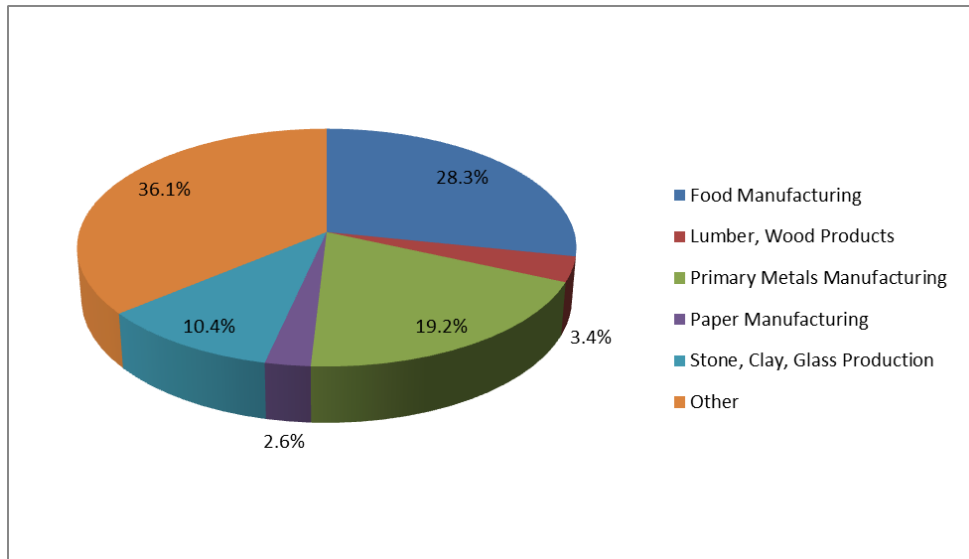
4.4 INDUSTRIAL SECTOR NATURAL GAS CONSUMPTION

Table 4-5 and Figure 4-7 show the distribution of consumption by industrial segment for all eligible premises. The food manufacturing segment represents the largest share of energy use at 28.3%, with paper manufacturing representing the smallest share at 2.6% of consumption.

Table 4-5: Industrial 2012 Natural Gas Consumption & Premise Counts by Segment

Segment	Energy Consumption (annual dth)	Energy Use Share	No. of Premises	Energy Use per Premise (dth)
Food Manufacturing	749,223	28.3%	465	1,611
Lumber, Wood Products	90,689	3.4%	340	267
Primary Metals Manufacturing	509,712	19.2%	1,081	472
Paper Manufacturing	69,240	2.6%	62	1,117
Stone, Clay, Glass Production	276,950	10.4%	446	621
Other	956,055	36.1%	8,245	116
Total	2,651,868	100.0%	10,639	249

Figure 4-7: Industrial 2012 Natural Gas Consumption by Segment



Nexant further disaggregated Cascade’s industrial load by end use. **Figure 4-8 and Figure 4-9** show the distribution of natural gas consumption by end use for all industrial premises and each segment respectively. Process heating represents the largest share of end use consumption at 87.1% across all segments.

Figure 4-8: 2012 Industrial Natural Gas Consumption by End Use

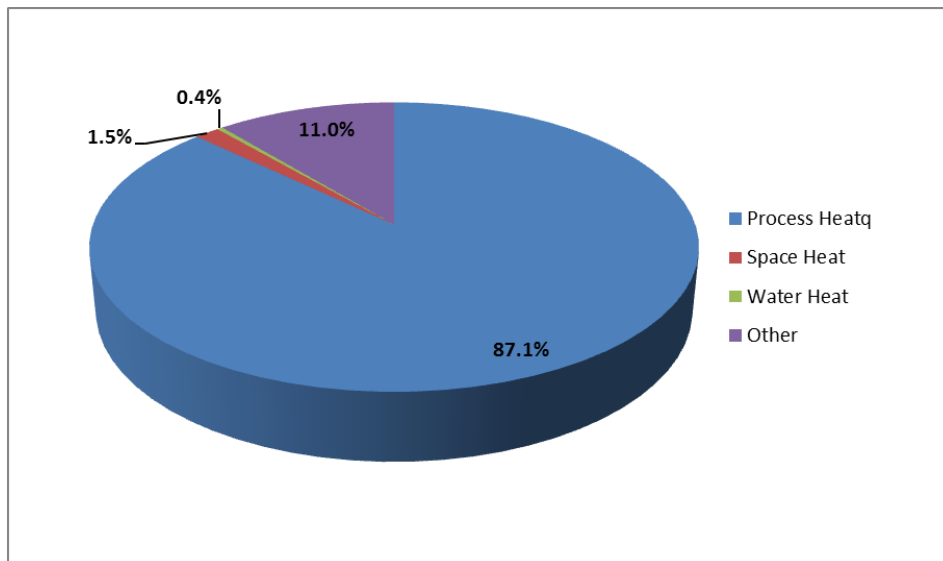
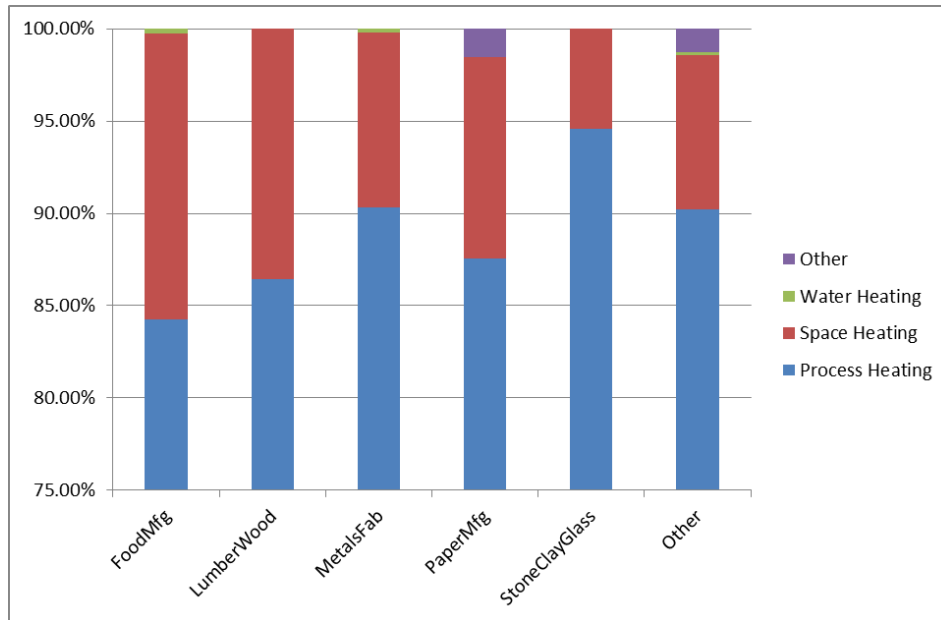


Figure 4-9: 2012 Industrial Natural Gas Consumption by Segment, by End Use



5 BASELINE FORECAST DISAGGREGATION

This section summarizes the baseline forecast disaggregation results in which the market segmentation findings as illustrated in **Section 4** are applied to the baseline natural gas forecast submitted by Cascade. This disaggregated baseline forecast, then, serves as the foundation upon which measure savings shares are applied to the applicable sector, segment, and end use²⁰.

5.1 BASELINE FORECAST DISAGGREGATION SUMMARY

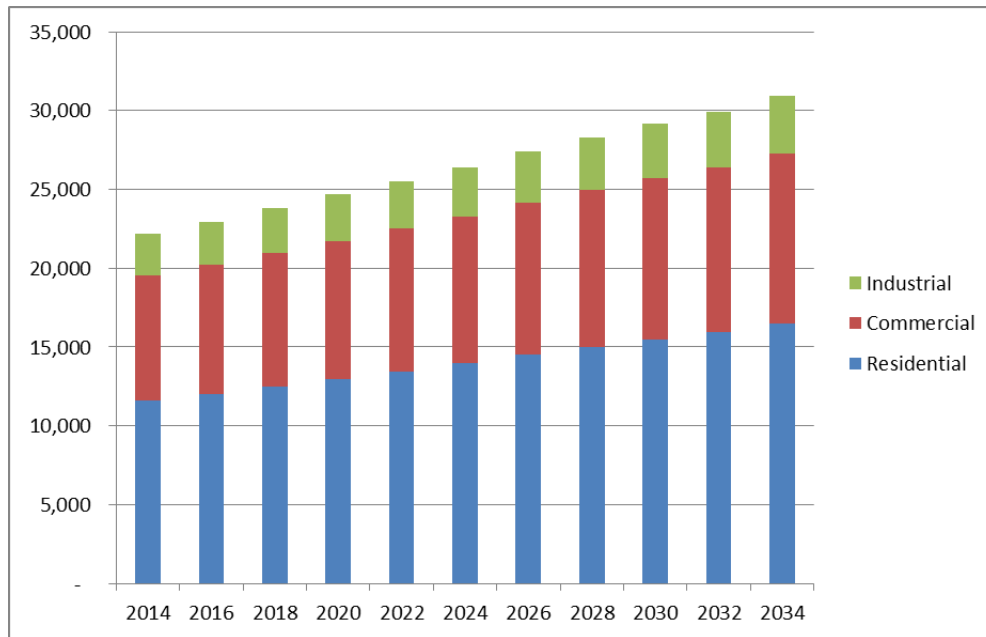
Table 5-1 and **Figure 5-1** summarize the baseline natural gas sales forecast of eligible DSM sales by sector for Cascade’s Washington service territory.

²⁰ The forecast was further disaggregated by equipment type in the TEA-POT model; however, that level of resolution is not included in this report.

Table 5-1: Natural Gas Consumption by Sector, by Year ('000 dth)

Sector	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034
Residential	11,609	12,023	12,508	12,986	13,454	13,951	14,505	15,001	15,475	15,935	16,506
Commercial	7,919	8,175	8,472	8,757	9,043	9,330	9,672	9,969	10,247	10,463	10,792
Industrial	2,663	2,749	2,849	2,945	3,041	3,138	3,253	3,353	3,446	3,519	3,630
Total	22,191	22,948	23,830	24,688	25,539	26,419	27,430	28,322	29,169	29,917	30,927

Figure 5-1: Natural Gas Consumption by Sector, by Year ('000 dth)



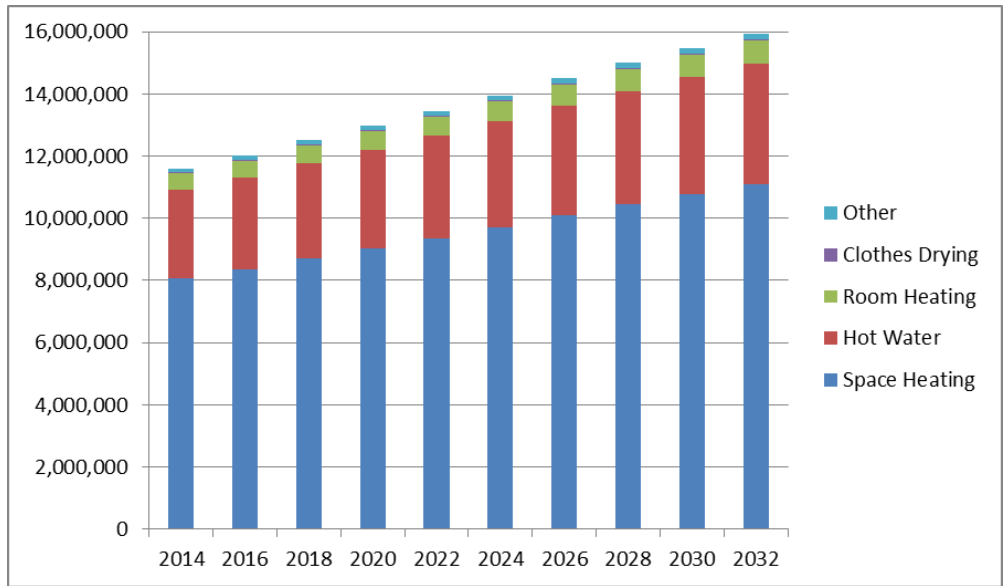
5.2 RESIDENTIAL SECTOR FORECAST

Table 5-2 and **Figure 5-2** summarize the residential baseline natural gas sales forecast by end use, by equipment type for Cascade’s Washington service territory. Furnace and Domestic Hot Water equipment types are the two largest consumers, followed by the ‘other’ space heating equipment category.

Table 5-2: Residential Baseline Natural Gas Consumption by End Use by Year (dth)

End Use	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032
Space Heating	8,079,947	8,368,484	8,706,184	9,038,434	9,364,609	9,710,519	10,096,080	10,440,921	10,771,067	11,091,194
Water Heating	2,831,426	2,932,537	3,050,876	3,167,305	3,281,605	3,402,821	3,537,932	3,658,773	3,774,465	3,886,646
Room Heating	538,556	557,788	580,297	602,443	624,184	647,240	672,939	695,924	717,929	739,267
Clothes Dyer	26,917	27,879	29,004	30,111	31,197	32,350	33,634	34,783	35,883	36,949
Other	131,767	136,473	141,980	147,398	152,718	158,359	164,646	170,270	175,654	180,875
Total	11,608,614	12,023,160	12,508,341	12,985,691	13,454,313	13,951,288	14,505,232	15,000,670	15,474,997	15,934,930

Figure 5-2: Residential Natural Gas Baseline Forecast by End Use by Year (dth)



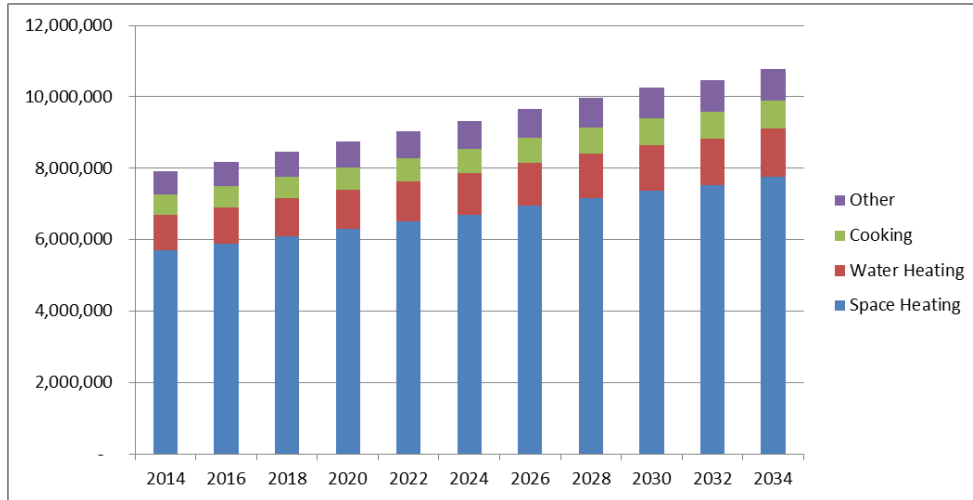
5.3 COMMERCIAL SECTOR FORECAST

Table 5-3 and Figure 5-3 summarize the commercial baseline natural gas sales forecast by end use, by equipment type for Cascade’s Washington service territory.

Table 5-3: Commercial Natural Gas Baseline Forecast by End Use by Year (dth)

End Use	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034
Space Heating	5,693,885	5,878,143	6,091,708	6,296,486	6,502,141	6,708,487	6,954,140	7,167,620	7,367,969	7,523,039	7,759,600
Water Heating	990,435	1,022,487	1,059,636	1,095,257	1,131,030	1,166,923	1,209,654	1,246,788	1,281,638	1,308,612	1,349,761
Cooking	575,922	594,559	616,161	636,874	657,675	678,547	703,394	724,987	745,252	760,937	784,864
Other	658,847	680,168	704,880	728,575	752,372	776,249	804,673	829,375	852,558	870,501	897,874
Total	7,919,090	8,175,357	8,472,386	8,757,191	9,043,218	9,330,206	9,671,861	9,968,771	10,247,417	10,463,089	10,792,100

Figure 5-3: Commercial Natural Gas Baseline Forecast by End Use by Year (dth)



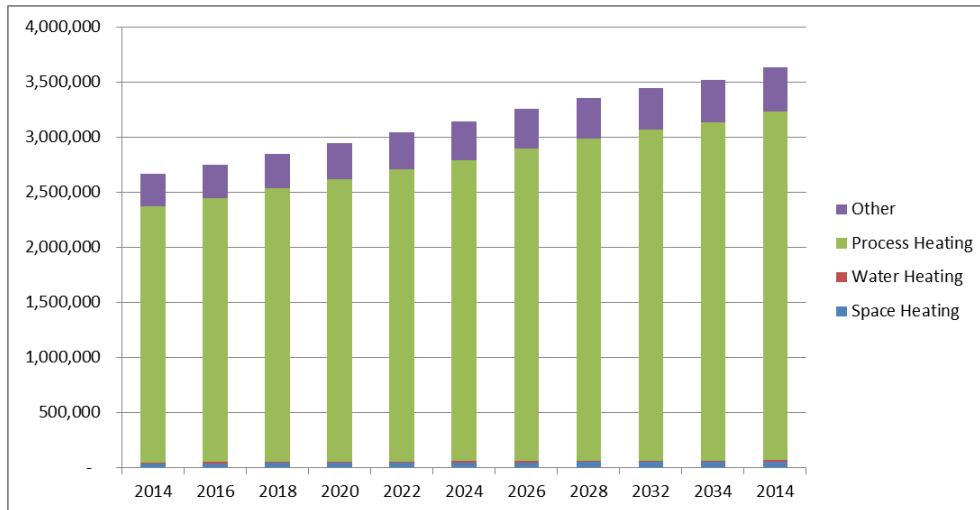
5.4 INDUSTRIAL SECTOR FORECAST

Table 5-4 and Figure 5-4 summarize the industrial baseline natural gas sales forecast by end use, by equipment type for Cascade’s Washington service territory.

Table 5-4: Industrial Natural Gas Consumption Baseline Forecast by End Use by Year (dth)

End Use	2014	2016	2018	2020	2022	2024	2026	2028	2032	2034	2014
Space Heating	40,749	42,067	43,596	45,061	46,533	48,010	49,768	51,296	52,729	53,839	55,532
Water Heating	9,322	9,623	9,973	10,308	10,645	10,983	11,385	11,734	12,062	12,316	12,703
Process Heating	2,319,212	2,394,264	2,481,252	2,564,661	2,648,428	2,732,476	2,832,535	2,919,489	3,001,094	3,064,257	3,160,612
Other	294,030	303,545	314,573	325,148	335,768	346,423	359,109	370,133	380,479	388,486	400,702
Total	2,663,312	2,749,499	2,849,394	2,945,178	3,041,373	3,137,892	3,252,796	3,352,651	3,446,364	3,518,898	3,629,549

Figure 5-4: Industrial Natural Gas Baseline Forecast by End Use by Year (dth)



6 PORTFOLIO ENERGY EFFICIENCY POTENTIAL

This section provides an overview of the findings for the entire portfolio of natural gas customers in Cascade’s Washington service territory. Natural gas energy efficiency findings for technical, economic and achievable potential are presented in two parts. At the beginning of each section, detailed findings are presented for the “base-case” technical, economic, and achievable scenarios. Where findings are broken out by segment (building type) or end use, they are done so under the achievable base case scenario (for appropriate numbering see **Table 2-6**). All base case scenarios were run under the following main assumptions:

- Measure cost effectiveness screen: Utility Cost Test (UCT)
- Incentive percentage of incremental cost (for achievable scenarios): 30%, 50% or 75%
- Avoided Costs: Current avoided costs as provided in Appendix H of Cascade’s 2012 IRP
- Discount Rate: 8.55%

Summary findings are then presented for various achievable potential scenarios given variations in 1) measure screening approach (based on cost-effectiveness test), 2) avoided costs, and 3) discount rate. Again, **Table 2-6** above illustrates the 22 scenarios (per sector) Nexant examined under the utility cost test (UCT) and TRC for each sector – residential, commercial and industrial (for a total of 66 scenarios for the three sectors presented). Detailed summary tables for savings potential for all scenarios are provided in **Volume III, Appendix C**.

6.1 BASE CASE TECHNICAL/ECONOMIC/ACHIEVABLE POTENTIAL FINDINGS

Table 6-1 and **Figure 6-1** present the estimated technical, economic and achievable savings potential for Cascade’s Washington service territory under the Utility Cost Test. First year (2014) natural gas conservation achievable base potential under the UCT screen for all sectors is 139,859 dth, representing 0.63% of baseline sales. It should also be noted that the achievable base savings potential is slightly greater than the achievable moderate savings potential (even though the moderate has a more aggressive adoption curve). This occurs because the measure cost used in the cost-effectiveness test under the achievable moderate scenario (50% of incremental cost) compared to the achievable moderate scenario (30% of incremental) causes more measures to fail cost-effectiveness. The fewer measures passing cost effectiveness has a greater impact on potential than the increased adoption of those measures. **Figure 6-2** shows the changes in Cascade’s baseline sales forecast under each of the base case potential scenarios, screened with the UCT.

Table 6-1: Portfolio Energy Efficiency Potential Savings by Base Case Scenario under UCT Screen

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	22,191,016	22,948,017	24,688,061	26,974,698	30,927,487
Cumulative Savings (dth)					
Technical Potential	744,155	2,337,526	5,667,873	9,931,037	16,585,195
Economic Potential	476,641	1,494,793	3,606,967	6,314,915	10,434,394
Achievable - Base	139,859	437,581	1,130,474	2,243,553	4,448,248
Achievable - Moderate	137,844	441,098	1,180,749	2,384,769	4,677,603
Achievable - High	141,599	446,575	1,153,137	2,239,052	4,160,771
Energy Savings (% of baseline sales)					
Technical Potential	3.35%	10.19%	22.96%	36.82%	53.63%
Economic Potential	2.15%	6.51%	14.61%	23.41%	33.74%
Achievable - Base	0.63%	1.91%	4.58%	8.32%	14.38%
Achievable - Moderate	0.62%	1.92%	4.78%	8.84%	15.12%
Achievable - High	0.64%	1.95%	4.67%	8.30%	13.45%

Figure 6-1: Portfolio Energy Efficiency Potential Savings (% Sales) by Base Case Scenario under UCT Screen

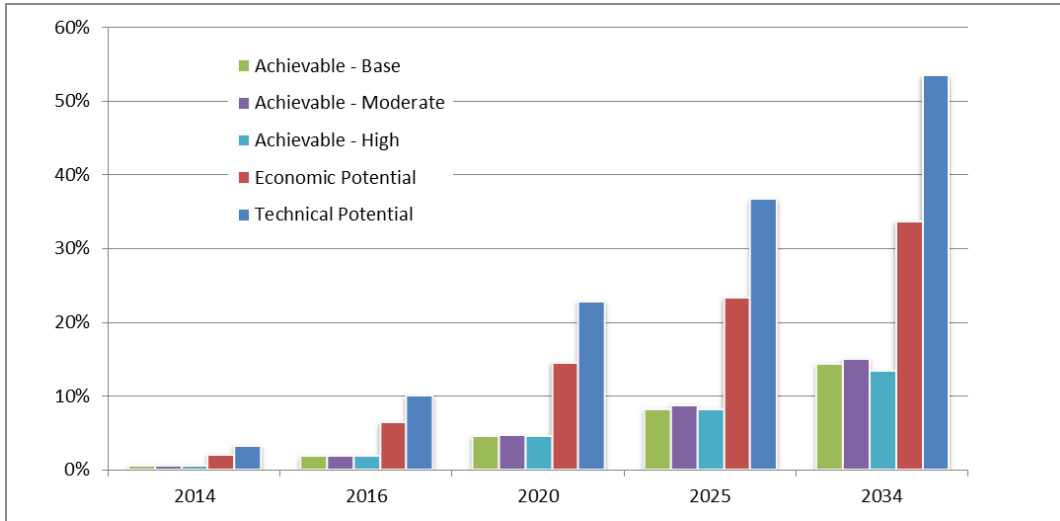
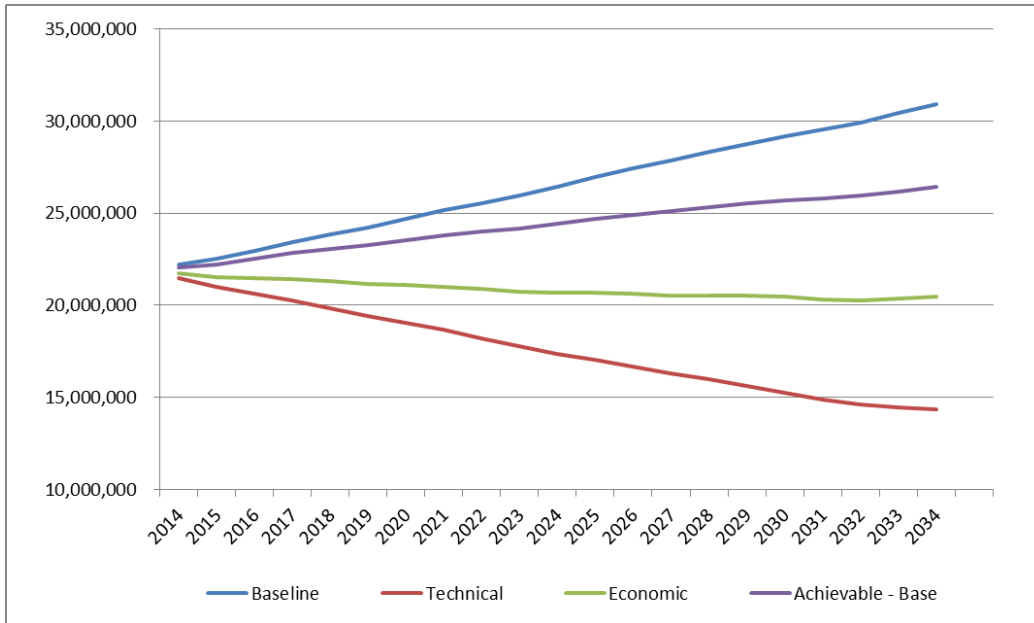


Figure 6-2: 21-year Portfolio Sales Forecast (dth) by Base Case Scenario under UCT Screen



6.2 ALTERNATE ACHIEVABLE BASE POTENTIAL FINDINGS

With the decrease in the cost of natural gas there is additional scrutiny over the cost-effectiveness of natural gas efficiency measures. There are several commonly used methodologies available to utilities to estimate cost effectiveness including the utility cost test and total resource cost test. The

Washington Utilities and Transportation Commission’s October 9, 2013 Policy Statement states the WUTC is “...unwilling to allow utilities to end natural gas conservation programs as a result of an unbalanced or incomplete TRC analysis...Accordingly, the UCT is an acceptable option when a properly balanced TRC is not available.”²¹. To address this policy statement, Nexant examined savings potential under both screens. **Table 6-2** and **Figure 6-3** below illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. As can be seen there is approximately 40% more savings potential under the achievable base scenario in 2014 under the UCT screen (139,859 dth) compared to the TRC screen (83,674 dth). This occurs because the UCT only considers the incentivized portion of the measure cost, thus allowing more measures to pass cost-effectiveness when compared with the TRC screen. It can also be seen that unlike the UCT findings, savings potential increases from achievable base to achievable moderate because the measure cost is the full incremental cost under all scenarios so the same number of measures are considered under each scenario.

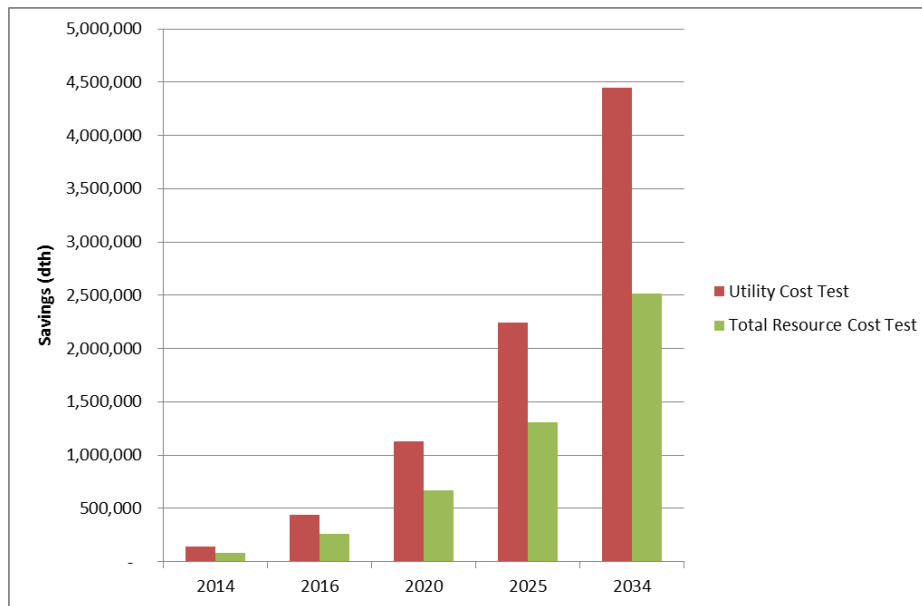
Table 6-2: Portfolio Savings Potential by Base-Case Scenario, by Cost-Effectiveness Screen

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential (6+28+50)	744,155	2,337,526	5,667,873	9,931,037	16,585,195
Economic Potential (7+29+51)	476,641	1,494,793	3,606,967	6,314,915	10,434,394
Achievable - Base (8+30+52)	139,859	437,581	1,130,474	2,243,553	4,448,248
Achievable - Moderate (9+31+53)	137,844	441,098	1,180,749	2,384,769	4,677,603
Achievable - High (10+32+54)	141,599	446,575	1,153,137	2,239,052	4,160,771
Cumulative Savings (dth) based on TRC Screen					
Technical Potential (1+23+45)	744,155	2,337,526	5,667,873	9,931,037	16,585,195
Economic Potential (2+24+46)	280,661	890,127	2,146,790	3,738,374	5,994,207
Achievable - Base (3+25+47)	83,674	261,580	668,838	1,310,576	2,512,861
Achievable - Moderate (4+26+48)	107,728	341,487	891,790	1,754,511	3,321,079
Achievable - High (5+27+49)	142,755	450,536	1,160,443	2,234,333	4,103,135

²¹ Docket UG-121207, pg. 14, paragraph 36.

<http://wutc.wa.gov/rms2.nsf/177d98baa5918c7388256a550064a61e/cceb91c1dd54c04788257bff0066ff99!OpenDocument>

Figure 6-3: Portfolio Achievable Base Savings Potential by Base-Case Scenario, by Cost-Effectiveness Screen



As mentioned above, recent volatility in the price of natural gas is having a significant impact on the cost-effectiveness of many natural gas efficiency measures. The avoided cost of procuring and delivering natural gas (calculated as a benefit in the cost-effectiveness screen) is directly related to this volatility. Thus, Nexant also assessed differences in 2014 achievable base portfolio savings potential given variations in avoided costs under both the UCT and TRC test (**Table 6-3**). These scenarios illustrate the sensitivity of total savings potential given uncertainty in the forecasted cost of natural gas (thus the avoided costs) for Cascade.

Table 6-3: 2014 Portfolio Achievable Base Potential by Cost Effectiveness Test, by Avoided Cost Scenario

Scenario (UCT #'s / TRC #'s)	Cumulative Savings by UCT Screen (dth)	Cumulative Savings by TRC Screen (dth)
Achievable Base Avoided Costs (8+30+52 / 3+25+47)	139,859	83,674
Avoided Costs +25% (16+38+60 / 11+33+55)	147,672	90,458
Avoided Costs +50% (17+39+61 / 12+34+56)	151,415	113,293
Avoided Costs +75% (18+40+62 / 13+35+57)	152,696	133,288
Avoided Costs -25% (19+41+63 / 14+36+58)	128,080	74,383
Avoided Costs -50% (20+42+64 / 15+37+59)	89,785	65,239

Finally, **Table 6-4** and **Table 6-5** summarize the differences in achievable base savings potential over time given variations in the corporate discount rate used by Cascade. Nexant used Cascade’s weighted average cost of capital of 8.55% to screen measures as the base-case assumption for all scenarios under

the UCT screen (a 3.4% discount rate was used for the residential TRC screen). An alternate discount rate of 4.17% (Cascade’s long term discount rate utilized for DSM planning and program reporting) was used to assess impact on savings potential as illustrated below.

Table 6-4: Portfolio Achievable Base Savings Potential (dth) by Discount Rate under UCT Screen

Scenario	2014	2016	2020	2025	2034
Base Case Discount Rate of 8.55% (Scenario #'s 8+30+52)	139,859	437,581	1,130,474	1,968,116	4,448,248
Discount Rate of 4.17% (Scenario #'s 22+44+66)	147,918	462,390	1,192,431	2,053,210	4,672,363

Table 6-5: Portfolio Achievable Base Savings Potential (dth) by Discount Rate under TRC Screen

Scenario	2014	2016	2020	2025	2034
Base Case Discount Rate of 3.4% (res), 8.55% (C&I) (Scenario #'s 3+25+47)	83,674	261,580	668,838	1,310,576	2,512,861
Discount Rate of 4.17% (Scenario #'s 21+43+65)	85,424	266,665	680,809	1,335,733	2,573,978

7 ACHIEVABLE POTENTIAL BY SECTOR

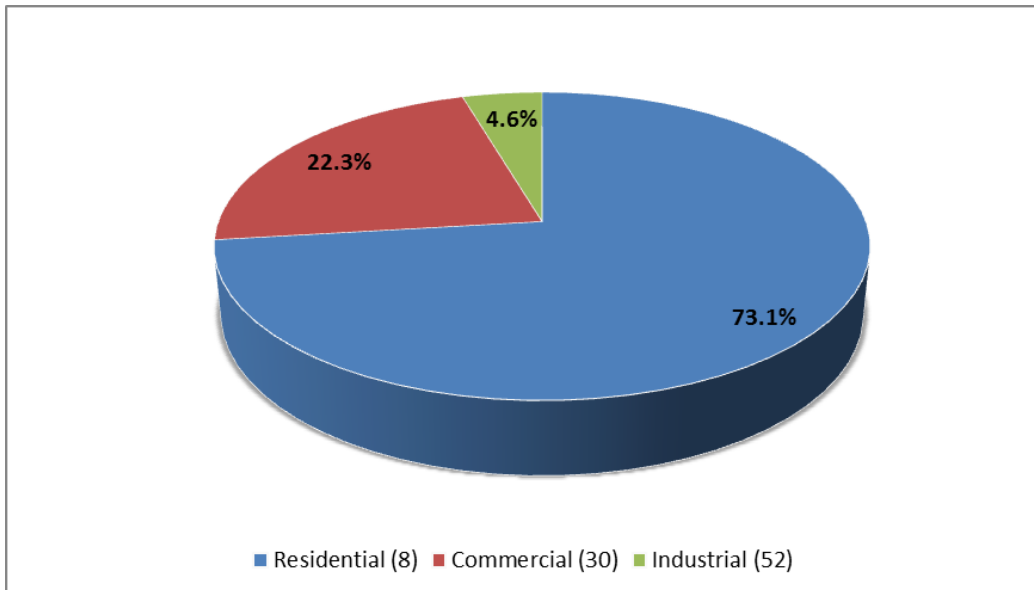
Table 7-1 presents the cumulative estimated energy efficiency achievable savings potential for the residential, commercial and industrial sectors under the UCT cost-effectiveness screen. As noted earlier, achievable potential decreases from the achievable base to the achievable high scenario. This occurs because under the UCT cost-effectiveness screen, the utility incurs a higher proportion of the measure’s incremental cost in the achievable high scenario (75% incentive) as compared to the achievable base scenario (30% incentive). This increase in the cost to the utility is causing more measures to fail the cost-effective screen, which is outweighing the increased adoption of the measures which do pass.

Figure 7-1 shows the same distribution of savings by sector for the achievable base scenario. Residential shows the largest potential at 73% of the total, with Commercial representing 22% and Industrial just under 5%.

Table 7-1: Cumulative Natural Gas Savings Potential by Achievable Scenario, by Sector (UCT) ²²

	2014	2016	2020	2025	2034
Achievable - Base Cumulative Savings (dth)					
Residential (8)	102,231	318,717	809,252	1,601,762	3,115,143
Commercial (30)	31,228	99,116	272,356	547,792	1,157,574
Industrial (52)	6,400	19,748	48,866	93,998	175,531
Achievable - Moderate Cumulative Savings (dth)					
Residential (4)	74,639	237,393	616,349	1,253,558	2,419,570
Commercial (26)	26,581	84,226	227,098	413,413	754,225
Industrial (48)	6,508	19,868	48,343	87,540	147,284
Achievable - Aggressive Cumulative Savings (dth)					
Residential (5)	98,949	313,235	801,824	1,596,849	2,992,451
Commercial (27)	35,136	110,840	294,314	521,315	915,961
Industrial (49)	8,671	26,461	64,305	116,170	194,724

Figure 7-1: 2014 Achievable Base Savings Potential by Sector under UCT Screen



²² The scenario number is listed in parenthesis for reference to **Table 2-6**

7.1 RESIDENTIAL ENERGY EFFICIENCY POTENTIAL FINDINGS

Sector specific findings for the residential sector are presented below. Similar to the portfolio section, detailed findings are presented first for the base-case technical, economic and achievable-base potential scenarios. It should be noted that all findings in the base-case scenario are run under the UCT cost effectiveness screen and the following main assumptions:

- Cost Effectiveness Screen: UCT
- Incentive Level: 30% (Achievable Base), then 50% and 75%
- Avoided Costs: Current
- Discount Rate: 8.55%²³

Summary findings are then presented for the alternate achievable-base potential scenarios given changes in cost-effectiveness screen, avoided cost and discount rate.

7.1.1 Base Case Technical/Economic/Achievable Savings Potential Findings

Table 7-2 and Figure 7-2 present the estimated cumulative technical, economic and achievable savings potential for the residential sector in Cascade’s Washington service territory under the Utility Cost Test (UCT). Cascade’s 2014 achievable-base savings potential is estimated at 102,231 dekatherms, reaching 3.1M dekatherms in 2034, representing 0.9% and 18.9% of current year sales respectively.

Table 7-2 Residential Cumulative Natural Gas Savings Potential by Base Case Scenario under the UCT

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	11,608,614	12,023,160	12,985,691	14,246,171	16,505,838
Cumulative Savings (dth)					
Technical Potential	463,954	1,483,179	3,607,978	6,460,296	10,928,515
Economic Potential	317,391	1,008,519	2,431,359	4,323,971	7,216,991
Achievable - Base	102,231	318,717	809,252	1,601,762	3,115,143
Achievable - Moderate	94,517	302,284	795,012	1,613,675	3,120,243
Achievable - High	94,522	297,154	749,820	1,479,572	2,735,363
Energy Savings (% of baseline sales)					
Technical Potential	4.00%	12.34%	27.78%	45.35%	66.21%
Economic Potential	2.73%	8.39%	18.72%	30.35%	43.72%
Achievable - Base	0.88%	2.65%	6.23%	11.24%	18.87%
Achievable - Moderate	0.81%	2.51%	6.12%	11.33%	18.90%
Achievable - High	0.81%	2.47%	5.77%	10.39%	16.57%

²³ While a 8.55% discount rate is used for all the base-case scenarios under the UCT, a 3.4% discount rate was used when screening residential measures under the TRC. Moreover, a scenario was also run to assess residential potential using a 4.17% discount rate.

Figure 7-2: Residential Energy Efficiency Potential Savings (% of Sales) by Base Case Scenario (UCT)

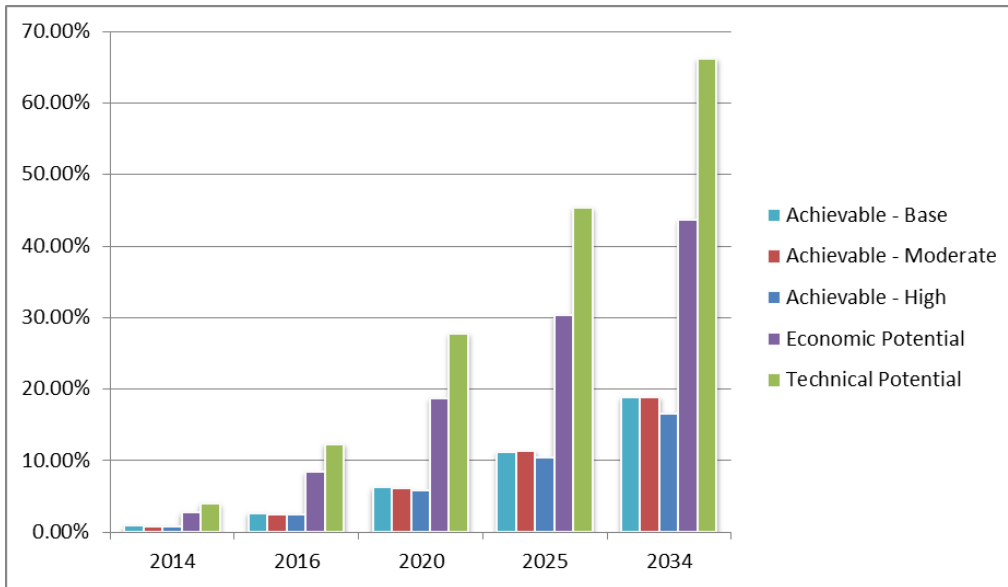


Figure 7-3 illustrates the technical savings potential in the residential sector along various points along the supply curve. These findings suggest that Cascade can obtain a large share of the total residential energy savings (81.5M therms) at a screened levelized cost of \$0.75 or less with diminishing savings returns thereafter. **Table 7-3** shows the achievable savings potential when screened at various levelized cost/therm under the UCT test. Given its current program funding threshold of \$0.42/levelized cost per therm, Cascade could potentially realize 73,677 dth of savings in 2014 were it to implement all cost-effective residential measures.

Figure 7-3: Residential Technical Potential Supply Curve under UCT

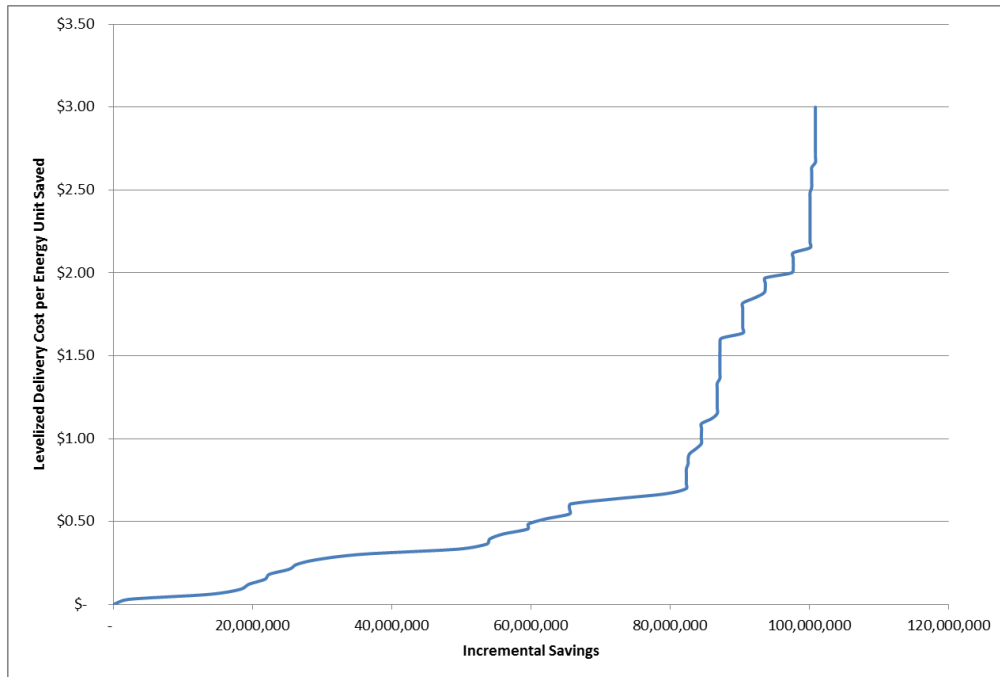


Table 7-3 2014 Residential Achievable Potential (dth) Screened by Levelized Cost (\$/therm) under UCT

	Screened at Levelized Cost of:						
	\$0.12	\$0.22	\$0.32	\$0.42	\$0.53	\$0.64	\$0.75
Space Heating	17,041	25,794	31,093	44,256	55,419	71,748	72,808
Room Heating	2	2	2	2	2	2	2
Water Heating	29,419	29,419	29,419	29,419	29,419	29,419	29,419
Clothes Drying	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	46,462	55,215	60,514	73,677	84,840	101,169	102,229

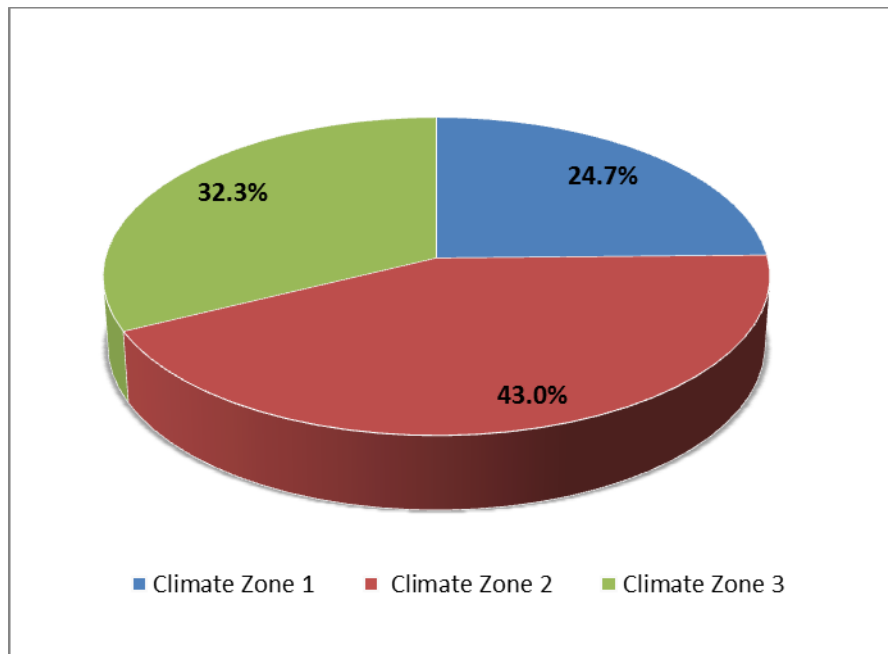
7.1.1.1 Residential Savings Potential by Climate Zone

Table 7-4 and **Figure 7-4** below summarize the cumulative residential savings potential by scenario and by segment. Climate Zone 2 demonstrates the most savings potential at 43% of the total (in line with total sales), followed by Climate Zone 3 (32%) then Climate Zone 1 (25%). These findings generally align with the baseline sales forecast in each climate zone (i.e. the more sales, the more savings potential); however, it can be seen that as a percentage of sales the most potential resides in climate zone 3 (0.93% of sales for the achievable base scenario).

Table 7-4: Residential 2014 Cumulative Natural Gas Savings by Climate Zone by Base Case Scenario (UCT)

	1	2	3	TOTAL
Baseline Sales Forecast (dth)	2,970,456	5,087,390	3,550,768	11,608,614
Cumulative Savings (dth)				
Technical Potential	114,926	202,507	146,522	463,954
Economic Potential	78,881	137,542	100,969	317,391
Achievable - Base	25,256	43,929	33,046	102,231
Achievable - Moderate	25,530	35,856	33,132	94,517
Achievable - High	23,775	40,128	30,619	94,522
Energy Savings (% of baseline sales)				
Technical Potential	3.87%	3.98%	4.13%	4.00%
Economic Potential	2.66%	2.70%	2.84%	2.73%
Achievable - Base	0.85%	0.86%	0.93%	0.88%
Achievable - Moderate	0.86%	0.70%	0.93%	0.81%
Achievable - High	0.80%	0.79%	0.86%	0.81%

Figure 7-4: Residential 2014 Achievable Base Savings Potential by Climate Zone (UCT)



7.1.1.2 Residential Savings Potential by Segment

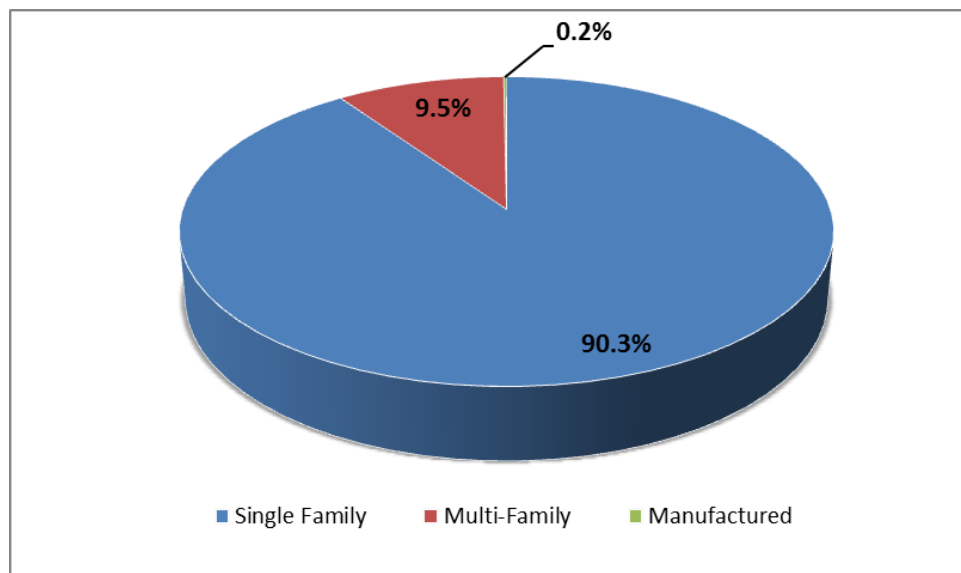
Table 7-5 and **Figure 7-5** below summarize the cumulative residential base-case savings potential by scenario and by segment. The single family segment shows the most potential for savings both on a total terms basis, and as a percentage of segment sales. As shown in

, manufactured homes represent the smallest share of savings, at 0.2% of the residential sector. Again, these savings percentage align largely with the baseline sales forecast in each segment, as shown earlier in **Table 4-2** (manufactured homes represent 0.1% of the energy consumption of the residential sector).

Table 7-5: Residential 2014 Base Case Savings Potential by Residential Segment by Scenario (UCT)

	Single Family	Multi-Family	Manufactured	TOTAL
Baseline Forecast (dth)	9,851,460	1,736,502	20,651	11,608,614
Energy Savings (dth)				
Technical Potential	417,130	46,052	772	463,954
Economic Potential	282,983	33,878	530	317,391
Achievable - Base	92,301	9,760	169	102,231
Achievable - Moderate	84,620	9,755	142	94,517
Achievable - High	84,890	9,513	118	94,522
Energy Savings as % of Baseline Sales				
Technical Potential	4.23%	2.65%	3.74%	4.00%
Economic Potential	2.87%	1.95%	2.57%	2.73%
Achievable - Base	0.94%	0.56%	0.82%	0.88%
Achievable - Moderate	0.86%	0.56%	0.69%	0.81%
Achievable - High	0.86%	0.55%	0.57%	0.81%

Figure 7-5: Residential 2014 Achievable Base Potential Savings by Segment (UCT)



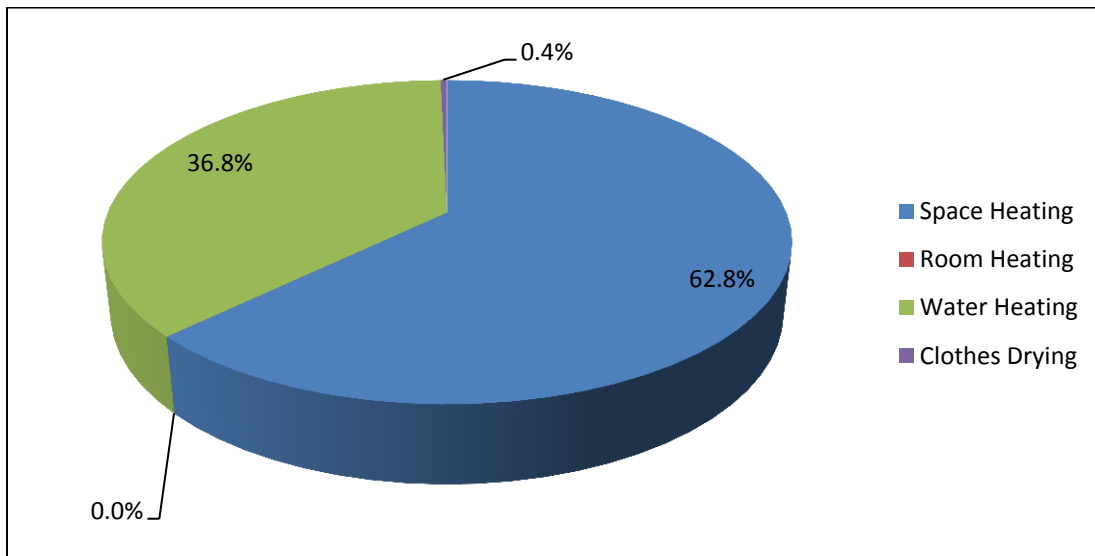
7.1.1.3 Residential Savings Potential by End Use

Table 7-6 summarizes the savings potential in the residential sector under the achievable-base scenario by segment and by end use, while **Figure 7-6** illustrates the 2014 achievable savings potential by residential end use. Space heating represents the largest share of saving potential across all segments at 62.8%, followed by water heating at 36.8%. Room heating and clothes drying make up the remainder.

Table 7-6: Residential 2014 Cumulative Achievable Base Savings by Segment, by End Use (UCT)

End Use	Single Family		Multi-Family		Manufactured		TOTAL
	Dekatherms	% of Total	Dekatherms	% of Total	Dekatherms	% of Total	
Space Heating	228,139	62.8%	26,924	61.9%	409	61.1%	255,472
Room Heating	50	0.01%	14	0.03%	0	0.01%	64
Water Heating	133,727	36.8%	16,398	37.7%	259	38.6%	150,384
Clothes Drying	1,266	0.35%	178	0.41%	1	0.22%	1,445
% of Sales		3.7%		2.5%		3.2%	3.5%

Figure 7-6: Residential 2014 Achievable Base Potential Savings by End Use (UCT)



7.1.2 Alternate Achievable Savings Potential Findings

As described in **Section 6.2 Alternate Achievable Base Potential Findings**, Nexant complied with the Washington Utilities and Transportation Commission’s October 9, 2013 Policy Statement addressing cost-effectiveness by examining savings potential under both the TRC and UCT screen. **Table 7-7** below

illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. There is more achievable potential under the UCT test due to its more favorable cost-effectiveness screening methodology with achievable base savings of 102,231 dekatherms in 2014 (compared to 58,075 dekatherms under the TRC). As noted earlier, achievable potential decreases from the achievable base to the achievable high scenario because under the UCT test, fewer measures are passing the achievable high cost effectiveness screen (utility pays a 75% incentive) than compared with the achievable base scenario (utility pays 30% incentive). This increase in the cost to the utility is causing more measures to fail the cost-effective screen, which is outweighing the increased adoption of the measures which do pass. For the Economic and Achievable Base scenarios UCT savings are higher than TRC savings by about 40%. UCT is also higher than TRC in the Achievable Moderate scenario by about 20%, whereas in the Achievable High scenario TRC savings are greater than UCT by about 5%.

Table 7-7: Residential Savings Potential by Base-Case Scenario, by Cost-Effectiveness Screen

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential	463,954	1,483,179	3,607,978	6,460,296	10,928,515
Economic Potential	317,391	1,008,519	2,431,359	4,323,971	7,216,991
Achievable - Base	102,231	318,717	809,252	1,601,762	3,115,143
Achievable - Moderate	94,517	302,284	795,012	1,613,675	3,120,243
Achievable - High	94,522	297,154	749,820	1,479,572	2,735,363
Cumulative Savings (dth) based on TRC Screen					
Technical Potential	463,954	1,483,179	3,607,978	6,460,296	10,928,515
Economic Potential	192,917	622,511	1,498,814	2,686,147	4,412,650
Achievable - Base	58,075	181,825	461,307	934,496	1,824,239
Achievable - Moderate	74,639	237,393	616,349	1,253,558	2,419,570
Achievable - High	98,949	313,235	801,824	1,596,849	2,992,451

The next scenarios illustrate the sensitivity of total savings potential given uncertainty in the forecasted cost of natural gas (thus the avoided costs) for Cascade. **Table 7-8** compares 2014 savings results of the UCT test vs. the TRC under various avoided cost scenarios. UCT savings are greatest by roughly 40% over TRC under the following scenarios: Current Avoided Costs, Avoided Costs +25%, and Avoided Costs -25%. However, the savings potential under the UCT is only 4% greater than the TRC when Avoided Costs are increased by +100%.

Table 7-8: Residential 2014 Achievable Base Potential by Cost Effectiveness Test, by Avoided Cost Scenario

Scenario (30% Incentive)	Cumulative 2-yr Savings by UCT Screen (dth)	Cumulative 2-yr Savings by TRC Screen (dth)	Difference in Therms (UCT-TRC)
Current Avoided Costs (8, 3)	102,231	58,075	44,156
Avoided Costs +25% (16, 11)	105,136	63,345	41,790
Avoided Costs +50% (17, 12)	105,137	84,542	20,595
Avoided Costs +100% (18, 13)	105,446	101,683	3,763
Avoided Costs -25% (19, 14)	93,769	54,914	38,855
Avoided Costs -50% (20, 15)	59,157	48,260	10,897

Table 7-9 summarizes the differences in achievable base savings potential given variations in the corporate discount rate used by Cascade under the UCT and TRC screen respectively. Nexant used Cascade’s weighted average cost of capital of 8.55% to screen residential measures as the base-case assumption under the UCT screen, and 3.4% under the TRC screen. An alternate discount rate of 4.17% was used to assess impact on savings potential for both cost-effectiveness screens. Using a 4.17% discount rate increases 2014 potential by 3% under the UCT, while it reduces potential by 1.7% under the TRC.

Table 7-9: Residential Achievable Base Savings Potential by Discount Rate under UCT and TRC Screen (dth)

Scenario	2014	2016	2020	2025	2034
UCT Screen					
Base Case Discount Rate of 8.55% (8)	102,231	318,717	809,252	1,601,762	3,115,143
Discount Rate of 4.17% (22)	105,301	328,232	833,403	1,648,602	3,212,676
TRC Screen					
Base Case Discount Rate of 3.4% (3)	58,075	181,825	461,307	934,496	1,824,239
Discount Rate of 4.17% (21)	57,088	177,597	442,776	878,733	1,669,872

7.1.3 Residential Achievable Potential Benefits & Costs

Table 7-10 and **Table 7-11** summarize benefit-cost ratios associated with the achievable potential scenarios given variations in avoided costs screened under the UCT and TRC respectively. The residential sector UCT ratio ranges from 2.01 to 4.35 depending on the avoided costs, while the TRC benefits range from \$1,612,661 to \$15,815,917, with costs ranging from \$758,517 to \$7,376,411. The TRC ratio ranges from 1.92 to 2.81 depending on avoided cost. Again, the UCT screen considers less costs (especially under lower incentive rates as is the case with the base case scenario assumption of 30% incentive rates), and thus has a more favorable benefit cost ration when compared to the TRC test (which considers the full incremental cost of each measure).

Table 7-10: Residential 2014 UCT Ratios for Achievable Potential by Avoided Cost Scenario

Scenario	UCT Benefits	UCT Costs	UCT Ratio
Base Avoided Costs (8)	\$ 5,208,577	\$ 2,219,358	2.35
Avoided Costs +25% (16)	\$ 6,730,392	\$ 2,457,045	2.74
Avoided Costs +50% (17)	\$ 8,076,595	\$ 2,457,161	3.29
Avoided Costs +100% (18)	\$ 10,798,665	\$ 2,483,598	4.35
Avoided Costs -25% (19)	\$ 3,484,687	\$ 1,733,075	2.01
Avoided Costs -50% (20)	\$ 1,411,965	\$ 469,090	3.01

Table 7-11: Residential 2014 TRC Ratios for Achievable Potential by Avoided Cost Scenario

Scenario	TRC Benefits	TRC Costs	TRC Ratio
Base Avoided Costs (3)	\$ 4,136,066	\$ 1,470,327	2.81
Avoided Costs +25% (11)	\$ 5,886,079	\$ 2,204,442	2.67
Avoided Costs +50% (12)	\$ 9,984,223	\$ 5,195,834	1.92
Avoided Costs +100% (13)	\$ 15,815,917	\$ 7,376,411	2.14
Avoided Costs -25% (14)	\$ 2,846,545	\$ 1,148,480	2.48
Avoided Costs -50% (15)	\$ 1,612,661	\$ 758,517	2.13

Finally, **Table 7-12** summarizes the total acquisition costs (\$/therm saved) to achieve the residential savings associated with each achievable scenario under the UCT and TRC cost tests, respectively. Acquisition cost per therm saved range from \$1.30 to \$2.17 under the UCT and \$2.06 to \$2.62 under the TRC.

Table 7-12: Residential 2014 Acquisition Costs for Achievable Potential Scenarios (UCT and TRC)

Scenario	UCT Costs	Savings (therms)	Acquisition Cost
Achievable Base	\$ 2,219,358	1,022,309	\$ 2.17
Achievable Moderate	\$ 1,809,078	945,173	\$ 1.91
Achievable Aggressive	\$ 1,231,523	945,219	\$ 1.30
Scenario	TRC Costs	Savings (therms)	Acquisition Cost
Achievable Base	\$ 1,470,327	580,753	\$ 2.53
Achievable Moderate	\$ 1,959,148	746,388	\$ 2.62
Achievable Aggressive	\$ 2,037,064	989,486	\$ 2.06

7.2 COMMERCIAL ENERGY EFFICIENCY POTENTIAL

Sector specific findings for the commercial sector are provided below. Similar to the portfolio and residential section, findings are presented first for the base-case technical, economic and achievable

potential; and then for the alternate achievable potential scenarios given changes in cost-effectiveness screen, avoided cost and discount rate.

7.2.1 Base Case Technical/Economic/Achievable Savings Potential Findings

Table 7-13 and **Figure 7-7** present the estimated technical, economic and achievable savings potential for the commercial sector in Cascade’s Washington service territory under the Utility Cost Test. 2014 savings potential in the commercial sector under the achievable base scenario is 31,229 dth, representing 0.39% of current year sales. Under a higher incentive rate of 75%, the 2014 savings potential in the commercial sector under the achievable high scenario increases to 37,461 dth, representing 0.47% of sales.

Table 7-13: Commercial Energy Efficiency Potential by Scenario under UCT Screen (dth)

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	7,919,090	8,175,358	8,757,191	9,525,092	10,792,100
Cumulative Savings (dth)					
Technical Potential (28)	245,635	749,691	1,811,603	1,811,603	4,919,046
Economic Potential (29)	138,153	422,290	1,023,921	1,023,921	2,774,773
Achievable - Base (30)	31,228	99,116	272,356	272,356	1,157,574
Achievable - Moderate (31)	35,705	115,110	324,650	324,650	1,332,303
Achievable - High (32)	37,461	120,085	332,083	332,083	1,214,167
Energy Savings (% of baseline sales)					
Technical Potential	3.10%	9.17%	20.69%	19.02%	45.58%
Economic Potential	1.74%	5.17%	11.69%	10.75%	25.71%
Achievable - Base	0.39%	1.21%	3.11%	2.86%	10.73%
Achievable - Moderate	0.45%	1.41%	3.71%	3.41%	12.35%
Achievable - High	0.47%	1.47%	3.79%	3.49%	11.25%

Figure 7-7: Commercial Energy Efficiency Potential by Scenario under Utility Cost Test

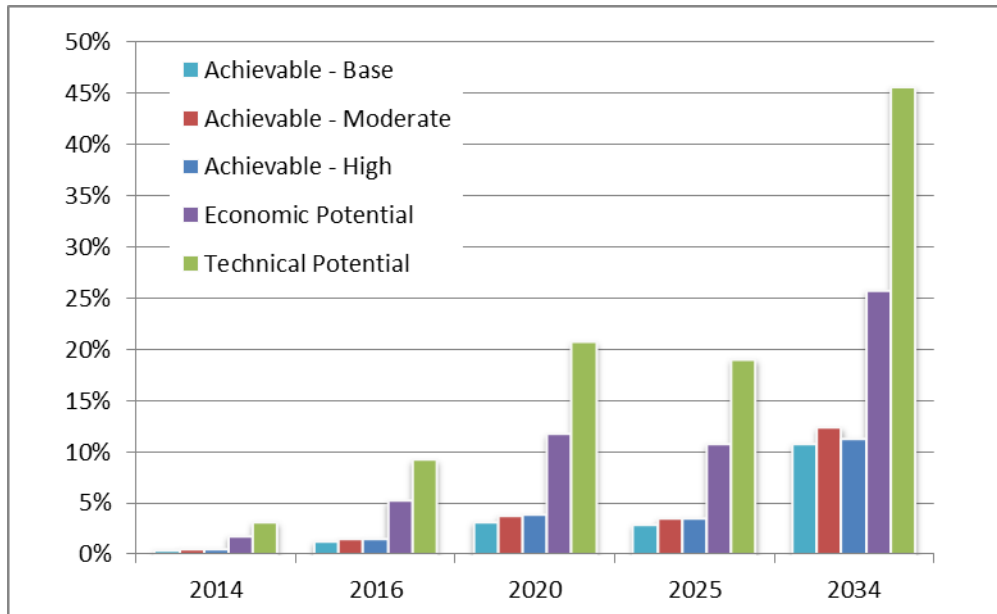


Figure 7-8 illustrates the 2014 technical savings potential supply curve. These findings suggest that Cascade can obtain a large share of the total commercial energy savings (29,131 dth) at a screened levelized cost of \$0.65/therm or less with diminishing savings returns thereafter. **Table 7-14** shows the achievable base savings when screened at various levelized cost/therm under the UCT test. Given its current program threshold of \$0.42/levelized cost per therm, it's possible to achieve 27,201 dth in the commercial sector assuming all cost effective measures are pursued.

Figure 7-8: Commercial Technical Potential Supply Curve under UCT

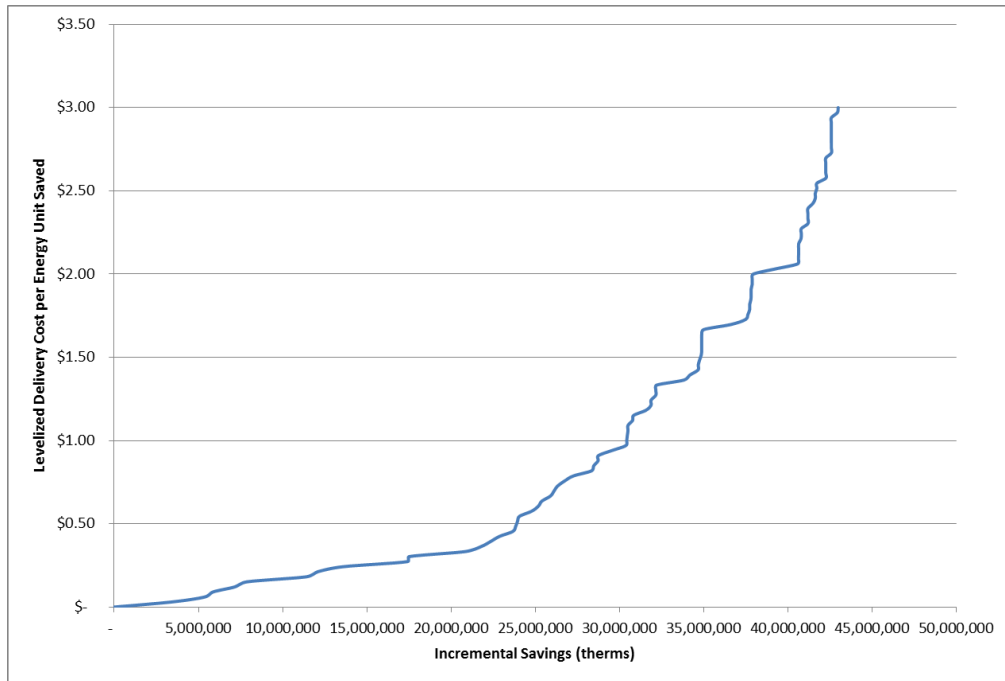


Table 7-14: Commercial 2014 Achievable Potential (dth) Screened by Levelized Cost (\$/therm) under UCT

	Screened at Levelized Cost of:						
	\$0.15	\$0.25	\$0.35	\$0.42	\$0.55	\$0.65	\$0.85
Space Heating	1,534	6,998	8,520	10,758	11,955	12,807	14,133
Water Heating	12,101	13,512	13,736	14,678	14,924	15,339	16,058
Cooking	234	250	254	254	274	274	274
Other	-	515	515	711	711	711	763
TOTAL	13,870	21,274	23,024	27,201	27,864	29,131	31,228

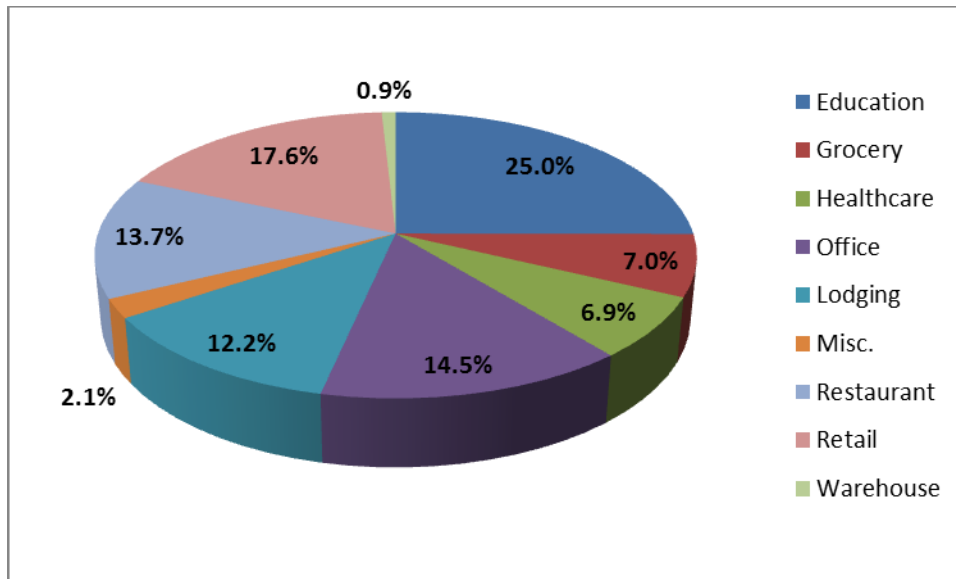
7.2.1.1 Commercial Savings Potential by Segment

Table 7-15 below summarizes the cumulative Commercial savings potential by scenario and by segment. Achievable base savings is fairly evenly distributed among the various segments with the most residing in education (25%) and the least in warehouses (0.9%). Again, these savings potential align closely with baseline sales. However, when viewed as a percentage of sales basis, the lodging segment has the highest savings potential at 1.25% of segment sales.

Table 7-15: 2014 Commercial Savings Potential by Scenario, by Segment (UCT)

	Education	Grocery	Healthcare	Office	Lodging	Misc.	Restaurant	Retail	Warehouse	TOTAL
Baseline Forecast (dth)	1,198,852	594,346	314,392	2,343,195	305,770	388,657	654,378	1,915,295	204,206	7,919,090
Energy Savings (dth)										
Technical Potential (28)	38,857	17,366	12,191	62,451	14,259	9,016	29,912	56,554	5,028	245,635
Economic Potential (29)	29,819	10,144	7,777	24,012	12,819	4,105	19,733	27,480	2,265	138,153
Achievable - Base (30)	7,822	2,182	2,169	4,517	3,810	670	4,280	5,509	270	31,228
Achievable - Moderate (31)	8,088	2,102	2,194	5,574	4,870	812	5,245	6,490	331	35,705
Achievable - High (32)	8,830	2,197	2,623	5,209	6,162	307	6,254	5,591	288	37,461
Energy Savings as % of Baseline Sales										
Technical Potential	3.24%	2.92%	3.88%	2.67%	4.66%	2.32%	4.57%	2.95%	2.46%	3.10%
Economic Potential	2.49%	1.71%	2.47%	1.02%	4.19%	1.06%	3.02%	1.43%	1.11%	1.74%
Achievable - Base	0.65%	0.37%	0.69%	0.19%	1.25%	0.17%	0.65%	0.29%	0.13%	0.39%
Achievable - Moderate	0.67%	0.35%	0.70%	0.24%	1.59%	0.21%	0.80%	0.34%	0.16%	0.45%
Achievable - High	0.74%	0.37%	0.83%	0.22%	2.02%	0.08%	0.96%	0.29%	0.14%	0.47%

Figure 7-9: 2014 Achievable Base Savings Potential by Commercial Segment (UCT)



7.2.1.2 Commercial Savings Potential by End Use

Figure 7-10 illustrates the savings potential in the commercial sector under the achievable-base scenario by segment and by end use. Table 7-16 shows the 2014 achievable savings potential by commercial end use. The majority of savings reside in space heating (51%) and water heating (45%) across all segments. However, some segments such as restaurants see a higher share of savings potential in the cooking end use (4.3%).

Figure 7-10: Commercial 2014 Achievable Base Savings Potential by Commercial End Use (UCT)

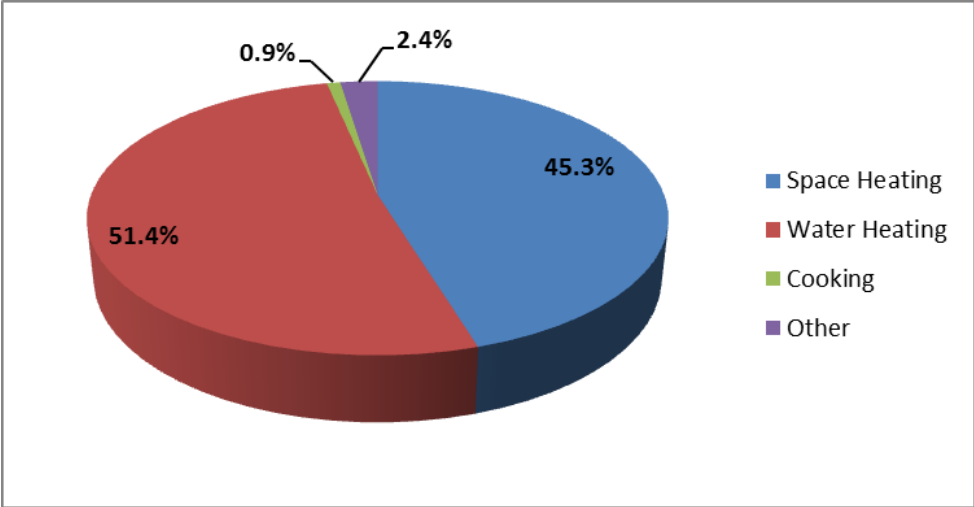


Table 7-16: Commercial 2014 Cumulative Achievable Base Savings by Commercial Segment, by End Use (dekatherms and % of Total)

End Use	Education		Grocery		Healthcare		Office		Lodging		Misc.		Restaurant		Retail		Warehouse		TOTAL
	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	
Space Heating	1,333	17.0%	1,660	76.1%	335	15.5%	3,705	82.0%	191	5.0%	606	90.5%	957	22.4%	5,116	92.9%	231	85.5%	14,133
Water Heating	5,760	73.6%	455	20.9%	1,829	84.3%	813	18.0%	3,567	93.6%	64	9.5%	3,139	73.3%	393	7.1%	39	14.5%	16,058
Cooking	19	0.2%	67	3.1%	4	0.2%	-	0.0%	-	0.0%	-	0.0%	184	4.3%	-	0.0%	-	0.0%	274
Other	711	9.1%	-	0.0%	-	0.0%	-	0.0%	52	1.4%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	763
% of Sales	0.6%		0.4%		0.7%		0.2%		1.2%		0.2%		0.6%		0.3%		0.1%		0.4%

7.2.2 Alternate Achievable Savings Potential Findings

As described in **Section 6.2**, Nexant examined savings potential under both the TRC and UCT screen to comply with WUTC’s October 9, 2013 Policy Statement regarding cost screening. **Table 7-17** below illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. Similar to the residential sector, significantly more savings potential is realized under the UCT screen with 31,228 dth in 2014 compared to 20,408 dth under the TRC screen.

Table 7-17: Commercial Savings Potential by Scenario, by Cost-Effectiveness Screen (dth)

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential (28)	245,635	749,691	1,811,603	1,811,603	4,919,046
Economic Potential (29)	138,153	422,290	1,023,921	1,023,921	2,774,773
Achievable - Base (30)	31,228	99,116	272,356	272,356	1,157,574
Achievable - Moderate (31)	35,705	115,110	324,650	324,650	1,332,303
Achievable - High (32)	37,461	120,085	332,083	332,083	1,214,167
Cumulative Savings (dth) based on TRC Screen					
Technical Potential (23)	245,635	749,691	1,811,603	3,036,629	4,919,046
Economic Potential (24)	74,703	227,948	552,393	881,742	1,300,918
Achievable - Base (25)	20,408	63,925	169,113	306,647	571,900
Achievable - Moderate (26)	26,581	84,226	227,098	413,413	754,225
Achievable - High (27)	35,136	110,840	294,314	521,315	915,961

Nexant also assessed differences in 2014 achievable base savings potential given variations in avoided costs under both the UCT and TRC test (**Table 7-18**). These scenarios illustrate the sensitivity of total savings potential given uncertainty in the forecasted cost of natural gas (thus the avoided costs) for Cascade.

Table 7-18: Commercial 2014 Achievable Base Potential by Cost Effectiveness Test, by Avoided Cost Scenario

Scenario (UCT #/ TRC #)	2014 Savings by UCT Screen (dth)	2014 Savings by TRC Screen (dth)	Difference in dth (UCT-TRC)
Current Avoided Costs/30% (30/25)	31,228	20,408	10,820
Avoided Costs +25% (38/33)	35,868	21,355	14,513
Avoided Costs +50% (39/34)	39,503	22,993	16,510
Avoided Costs +75% (40/35)	40,410	25,843	14,567
Avoided Costs -25% (41/36)	28,308	14,279	14,030
Avoided Costs -50% (42/37)	24,870	11,789	13,081

Table 7-19 summarizes the differences in achievable base savings potential given variations in the corporate discount rate used by Cascade under the UCT and TRC screen respectively. Per the recommendations provided by the Washington Utilities and Transportation Commission in the October 9, 2013 Policy Statement, Nexant used Cascade’s weighted average cost of capital of 8.55% to screen measures as the base-case assumption for all scenarios. An alternate discount rate of 4.17% was used to assess impact on savings potential. Potential increases by approximately 16% and 11% when going from the 8.55% to 4.17% discount rate under the UCT and TRC screen, respectively.

Table 7-19: Commercial Achievable Base Savings Potential by Discount Rate (UCT and TRC)

Scenario	2014	2016	2020	2025	2034
UCT Screen					
Base Case Discount Rate of 8.55% (30)	31,228	99,116	272,356	547,792	1,157,574
Discount Rate of 4.17% (44)	36,139	114,173	309,589	309,589	1,282,239
TRC Screen					
Base Case Discount Rate of 8.55% (25)	20,408	63,925	169,113	306,647	571,900
Discount Rate of 4.17% (43)	22,578	71,513	195,457	380,152	777,474

7.2.3 Commercial Achievable Potential Benefits & Costs

Table 7-20 and **Table 7-21** summarize the associated cost-benefit ratios associated with the achievable potential scenarios given variations in avoided costs screened under the UCT and TRC respectively.

Table 7-20: Commercial 2014 UCT Achievable Potential Ratios by Avoided Cost Scenario

Scenario	UCT Benefits	UCT Costs	UCT Ratio
Base Avoided Costs (30)	\$ 1,337,436	\$ 533,881	2.5
Avoided Costs +25% (38)	\$ 1,968,539	\$ 837,284	2.4
Avoided Costs +50% (39)	\$ 2,635,439	\$ 1,119,598	2.4
Avoided Costs +75% (40)	\$ 3,169,520	\$ 1,217,843	2.6
Avoided Costs -25% (41)	\$ 876,628	\$ 363,912	2.4
Avoided Costs -50% (42)	\$ 489,934	\$ 239,557	2.0

Table 7-21: Commercial 2014 TRC Achievable Potential Ratios by Avoided Cost Scenario

Scenario	TRC Benefits	TRC Costs	TRC Ratio
Base Avoided Costs (25)	\$ 722,400	\$ 392,424	1.8
Avoided Costs +25% (33)	\$ 966,385	\$ 455,139	2.1
Avoided Costs +50% (34)	\$ 1,304,296	\$ 607,203	2.1
Avoided Costs +75% (35)	\$ 1,802,684	\$ 892,712	2.0
Avoided Costs -25% (36)	\$ 352,790	\$ 144,440	2.4
Avoided Costs -50% (37)	\$ 176,746	\$ 61,968	2.9

Finally, **Table 7-22** and **Table 7-23** summarize the total costs projected to be paid by Cascade to achieve the savings associated with the achievable base, moderate, and aggressive scenarios for 2014 and the associated savings under the UCT and TRC costs tests, respectively. The acquisition costs (\$/therm-saved) under each scenario are also presented. The acquisition costs under the UCT range from \$1.37 to \$1.93/therm-saved. While the acquisition costs are slightly higher under the TRC screen, ranging from \$1.52 to \$1.95/therm-saved.

Table 7-22: Commercial 2014 Acquisition Costs for Achievable Potential Scenarios (UCT)

Scenario	UCT Costs	Savings (therms)	Acquisition Cost (\$/therm)
Achievable Base (30)	\$ 533,880.91	312,284	\$ 1.71
Achievable Moderate (31)	\$ 690,255.13	357,052	\$ 1.93
Achievable Aggressive (32)	\$ 513,840.96	374,614	\$ 1.37

Table 7-23: Commercial 2014 Acquisition Costs for Achievable Potential Scenarios (TRC)

Scenario	TRC Costs	Savings (therms)	Acquisition Cost (\$/therm)
Achievable Base (25)	\$ 392,424.31	204,080	\$ 1.92
Achievable Moderate (26)	\$ 517,628.38	265,814	\$ 1.95
Achievable Aggressive (27)	\$ 535,150.01	351,358	\$ 1.52

7.3 INDUSTRIAL ENERGY EFFICIENCY POTENTIAL

Sector specific findings for the industrial sector are provided below. Similar to the portfolio section, findings are presented first for the base-case technical, economic and achievable potential; and then for the alternate achievable potential scenarios given changes in cost-effectiveness screen, avoided cost and discount rate.

7.3.1 Base Case Technical/Economic/Achievable Savings Potential Findings

Table 7-24, and **Figure 7-11** present the estimated technical, economic and achievable savings potential for the industrial sector in Cascade’s Washington’s service territory under the Utility Cost Test. Cumulative savings by the year 2034 are projected at 20% of baseline sales for Technical Potential, and this savings potential reduces to 4.8% over the 20 year study horizon for the Achievable Base scenario. As is the case with each sector, the Achievable scenario’s projected savings are not necessarily linear with the ‘base’, ‘moderate’, and ‘high’ designations.

Table 7-24: Industrial Energy Efficiency Potential Savings by Base Case Scenario (UCT)

	2014	2016	2020	2025	2034
Baseline Sales Forecast (dth)	2,663,312	2,749,499	2,945,178	3,203,435	3,629,550
Cumulative Savings (dth)					
Technical Potential	34,565	104,656	248,293	434,112	737,634
Economic Potential	21,097	63,985	151,686	268,511	442,629
Achievable - Base	6,400	19,748	48,866	93,998	175,531
Achievable - Moderate	7,621	23,704	61,087	120,160	225,057
Achievable - High	9,616	29,337	71,234	128,528	211,241
Energy Savings (% of baseline sales)					
Technical Potential	1.30%	3.81%	8.43%	13.55%	20.32%
Economic Potential	0.79%	2.33%	5.15%	8.38%	12.20%
Achievable - Base	0.24%	0.72%	1.66%	2.93%	4.84%
Achievable - Moderate	0.29%	0.86%	2.07%	3.75%	6.20%
Achievable - High	0.36%	1.07%	2.42%	4.01%	5.82%

Figure 7-11: Industrial Energy Efficiency Potential Savings (% Sales) by Base Case Scenario (UCT)

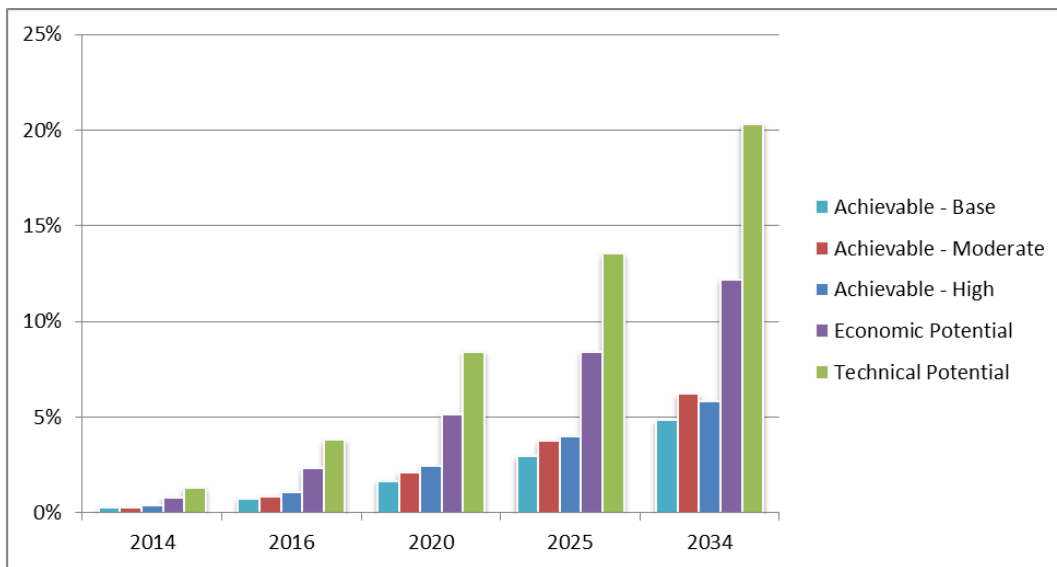


Figure 7-12 illustrates the achievable savings potential along various points of the industrial technical potential supply curve. These findings suggest that Cascade can obtain a large share of the total industrial energy savings (170,554 dekatherms) at a screened levelized cost of \$0.42/therm or less with diminishing savings returns thereafter. **Table 7-25** shows the achievable base savings potential when screened at various levelized cost/therm under the UCT test. When screened at Cascade’s current levelized cost threshold of \$0.42/therm, it’s possible to achieve up to 170,554 dth in the industrial market assuming all cost-effective measures are pursued.

Figure 7-12: Industrial Technical Potential Supply Curve under UCT

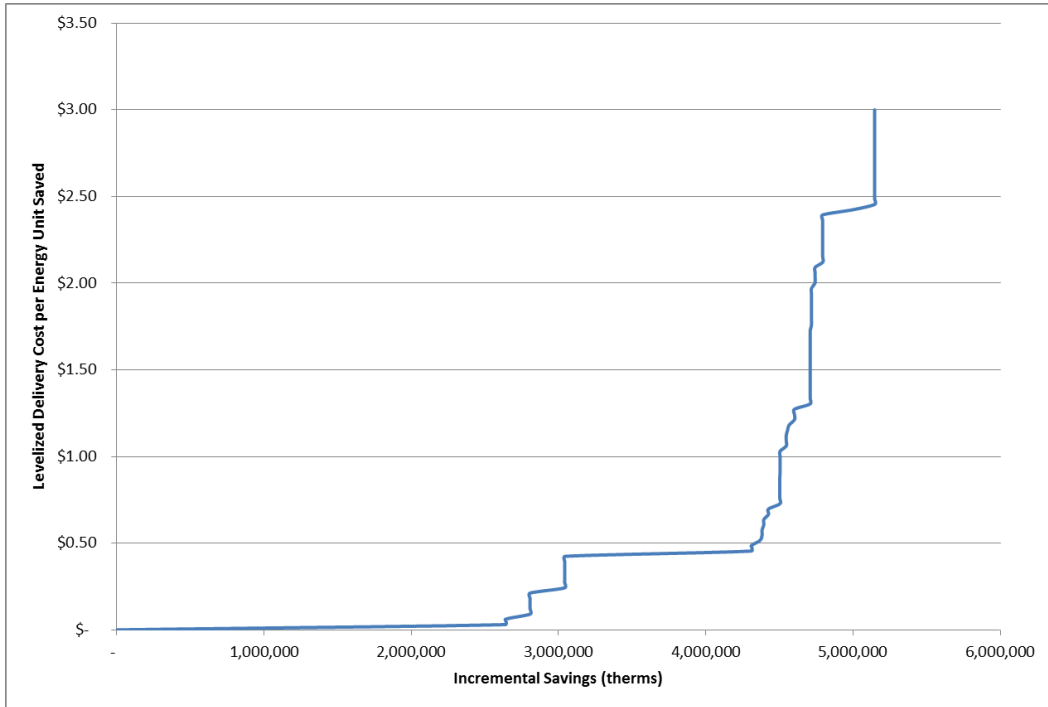


Table 7-25: Industrial 2014 Achievable Potential (dth) Screened by Levelized Cost (\$/therm) under UCT

	Screened at Levelized Cost of:						
	\$0.15	\$0.25	\$0.35	\$0.42	\$0.55	\$0.65	\$0.85
Process Heating	110,782	110,782	110,782	150,842	150,842	150,842	150,842
Space Heating	5,939	15,796	15,849	19,712	22,846	24,689	24,689
Water Heating	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	116,721	126,578	126,631	170,554	173,688	175,531	175,531

7.3.1.1 Industrial Savings Potential by Segment

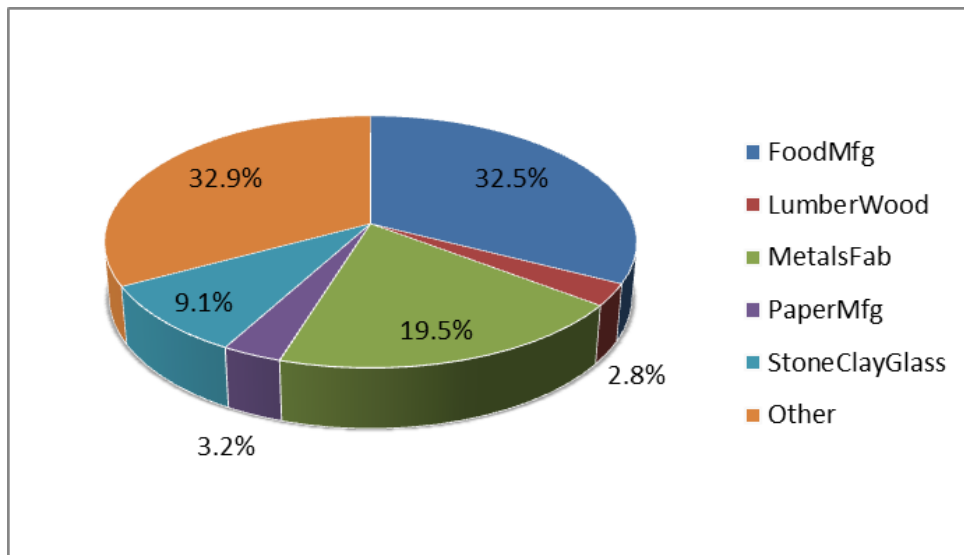
Table 7-26 and Figure 7-13 below summarize the cumulative industrial savings potential by scenario and by segment. As a percent of baseline sales, the Achievable Base potential scenario represents 0.24% of baseline sales. By segment under the achievable base savings scenario, Food Manufacturing and the “Other” category²⁴ are projected to make up roughly 33% each of total potential savings, while Metals Fabrication makes up the third largest potential savings at 19.5% of the total potential.

²⁴ The “Other” industrial segment includes various industries including textiles, petroleum and allied products, printing, chemicals and allied products, leather manufacturing, electronic manufacturing, forestry, among other many other industrial industry types.

Table 7-26: 2014 Base Case Savings Potential by Scenario by Industrial Segment

	FoodMfg	LumberWood	MetalsFab	PaperMfg	StoneClayGlass	Other	TOTAL
Baseline Forecast (dth)	752,456	91,080	511,912	69,538	278,145	960,181	2,663,312
Energy Savings (dth)							
Technical Potential	10,838	1,126	6,635	989	3,265	11,712	34,565
Economic Potential	6,694	639	4,084	638	1,976	7,066	21,097
Achievable - Base	2,082	181	1,245	204	583	2,104	6,400
Achievable - Moderate	2,424	208	1,494	245	717	2,533	7,621
Achievable - High	3,078	259	1,886	312	899	3,182	9,616
Energy Savings as % of Baseline Sales							
Technical Potential	1.44%	1.24%	1.30%	1.42%	1.17%	1.22%	1.30%
Economic Potential	0.89%	0.70%	0.80%	0.92%	0.71%	0.74%	0.79%
Achievable - Base	0.28%	0.20%	0.24%	0.29%	0.21%	0.22%	0.24%
Achievable - Moderate	0.32%	0.23%	0.29%	0.35%	0.26%	0.26%	0.29%
Achievable - High	0.41%	0.28%	0.37%	0.45%	0.32%	0.33%	0.36%

Figure 7-13: 2014 Achievable Base Savings Potential by Industrial Segment (UCT)



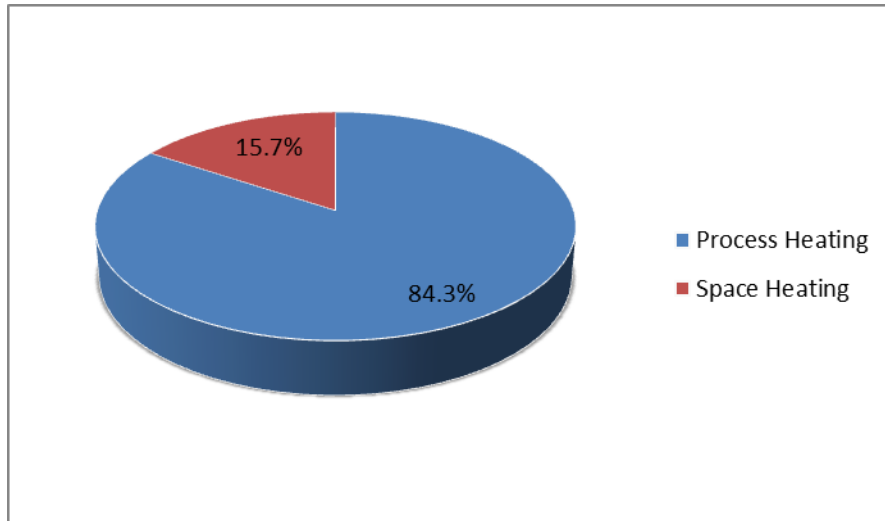
7.3.1.2 Industrial Savings Potential by End Use

Table 7-27 summarizes the savings potential in the industrial sector under the achievable-base scenario by segment and by end use. Process Heating End Use represents the majority of the savings opportunity in all industrial segments. No water heating or “other” end use measures passed cost-effectiveness, and therefore have no achievable potential in the industrial sector. **Figure 7-14** shows the 2014 achievable savings potential by industrial end use with process heat representing 84.3% of savings potential across all segments.

Table 7-27: 2014 Achievable Base Savings by Industrial Segment, by End Use (UCT)

End Use	FoodMfg		LumberWood		MetalsFab		PaperMfg		StoneClayGlass		Other		TOTAL
	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	dth	% of Total	
Process Heating	1,642	78.9%	1,061	85.3%	527	90.3%	176	86.0%	527	90.3%	1,800	85.5%	5,732
Space Heating	440	21.1%	183	14.7%	57	9.7%	29	14.0%	57	9.7%	304	14.5%	1,070
Water Heating	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-
Other	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-	0.0%	-
% of Sales	0.27%		1.35%		0.11%		0.29%		0.21%		0.22%		0.25%

Figure 7-14: Achievable Base Savings Potential by Industrial End Use (UCT)



7.3.2 Alternate Achievable Savings Potential Findings

As described in **Section 6.2**, Nexant examined savings potential under both the TRC and UCT screen to comply with WUTC’s October 9, 2013 Policy Statement regarding cost screening. **Table 7-28** below illustrates the differences in cumulative savings potential based on whether the UCT or TRC test is used to screen measure cost effectiveness. As with the other sectors, UCT potential is consistently larger than TRC potential by amounts varying from 8%-37% higher, with 21 year UCT savings ranging from 175,531 dth under the Achievable Base scenario, to 225,057 dth under the Achievable moderate scenario. 21-year TRC savings range from 116,722 dth under the Achievable Base scenario, to 147,284 dth under the Achievable moderate scenario.

Table 7-28: Industrial Savings Potential by Scenario, by Cost-Effectiveness Screen

	2014	2016	2020	2025	2034
Cumulative Savings (dth) based on UCT Screen					
Technical Potential (50)	34,565	104,656	248,293	434,112	737,634
Economic Potential (51)	21,097	63,985	151,686	268,511	442,629
Achievable - Base (52)	6,400	19,748	48,866	93,998	175,531
Achievable - Moderate (53)	7,621	23,704	61,087	120,160	225,057
Achievable - High (54)	9,616	29,337	71,234	128,528	211,241
Cumulative Savings (dth) based on TRC Screen					
Technical Potential (45)	34,565	104,656	248,293	434,112	737,634
Economic Potential (46)	13,042	39,667	95,583	170,485	280,638
Achievable - Base (47)	5,191	15,830	38,418	69,433	116,722
Achievable - Moderate (48)	6,508	19,868	48,343	87,540	147,284
Achievable - High (49)	8,671	26,461	64,305	116,170	194,724

Nexant also assessed differences in 2014 savings potential given variations in avoided costs under both the UCT and TRC test (**Table 7-29**). These scenarios illustrate the sensitivity of total savings potential given uncertainty in the forecasted cost of natural gas (thus the avoided costs) for Cascade. While savings potential increases when avoided costs are increased (given increases in the price of natural gas), the increase is smaller under the UCT when compared to the TRC scenarios.

Table 7-29: Industrial 2014 Achievable Base Potential by Cost Effectiveness Test, by Avoided Cost

Scenario (UCT #/ TRC #)	2014 Savings by UCT Screen (dth)	2014 Savings by TRC Screen (dth)	Difference in Therms (UCT-TRC)
Current Avoided Costs/30% (52/47)	6,400	5,191	1,209
Avoided Costs +25% (60/55)	6,668	5,758	911
Avoided Costs +50% (61/56)	6,775	5,758	1,017
Avoided Costs +75% (62/57)	6,840	5,762	1,079
Avoided Costs -25% (63/58)	6,003	5,191	813
Avoided Costs -50% (64/59)	5,758	5,191	567

Table 7-30 summarizes the differences in achievable base savings potential given variations in the corporate discount rate used by Cascade under the UCT and TRC screen respectively. Per the recommendations provided by the Washington Utilities and Transportation Commission in the October 9, 2013 Policy Statement, Nexant used Cascade’s weighted average cost of capital of 8.55% to screen measures as the base-case assumption for all scenarios. An alternate discount rate of 4.17% was used to assess impact on savings potential. Savings potential is slightly higher under the 4.17% discount rate, with the difference between savings on an annual basis under the UCT screen varying by less than 1%,

whereas the difference is greater under the TRC screen, with savings hovering near 10% greater for the 4.17% discount rate than the 8.55%.

Table 7-30: Industrial Achievable Base Savings Potential by Discount Rate by Cost Effectiveness Screen

Scenario	2014	2016	2020	2025	2034
UCT Screen					
Base Case Discount Rate of 8.55% (52)	6,400	19,748	48,866	93,998	175,531
Discount Rate of 4.17% (66)	6,478	19,985	49,439	95,020	177,448
TRC Screen					
Base Case Discount Rate of 8.55% (47)	5,191	15,830	38,418	69,433	116,722
Discount Rate of 4.17% (65)	5,758	17,555	42,576	76,848	126,632

7.3.3 Industrial Achievable Potential Benefits & Costs

Table 7-31 and **Table 7-32** summarize the associated cost-benefit ratios of the industrial achievable potential scenarios given variations in avoided costs screened under the UCT and TRC respectively. With avoided costs ranging from 50% below base to 75% above base, the UCT Ratio ranges from 9.2 to 10.1, while the TRC Ratio ranges from 5.8 to 11.5. The cost-benefit ratios are higher in the industrial sector because those measures that passed where non-equipment measures and had a very favorable cost-benefit ratio.

Table 7-31: Industrial 2014 UCT Ratios for Achievable Potential Base Scenario

Scenario	UCT Benefits	UCT Costs	UCT Ratio
Base Avoided Costs (52)	\$ 319,626	\$ 31,919	10.0
Avoided Costs +25% (60)	\$ 409,242	\$ 41,869	9.8
Avoided Costs +50% (61)	\$ 500,729	\$ 51,765	9.7
Avoided Costs +75% (62)	\$ 591,179	\$ 58,677	10.1
Avoided Costs -25% (63)	\$ 234,858	\$ 25,615	9.2
Avoided Costs -50% (64)	\$ 149,435	\$ 15,909	9.4

Table 7-32: Industrial 2014 TRC Ratios for Achievable Potential Base Scenario

Scenario	TRC Benefits	TRC Costs	TRC Ratio
Base Avoided Costs (47)	\$ 274,201	\$ 23,834	11.5
Avoided Costs +25% (55)	\$ 373,588	\$ 53,031	7.0
Avoided Costs +50% (56)	\$ 448,306	\$ 53,031	8.5
Avoided Costs +75% (57)	\$ 523,460	\$ 53,510	9.8
Avoided Costs -25% (58)	\$ 205,649	\$ 23,833	8.6
Avoided Costs -50% (59)	\$ 137,100	\$ 23,833	5.8

Table 7-34 and Table 7-34 summarize the total costs projected to be paid by Cascade to achieve the savings associated with achievable base, moderate and aggressive scenarios in 2014 under the TRC and UCT scenarios, respectively. The acquisition costs²⁵ (\$/therm-saved) under each scenario are also presented. UCT savings range from 63,997 therms to 96,158 and with acquisition costs ranging from \$0.50 – \$0.76 \$/therm; while TRC savings range from 51,906 to 86,710 therms and acquisition costs range from \$0.35 - \$0.46 \$/therm.

Table 7-33: Industrial 2014 Acquisition Costs for Achievable Potential Scenarios (UCT)

Scenario	UCT Costs	Savings (therms)	Acquisition Cost (\$/therm)
Achievable Base (52)	\$ 31,919.00	63,997	\$ 0.50
Achievable Moderate (53)	\$ 57,973.89	76,212	\$ 0.76
Achievable Aggressive (54)	\$ 50,161.41	96,158	\$ 0.52

Table 7-34: Industrial 2 Acquisition Costs for Achievable Potential Scenarios (TRC)

Scenario	TRC Costs	Savings (therms)	Acquisition Cost (\$/therm)
Achievable Base (47)	\$ 23,834.07	51,906	\$ 0.46
Achievable Moderate (48)	\$ 30,152.38	65,081	\$ 0.46
Achievable Aggressive (49)	\$ 30,385.36	86,710	\$ 0.35

²⁵ Acquisition costs in this study do not include administrative expenses.

8 CONCLUSIONS

The results of this study reveal that considerable natural gas energy efficiency opportunities exist for Cascade Natural Gas Corporation in its Washington service territory, despite recent declines in the cost of natural gas, the savings achieved to-date by Cascade’s DSM programs, and increasing building standards due to the 2012 Washington State Energy Codes for buildings. Our analysis shows that 137,844 dth of natural gas savings are achievable in 2014 across all sectors when measures are screened using the UCT, increasing to 4.5M dth of cumulative natural gas savings by 2034. These findings should be viewed with the following considerations in mind:

- The natural gas savings potential highlighted in this report does not reflect “program potential”, but rather achievable potential which assumes all cost-effective measures are pursued and implemented.
- The achievable potential findings also assume no limitations on program spending to achieve all cost-effective measure savings.
- Administrative costs were not included when screen measures for cost-effectiveness.
- The approach of using the UCT as the cost-effectiveness screen departs from prior potential studies conducted for Cascade. Prior studies for Cascade utilized the TRC cost-effectiveness screen which typically results in less saving potential when compared to the UCT. Nexant has run various scenarios to illustrate the difference in savings potential under both the UCT and TRC cost-effectiveness screen.
- The measure costs utilized for the purposes of the potential assessment are lower resolution than those that would be available by the company for program planning. For program planning purposes the costs may be refined by the company to better reflect costs in their specific service territory.
- This report (**Volume II**) provides summary findings on each of the 66 scenarios modeled under this research. Detailed cumulative natural gas savings potential by sector, by segment, by end use and by year are presented for all 66 scenarios modeled by Nexant in **Vol. III, Appendix B**.

9 ENERGY EFFICIENCY MEASURES EXAMINED

9.1 MEASURES EXAMINED

Nexant examined a total of 190 measures for all sectors combined. 39 residential measures were included in this study. For the non-residential sector, there were 134 total measures included in the potential energy savings analysis. Of these 134 measures, 36 were considered in the industrial model and 63 were included in the commercial model. Therefore the total number of measures included in the model is 125, yet many measures had overlap between different sectors and segments and therefore may appear in the summary as one measure. **Table 9-1** through **Table 9-3** provides a brief description of the types of measures included for each end use in the residential, commercial and industrial model respectively. The list of measures was developed based on a review of Cascade’s current measure offerings, measures examined in the 2009 Potential Assessment for Cascade, and measures included in other contemporary natural gas potential assessments, along with individual measures recommended by either Nexant or Cascade staff.

Table 9-1: Summary of Residential Measures

End Use	Measure Type	Measure Name
Space Heating	Non-Equipment	Air sealing
Space Heating	Non-Equipment	Attic/ceiling insulation
Space Heating	Non-Equipment	Boiler controls
Space Heating	Non-Equipment	Boiler repair/maintenance
Space Heating	Non-Equipment	Built Green Home
Space Heating	Equipment	Condensing Boiler
Space Heating	Non-Equipment	Duct sealing
Space Heating	Non-Equipment	Energy Star Certified Home / E*+
Space Heating	Non-Equipment	Entryway doors
Space Heating	Non-Equipment	Exterior wall insulation
Space Heating	Non-Equipment	Floor insulation
Space Heating	Non-Equipment	Furnace repair/maintenance
Space Heating	Equipment	Natural Gas Heat Pump
Space Heating	Non-Equipment	Heat recovery ventilator
Space Heating	Equipment	High Efficiency Boiler
Space Heating	Equipment	High efficiency Combination Domestic Hot Water and Hydronic Space Heating System
Space Heating	Equipment	High efficiency furnace 90%+ AFUE
Space Heating	Equipment	High efficiency furnace 95%+ AFUE
Space Heating	Non-Equipment	Insulation, basement side wall
Space Heating	Non-Equipment	Programmable thermostat
Space Heating	Non-Equipment	Slab insulation R-0 to R-5 (4 ft.)
Space Heating	Non-Equipment	Window treatments
Space Heating	Non-Equipment	Window upgrade $U \leq 0.3$
Water Heating	Equipment	Condensing Domestic Hot Water
Water Heating	Equipment	Condensing High Efficiency Natural Gas Tankless Water Heater
Water Heating	Equipment	Conventional High Efficiency Natural Gas Water Heater
Water Heating	Non-Equipment	Drain water heat recovery
Water Heating	Non-Equipment	ENERGY STAR dishwasher
Water Heating	Non-Equipment	Faucet aerators
Water Heating	Equipment	Heat Pump Water Heater
Water Heating	Non-Equipment	Hot water pipe insulation
Water Heating	Non-Equipment	Hot water temperature setback
Water Heating	Non-Equipment	Low-flow showerheads (1.5 GPM , 1.75 GPM max)
Water Heating	Equipment	Solar Hot Water Heater
Room Heating	Equipment	High efficiency Natural Gas Hearth 80%+ AFUE

Clothes Drying	Equipment	High efficiency clothes washer
Other	Equipment	High Efficiency Pool/Spa heating boilers

Table 9-2: Summary of Commercial Measures

End Use	Measure Type	Measure Name
Space Heating	Equipment	Boiler Economizer
Space Heating	Non-Equipment	Boiler pipe insulation
Space Heating	Non-Equipment	Recirculation controls
Space Heating	Equipment	Boiler Steam Trap
Space Heating	Equipment	Boiler vent damper
Space Heating	Equipment	Combination HVAC/hot water delivery
Space Heating	Equipment	Demand-controlled ventilation
Space Heating	Equipment	Direct fired radiant heating
Space Heating	Non-Equipment	Duct sealing & insulation
Space Heating	Non-Equipment	Energy management system optimization
Space Heating	Non-Equipment	Floor insulation
Space Heating	Equipment	Heat Pump (Natural Gas)
Space Heating	Non-Equipment	Heat exchanger
Space Heating	Equipment	High efficiency condensing boiler
Space Heating	Equipment	High efficiency condensing furnace - min. 91% AFUE
Space Heating	Equipment	High efficiency condensing unit heater - min 92% AFUE
Space Heating	Equipment	High efficiency non-condensing unit heater - min 86% AFUE
Space Heating	Non-Equipment	HVAC controls
Space Heating	Non-Equipment	HVAC system commissioning
Space Heating	Equipment	power burner
Space Heating	Non-Equipment	Roof insulation (retrofit only)
Space Heating	Equipment	Solar wall systems
Space Heating	Equipment	Steam System Efficiency Improvements
Space Heating	Non-Equipment	Variable Volume Air System
Space Heating	Non-Equipment	Wall insulation (retrofit only)
Space Heating	Non-Equipment	Windows – see definitions for iterations
Water Heating	Equipment	Domestic hot water tank - condensing tank - min 91% eff
Water Heating	Equipment	Domestic hot water tankless water heater Energy Star .82
Water Heating	Equipment	Drainwater heat recovery
Water Heating	Non-Equipment	Energy Star Door Type Dishwasher Low Temp Gas
Water Heating	Non-Equipment	Faucet aerators
Water Heating	Equipment	Heat Pump Water Heater
Water Heating	Non-Equipment	Heat recovery
Water Heating	Non-Equipment	High efficiency commercial gas clothes washer 1.8 MEF

Water Heating	Equipment	High efficiency water heater
Water Heating	Non-Equipment	Hot water pipe insulation
Water Heating	Non-Equipment	Hot water temperature reset
Water Heating	Non-Equipment	Low Flow Pre-rinse Spray Valves
Water Heating	Non-Equipment	Low-flow showerheads
Water Heating	Non-Equipment	Motion Faucet Controls
Water Heating	Non-Equipment	Multi-Tank Conveyor Low Temp Dishwasher
Water Heating	Equipment	Ozone injection laundry systems
Water Heating	Non-Equipment	Pool cover
Water Heating	Equipment	Pool/Spa solar heat
Water Heating	Non-Equipment	Recirculation controls
Water Heating	Equipment	Solar Hot Water Heater
Water Heating	Equipment	Storage Water Heater
Water Heating	Non-Equipment	Waste Water Heat Exchanger
Cooking	Equipment	Combination Oven
Cooking	Equipment	Conveyor Oven
Cooking	Equipment	ENERGY STAR Convection Oven
Cooking	Equipment	ENERGY STAR Gas Fryer
Cooking	Equipment	ENERGY STAR Griddle
Cooking	Equipment	High efficiency steam cooker

Table 9-3: Summary of Industrial Measures

End Use	Measure Type	Measure Name
Process	Equipment	Efficient Boiler
Process	Equipment	Efficient Burners
Process	Equipment	Efficient Process Furnace
Process	Non-Equipment	Improved Controls
Process	Non-Equipment	Process Heating O&M
Space	Non-Equipment	Boiler repair/maintenance
Space	Equipment	Boiler Steam Trap
Space	Equipment	Boiler vent damper
Space	Non-Equipment	Demand-controlled ventilation
Space	Equipment	Direct fired radiant heating
Space	Non-Equipment	Duct sealing
Space	Non-Equipment	Energy management system optimization
Space	Non-Equipment	Heat exchanger
Space	Equipment	High efficiency condensing boiler - Min. 90% therm. Eff. &
Space	Equipment	High efficiency condensing furnace - min. 91% AFUE
Space	Equipment	High efficiency condensing unit heater - min 92% AFUE
Space	Equipment	High efficiency non-condensing unit heater - min 86% AFUE
Space	Non-Equipment	HVAC controls

Space	Non-Equipment	HVAC system commissioning
Space	Equipment	Refrigeration system superheat recovery HVAC
Space	Non-Equipment	Roof insulation (retrofit only)
Space	Non-Equipment	Space Heating O&M
Space	Equipment	Steam System Efficiency Improvements
Space	Non-Equipment	Wall insulation (retrofit only)
Space	Non-Equipment	Waste Water Heat Exchanger
Space	Non-Equipment	Windows- see definitions for iterations
Water	Equipment	Refrigeration system superheat recovery DHW

9.2 MEASURE DEFINITIONS

The following section provides summary definitions of each of the measures evaluated as part of this potential assessment. Measures are organized by sector, by end use.

9.2.1 Residential

9.2.1.1 Space Heating

Air sealing: This measure creates pressure boundaries in the shell of the home and reduces air leaks through strategic use and application of air-sealing materials which prevent air movement and subsequent heat loss.

Attic/ceiling insulation: Insulation is added to the attic/ceiling as a thermal boundary. insulating the attic includes air sealing. The following iterations were included in this analysis: R-0 to R-49 assumed no prior attic/ceiling insulation. R-11 to R-49 assumed an existing R-11 level of insulation. R-19 to R-49 assumed the prior insulated condition to be R-19.

Basement Floor insulation & Crawlspace insulation - R-30 or higher: R-30 insulation is added to the basement or crawlspace floor.

Boiler controls: Boiler reset controls capable of resetting boiler supply water temperature in an inverse linear fashion with outdoor air temperature.

Boiler repair/maintenance: This measure pertains to boiler diagnostic testing, repair, and tune-up which ensures the boiler will run smoothly and efficiently.

Built Green Home: Many features of a built green home are environmental-impact related, but not necessarily energy related. Therefore a base Energy Star Home Efficiency was assumed (R-44 insulation vs. R-38 base, 92 AFUE furnace vs. 78 AFUE base, 62 EF water heater vs. 57 EF base, and ACH reduction from 7.08 (base) to 4.6. In addition to these Energy Star Home efficiency measures, the following were

added for the Built Green Home energy savings algorithms: Duct insulation to R-11 vs. R-6.8 base, R-26 wall insulation vs. R-13 base, upgrade to energy star clothes washer and dishwasher.

Condensing Boiler: This measure pertains to the installation of a condensing boiler that has a high efficiency (typically greater than 90%) which is achieved by using the waste heat in the flue gases to pre-heat the cold water entering the boiler.

Duct Sealing: This measure is associated with performing duct sealing using mastic sealant or metal tape to the distribution system of homes with either central air conditioning using a ducted system. This measure prevents heat loss through leaky duct work.

Entryway door: Installation of an entryway door that has a lower U-value than the Washington Code specifications. Lower U-value correlates with better insulation capabilities which prevent heat loss.

Exterior wall R-0 to Blow-in R-13 insulation: Blow-in cellulose insulation is usually applied to exterior walls, or walls that provide a thermal barrier inside the home. Since walls in most homes represent more exterior surface area than the floors or ceilings, they present more opportunity to lose and gain heat.

Furnace repair/maintenance: Repair or replace any deteriorating components to ensure furnace runs efficiently.

Heat recovery ventilator: Installation of an Energy Star qualified air to air heat recovery ventilator; the counter-flow provides improved climate control, while saving energy through reduction of heating (and cooling) requirements by mixing outbound air with inbound air.

High Efficiency Boiler: This measure involves installation of a high efficiency or condensing boiler that improves efficiency by recovering “waste heat” which usually exits a house from the flue of a conventional boiler. It does this by condensing the water vapor produced in the combustion process and using the heat from this condensation thereby extracting more usable heat for use in the building

High efficiency Combination Domestic Hot Water and Hydronic Space Heating System using pre-approved Tankless Water Heater: Hydronic systems transfer heat through thermal radiation, thereby reducing air temperature stratification. Thermal heat heats the objects in the home which is more efficient than heating the air in the home.

High efficiency furnace 90%+ AFUE: High efficiency furnace features may include improved heat exchangers and modulating multi-stage burners. Washington State Energy Code efficiencies are AFUE 80 for equipment that meets code, and 76 AFUE for stock equipment. Two measure iterations were run in this analysis: a 90% efficiency furnace and a 95% efficient furnace.

High Efficiency Pool/Spa heating boilers: Installation of a high efficiency or condensing boiler that improves efficiency by recovering “waste heat” that usually exits the facility from the flue of a

conventional boiler. These boilers function by condensing the water vapor produced in the combustion process and using the heat from this condensation. Baseline efficiencies are 80% for equipment that meets code, and 75% for stock equipment.

Insulation, basement side wall: Add R-13 insulation to the basement or crawlspace side wall.

Programmable Thermostat: This measure characterizes the household energy savings from the installation of a new or reprogramming of an existing programmable thermostat for reduced heating energy consumption through temperature set-back (while unoccupied or during reduced demand times).

Slab insulation R-0 to R-5 (4 ft.): Installing R-5 insulation value of a depth of 4 ft. down on the perimeter to an existing slab with no additional insulation.

Window treatments: Glazing installed onto the window resulting in a U-value of 0.44.

Window upgrade $U < 0.3$: Upgrading windows resulting in a U-value less than or equal to 0.30. This measure reduces the heat transfer through the windows.

9.2.1.2 Water Heating

Condensing Domestic Hot Water: Unlike a regular gas water heater, a condensing DHW unit captures the combustion gas and utilizes the residual heat in the combustion gas to heat the water in the storage tank. A gas condensing water heater is designed with greater surface area flue. The heat and combustion gases have much farther to travel before they exit the water tank, so more heat is transferred to the water in the tank. Energy Factor (EF) typically > 0.80 . Measure replaces stock EF 0.54 water heater or EF 0.62 water heater that meets Washington State Energy Code.

Condensing High Efficiency Natural Gas Tankless Water Heater: This unit achieves savings by eliminating standby losses in stand-alone or tank-type water heaters and through higher efficiency than baseline storage hot water heaters. Minimum efficiency for the Tankless Water Heater is generally 0.80. Measure replaces stock EF 0.54 water heater or EF 0.62 water heater that meets code.

Conventional High Efficiency Natural Gas Water Heater: This measure characterizes the purchase and installation of a new efficient gas-fired water heater, in place of a code or existing residential unit. Natural gas savings are generated from the higher efficiency ($EF > 0.62$) water heater. Measure replaces stock EF 0.54 water heater or code EF 0.62 water heater.

Drain water heat recovery: 80%–90% of the energy used to heat water in a home goes down the drain with used hot water. Drain-water heat recovery systems reduce the amount of energy needed for water heating by capturing heat from the used water to preheat cold water entering the water heater or going to other water fixtures.

ENERGY STAR dishwasher: An Energy Star certified dishwasher uses less water per cycle which correlates to therms saved per year through reduced water heat.

Hot water pipe insulation: Adding insulation to both the hot and cold domestic hot water pipes. Insulating helps reduce standby losses. Default savings are provided per 3 feet of length and are appropriate up to 6 feet of the hot water pipe and 3 feet of the cold. Existing pipes are assumed to be un-insulated (R-0).

Hot water temperature setback: The thermostat setting of a hot water tank is lowered to 120 degrees. The baseline condition is a hot water tank with a thermostat setting that is higher than 120 degrees, typically systems with settings of 130 degrees or higher.

Low Flow Faucet aerators: Installation of a low flow faucet aerator in a household kitchen or bath faucet fixture. Gas savings are generated from a maximum flow rate of 1.5 compared to a standard 2.2 gpm faucet.

Low Flow Showerheads: Installation of a low flow showerhead in a single or multi-family household. Gas savings are generated from a maximum flow rate of 2.0 gpm compared to a standard 2.5 gpm showerhead

Solar Hot Water Heater: This measure assumes that a gas water heater is replaced with a solar water heater with backup, reducing the water heating load by about 60%. Solar water heating system includes a storage tank and solar collector. Replaces stock EF 0.54 water heater.

9.2.1.3 Room Heating

High efficiency Natural Gas Hearth +80% AFUE: Efficient alternative to a masonry fireplace via reduced air infiltration by removing the fireplace, and adding an 80%+ efficiency appliance. Overall space heating reduction is the result.

High efficiency Natural Gas Hearth +70% FE (Fireplace Efficiency): Efficiency alternative to masonry fireplace by reducing air infiltration by removing the fireplace and replacing it with a 70%+ efficiency appliance. Overall space heating reduction is the result.

9.2.1.4 Clothes Drying

High efficiency clothes washer: Efficient clothes washers use one-third the water of standard clothes washers. Efficient clothes washers also shorten drying time due to high speed spin cycles, which reduce the water content of washed clothes.

9.2.1.5 Others

ENERGY STAR Certified Home + U.30 Window Glazing: A home can earn the ENERGY STAR certificate by completing the following: thermal enclosure system, high efficiency heating and cooling system, energy-efficient lighting and appliances, and U 0.30 glazing.

ENERGY STAR Plus Certified Home (Gas, with or without AC): ENERGY STAR Certified Home + U.30 Glazing (as above), with the following added efficiency alternates: R-44 Ceiling Insulation, 92 AFUE furnace, 0.62 EF water heater, <0.46 Air Changes per Hour.

Home Performance with ENERGY STAR: Completion of three measures listed below triggers a cash incentive:

Shell: Attic, Floor or Wall Insulation

Sealing: PECS, Duct Sealing and Insulation, Whole House Air Sealing

Water Heat: High-Efficiency Water Heat

Space Heat: High-Efficiency Furnace, HE Boilers, Combination Hydronic Heat or Fuel Conversion

9.2.2 Commercial

9.2.2.1 Space Heating

Boiler Economizer: Economizers are heat exchange devices that heat fluids, (usually water), up to, but not normally beyond the boiling point of the fluid. Economizers are so named because they can make use of the enthalpy in fluid streams that are hot, but not hot enough to be used in a boiler, thereby recovering more useful enthalpy and improving the boiler's efficiency.

Boiler pipe insulation: Insulate Boiler Pipes, 2" diameter with 1" R-4 insulation or better. Savings compared to a standard un-insulated boiler pipe.

Boiler repair/maintenance: This measure pertains to boiler diagnostic testing, repair, and tune-up to improve boiler operational efficiency.

Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig: Replacement of a leaking steam trap. A proper working trap keeps steam lines free of condensate. Condensate can cause damage to valves, piping, and equipment, reducing operational efficiency and equipment life.

Boiler vent damper - min. 1000 kBtu input: A vent damper prevents conditioned air from being pulled into the flue (exiting the building) when the heating appliance is not running. When there's a demand for heat and the furnace or boiler starts to run, the damper opens to improve draw.

Demand-controlled ventilation: Installation of a demand controlled ventilation system to adjust outside air quantities in response to measured CO₂ levels. Conventional ventilation supply ventilated air based

on assumed, rather than actual, occupancy. This often results in over-ventilation, wasting both money and energy. Demand-controlled ventilation monitors conditions in every zone, and then delivers the required ventilation where it is needed.

Direct fired radiant heating: This measure involves the installation of a low intensity gas-fired radiant heater. It is more efficient than baseboard heating and usually more efficient than forced-air heating because it eliminates duct losses.

Duct sealing & insulation: This measure prevents air leaks through duct work via duct sealing, by using a sealant such as mastic or metal tape, or replacing the air distribution with a new system entirely. This applies only to facilities with a ducted heating system.

Energy management system optimization: Energy management system optimization involves using system appropriate automation hardware and software to detect and identify opportunities for savings and implement catered solutions.

Floor Insulation: R-30 insulation is added to the basement or crawlspace floor. Assumed base-case minimum of R-4.94.

Gas Engine-drive Heat Pumps: This measure provides space heating and cooling using an advanced natural gas engine in place of an electric motor. Variable –speed engine controls allow the GHP to closely follow the load and maintain efficiency. Heat recovery from engine cooling jacket and exhaust supplements the GHP output during heating mode. (Electric heat pumps require inefficient resistant heating to supplement the heat pump output at low outdoor temperatures).

Heat Exchanger: Traditional systems that condition air use the air only once, and then exhaust it. Much of this energy can be recovered by installing heat-recovery coils in the exhaust air handlers. This heat exchanger can precondition the outside air coming into the building, recovering energy without risking contamination.

High efficiency condensing boiler - Min. 90% therm. Eff. & 300 kBtu input: Installing a new high efficiency, gas-fired condensing boiler in a commercial location. Gas savings achieved through the utilization of a sealed combustion chamber and multiple heat exchangers that remove a significant portion of the waste heat from flue gasses. Because multiple heat exchangers are used to remove waste heat from the escaping flue gasses, some of the flue gasses condense and must be drained. Baseline efficiencies are 80% for equipment that meets code, and 75% for stock equipment.

High efficiency condensing furnace - min. 91% AFUE: The installation of a new high efficiency, gas-fired condensing furnace in a commercial location. Savings achieved through the utilization of a sealed, super insulated combustion chamber, more efficient burners, and multiple heat exchangers that remove a significant portion of waste heat from flue gasses. This system produces condensate which must be drained. The base case is a standard furnace with AFUE of 78.

High efficiency condensing unit heater - min 92% AFUE: This measure applies to a gas fired condensing unit heater installed in a commercial application. A heat exchanger is attached to the condensing unit heater to capture heat and vapor from the exhaust gases. That heat, instead of being flushed outside, is turned back into useable heat circulating inside the heated space. Baseline equipment is a new unit heater meeting 2012 WA energy code minimum efficiency.

High efficiency non-condensing unit heater - min 86% AFUE: This measure applies to a gas fired non-condensing unit heater installed in a commercial application. Hot gases generated from combustion of hydrogen are directly vented to the outside. Baseline equipment is a new unit heater meeting 2012 WA energy code minimum efficiency.

HVAC controls: The installation of the following: Programmable Thermostats, Energy Management Systems or Direct Digital Control systems. These options enable more efficient control of the HVAC system.

HVAC system commissioning: HVAC System Commissioning is a systematic, documented process that includes inspection and testing conducted to confirm that the buildings systems are being operated and maintained in conformance with the design intent. Buildings that are not properly commissioned can suffer from high energy costs, poor indoor air quality, poor system control, and many other mechanical problems.

Power Burner: This measure involves a condensing, integrated water heater/boiler with an AFUE of \geq 90%, with Power Burner. Baseline equipment is condensing, integrated water heater/boiler with an AFUE of \geq 90%, with standard atmospheric burner.

Roof insulation (retrofit only) - Tier 1: Min R-30: Addition of roof insulation to minimum R-30 to replace existing insulation that is less than R-11.

Roof insulation (retrofit only) - Tier 2: Min R-45: Addition of roof insulation to minimum R-45 to replace existing insulation that is less than R-11.

Solar Wall: Installation of solar wall which captures solar heat to pre-warm air for space heating. The solar heat cuts down on the amount of natural gas needed for space heating.

Steam System Efficiency Improvements: This measure includes assessing and adding or replacing main line air vents. Assess and replace radiator vents. Upgrade boiler control system to averaging system with indoor and outdoor sensors.

Variable Volume Air System: A mechanical HVAC system responsible for serving multiple zones which control the temperature in a zone by regulating the quantity of warm or cooled air supplied. The fan capacity has variable-speed drives, which reduces energy consumption versus constant volume systems.

Wall insulation (retrofit only) - Tier 1: Min R-11: Installation of exterior wall Insulation that is greater than R-11 to replace existing insulation that is less than R-4.

Wall insulation (retrofit only) - Tier 2: Min R-19: Installation of exterior wall Insulation that is greater than R-19 to replace existing insulation that is less than R-4.

Waste Water Heat Exchanger: A waste water heat exchanger recovers waste heat by pre-warming incoming water with the waste water in a separately contained unit which prohibits contamination while allowing heat transfer.

Windows- add argon to vinyl Low-E: This measure involves adding vinyl low-E Glass and Argon gas between layers of window glass for superior thermal efficiency. Baseline equipment is a vinyl-framed window with low-E glass installed, no argon fill.

Windows- Add Low E and Argon to vinyl tint: Same as the measure above except the windows are tinted. Baseline is vinyl framed-tinted window with argon gas fill, but not Low-E.

Windows- Add Low E to vinyl tint: addition of low-e glass to vinyl tint windows. Baseline is vinyl-framed, tinted window with (not low-E).

Windows- non-tinted AL code to class 36: Improvements of window to AL code class 36. Baseline equipment is an aluminum-framed non-tinted code window.

Windows- non-tinted AL code to class 40: Improvements of window to AL code class 40. Baseline equipment is an aluminum-framed non-tinted code window.

Windows- non-tinted AL code to class 45: Improvements of window to AL code class 45. Baseline equipment is an aluminum-framed non-tinted code window.

Windows- tinted AL code to class 36: Improvements of window to AL code class 36. Baseline equipment is an aluminum-framed tinted code window.

Windows- tinted AL code to class 40: Improvements of window to AL code class 40. Baseline equipment is an aluminum-framed tinted code window.

9.2.2.2 Water Heating

Combination HVAC/hot water delivery: new high efficiency condensing boiler for water and space heating to replace existing standard boiler with thermal efficiency 75% for existing, plus >75,000 BTU gas water heater EF 0.80.

Domestic hot water - condensing tank - min 91% efficiency: Unlike a regular gas water heater, the condensing DHW captures the combustion gas and utilizes the captured gas to heat the water in the

storage tank. A gas condensing water heater has its flue designed with greater surface area. The heat and combustion gases have much farther to travel before they exit the water tank, so more heat is transferred to the water in the tank. Typically EF > 0.80. Measure replaces stock EF 0.54 water heater or code EF 0.62 water heater.

Domestic hot water tankless water heater ENERGY STAR EF 0.82 efficiency: This measure achieves savings by eliminating the standby losses that occur in stand-alone or tank-type water heaters. Efficiency for the Tankless Water Heater is generally EF > 0.80. Measure replaces stock EF 0.54 water heater or code EF 0.62 water.

Drainwater heat recovery: Drain-water heat recovery systems reduce the amount of energy needed for water heating by capturing the heat from used drainwater and using it to preheat cold water entering the water heater or going to other water fixtures.

ENERGY STAR Door Type Dishwasher Low Temp Gas: Replace a standard door-type energy star dishwasher with a low temperature door-type single tank energy star dishwasher. Significant reduction in water heating cost. Water use for the efficient equipment is 1.18 gallons/rack compared to a conventional 2.1 gallons/rack.

Faucet aerators: Install low flow faucet aerators. New installation flow rate assumptions are ≤ 1.5 gpm for bathrooms, and ≤ 2.2 GPM for kitchens. Stock equipment flow rate assumption is 3.0 gpm.

High efficiency commercial gas clothes washer 1.8 MEF: Installation of high efficiency commercial gas clothes washer, 2.2 MEF, and 3.3-4.3 cubic feet capacity. Measure replaces standard commercial gas clothes washer 1.6 MEF.

High efficiency water heater: This measure characterizes the purchase and installation of a new efficient gas-fired water heater, in place of an existing commercial unit. Natural gas savings are generated from the higher efficiency (EF > 0.62) water heater. Measure replaces stock EF 0.54 water heater or code EF 0.62 water heater.

Hot water pipe insulation: Adding insulation to both the hot and cold water pipes. Insulating helps reduce standby losses. Default savings are provided per 3 feet of length and are appropriate up to 6 feet of the hot water pipe and 3 feet of the cold water pipe. Existing pipes are assumed to be un-insulated (R-0).

Hot water temperature reset: The thermostat setting of a hot water tank is lowered to 120 degrees. The baseline condition is a hot water tank with a thermostat setting that is higher than 120 degrees, typically systems with settings of 130 degrees or higher.

Low-flow Pre-Rinse Spray Valve: Installation of low flow pre rinse spray valve, < 1.06 gpm, clean ability performance of <26 seconds per plate. The baseline equipment efficiency value for code is 1.6 gpm, stock is 1.9 gpm.

Low-flow showerheads: Installation of a low flow showerhead \leq 2.0 gpm in a commercial setting. Replaces stock showerhead with 3.0 gpm flow rate.

Motion Faucet Controls: Installation of a motion controlled faucet with an average assumed flow duration of 12 seconds versus a standard faucet with an assumed average flow duration of 15 seconds.

Multi-Tank Conveyor Low Temp Dishwasher: Installation of a low-temperature multi-tank conveyor dishwasher to replace a standard multi-tank conveyor dishwasher. Water use for the efficient equipment is 0.54 gallons/rack compared to a conventional 1.04 gallons/rack.

Ozone injection laundry systems: Installation of washing machine with ozone injection system, allowing use of cold water. Baseline equipment is a standard washing machine without ozone injection. This measure saves the amount of energy required to heat water for a standard laundry system.

Pool cover: This measure involves a standard thermal pool cover which should have a minimum insulation value of R-12 to meet code requirement. Baseline equipment is a pool without cover. This measure reduces wasted heat when the pool is not occupied.

Pool/Spa solar heat: This measure assumes that a gas water heater is replaced with a solar water heater with backup. Solar water heating system includes a solar collector, the pool or spa is the storage. Measure replaces stock EF 0.54 water heater or code EF 0.62 water heater.

Solar Hot Water Heater: This measure assumes that a gas water heater is replaced with a solar water heater with backup. Solar water heating system includes a storage tank and solar collector. Measure replaces stock EF 0.54 water heater or code EF 0.62 water heater.

Storage Water Heater: Installation of a water heater with heating capacity > 75,000 Btuh, thermal efficiency (TE) \geq 88% to replace baseline equipment with TE \geq 80%.

9.2.2.3 Cooking

Combination Oven: Installation of combination convection with steam oven with cooking efficiency \geq 38% and a convection mode cooking efficiency \geq 44% to replace a standard combination convection and steam oven. Baseline model has a gas cooking energy efficiency of 35%.

Conveyor Oven: Installation of natural gas conveyor oven with a tested baking energy efficiency > 42% to replace existing deck oven.

ENERGY STAR Convection Oven: Installation of an energy star convection oven with cooking efficiency \geq 44% to replace a natural gas convection oven that is not ENERGY STAR certified. Baseline efficiencies are 30% for equipment that meets code, and 25% for stock equipment.

ENERGY STAR Gas Fryer: Installation of a natural gas fired ENERGY STAR fryer with cooking energy efficiency of 50% to replace a natural gas fryer that is not ENERGY STAR certified. Baseline efficiencies are 35% for equipment that meets code, and 30% for stock equipment.

ENERGY STAR Griddle: Installation of a natural gas fired ENERGY STAR griddle with cooking energy efficiency of 38% to replace a natural gas fryer that is not ENERGY STAR certified with 32% efficiency.

High efficiency steam cooker: Installation of an ENERGY STAR[®] qualified gas steam cooker with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity to replace non-ENERGY STAR[®] commercial steamer. Baseline efficiencies are 18% for equipment that meets code, and 15% for stock equipment.

9.2.3 Industrial

9.2.3.1 Process Heating

Efficient Boiler: Upgrading boiler to higher efficiency model of AFUE \geq 90%, Standard boiler has no upgrades.

Efficient Burners: The boiler burner combines fuel and air in proper proportions for combustion and enables the fuel-air mixture to burn stably to give a specified flame size and shape. Efficient burners are designed to maximize combustion efficiency while minimizing the release of emissions.

Efficient Process Furnace: An industrial process furnace provides heat for a process, or can serve as a reactor to provide the heat of a reaction. Efficient process heaters reduce the energy consumption required to complete these results via 1) controlling the air-fuel ratio, 2) enhancing heat transfer within the furnace, 3) containing heat within the furnace by reducing leakage, 4) recovering waste heat, and 5) using sensors and controls to optimize the four previous process areas.

Improved process heating control: Improved process heating control measures improve the fuel/air mixture for optimum combustion of input fuels. Baseline equipment is standard process heating controls.

Process Heating O&M: Improve efficiency through maintaining optimum flame temperatures, monitoring levels of oxygen in flue gas, etc. Base-case involves no operations and maintenance measures.

9.2.3.2 Space Heating

Boiler repair/maintenance: Boiler diagnostic testing, repair, and tune-up. Base-case involves an existing boiler without diagnostic testing, repair, or tune-up for the prior two years.

Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig: Replacement of a leaking steam trap. A proper working trap keeps steam lines free of condensate. Condensate can cause damage to valves, piping, and equipment, reducing efficiency and equipment life.

Boiler vent damper - min. 1000 kBtu input: Installation of a vent damper to a boiler or furnace is an easy way to cut energy losses. The damper prevents conditioned air exfiltration via the flue when the heating appliance is not running.

Demand-controlled ventilation: Installation of a demand controlled ventilation system to adjust outside air quantities in response to measured CO₂ levels. Conventional ventilation supply ventilates air based on assumed, rather than actual, occupancy. This often results in over-ventilation. Demand-controlled ventilation monitors conditions in every zone, and then delivers the required ventilation where it is needed.

Direct fired radiant heating: This measure involves the installation of a low intensity gas fired radiant heater. It is more efficient than baseboard heating and usually more efficient than forced-air heating via eliminating duct losses.

Duct sealing: This measure prevents air leaks through duct work via duct sealing, either using a sealant such as mastic or metal tape, or replacing the air distribution with a new system entirely. This applies only to facilities with a ducted heating system.

Energy management system optimization: Energy management system optimization involves using system appropriate automation hardware and software to detect and identify opportunities for savings and implement catered solutions.

Heat Exchanger: A heat exchanger recovers waste heat by pre-warming incoming medium with the waste exhaust medium in a separately contained unit which prohibits contamination while allowing heat transfer.

High efficiency condensing boiler - Min. 90% therm. Eff. & 300 kBtu input: This measure involves installation of a high efficiency or condensing boiler that improves efficiency by recovering “waste heat” that usually exits from the flue of a conventional boiler. Alternatively, the measure unit re-uses the heat from condensation. Baseline efficiencies are 80% for equipment that meets code, and 75% for stock equipment.

High efficiency condensing furnace - min. 91% AFUE: The installation of a new high efficiency, gas-fired condensing furnace in a commercial location. Savings achieved through the utilization of a sealed, super

insulated combustion chamber, more efficient burners, and multiple heat exchangers that remove a significant portion of the waste heat from the flue gasses. Because multiple heat exchangers are used to remove waste heat from the escaping flue gasses, some of the flue gasses condense and must be drained. This measure replaces a standard furnace with AFUE of 78.

High efficiency condensing unit heater - min 92% AFUE: This measure applies to a gas fired condensing unit heater installed in a commercial application. A heat exchanger is attached to the condensing unit heater to capture heat and vapor from the exhaust gases. That heat, instead of being flushed outside, is turned back into useable heat circulating inside the heated space. Baseline equipment is a new unit heater meeting 2012 WA energy code minimum efficiency.

High efficiency non-condensing unit heater - min 86% AFUE: This measure applies to a gas fired non-condensing unit heater installed in a commercial application. Hot gases generated from combustion of hydrogen are directly vented to the outside. There is no condensate. Baseline equipment is a new unit heater meeting 2012 WA energy code minimum efficiency.

HVAC controls: The installation of the following: Programmable Thermostats, EMS or DDS systems. These systems enable more efficient control of the HVAC system.

HVAC system commissioning: HVAC System Commissioning is a systematic, documented process that includes inspection and testing conducted to confirm that a buildings system are capable of being operated and maintained in conformance with the design intent. Buildings that are not properly commissioned can suffer from high energy costs, poor indoor air quality, poor system control, and many other mechanical problems.

Refrigeration system superheat recovery HVAC: Heat released from the refrigerant is recovered from the compressor and is used to pre-heat HVAC feeds.

Roof insulation (retrofit only) - Tier 1: Min R-30: Addition of roof insulation to minimum R-30 to replace existing insulation that is less than R-11.

Roof insulation (retrofit only) - Tier 2: Min R-45: Addition of roof insulation to minimum R-45 to replace existing insulation that is less than R-11.

Space Heating O&M: Improve efficiency through maintaining optimum flame temperatures, monitoring levels of oxygen in flue gas, boiler insulation, waste heat recover, burner efficiency improvements, etc. Base case involves no operations and maintenance measures.

Steam System Efficiency Improvements: This measure includes assessing and adding or replacing main line air and radiator vents, and upgrading the boiler control system to averaging system with indoor and outdoor sensors. The damper opens to improve draw.

Wall insulation (retrofit only) - Tier 1: Min R-11: Installation of exterior wall Insulation that is greater than R-11 to replace existing insulation that is less than R-4.

Wall insulation (retrofit only) - Tier 2: Min R-19: Installation of exterior wall Insulation that is greater than R-19 to replace existing insulation that is less than R-4.

Waste Water Heat Exchanger: A waste water heat exchanger recovers waste heat by pre-warming incoming water with the waste water in a separately contained unit which prohibits contamination while allowing heat transfer.

Windows- add argon to vinyl Low-E: This measure involves adding vinyl low-E Glass and Argon gas between layers of window glass for superior thermal efficiency. Baseline equipment is a vinyl-framed window with low-E glass installed, no argon fill.

Windows- Add Low E and Argon to vinyl tint: Same as the measure above except the windows are tinted. Baseline is vinyl framed-tinted window with argon gas fill, but not Low-E.

Windows- Add Low E to vinyl tint: addition of low-e glass to vinyl tint windows. Baseline is vinyl-framed, tinted window (not low-E).

Windows- non-tinted AL code to class 36: Improvements of window to AL code class 36. Baseline equipment is an aluminum-framed non-tinted code window.

Windows- non-tinted AL code to class 40: Improvements of window to AL code class 40. Baseline equipment is an aluminum-framed non-tinted code window.

Windows- non-tinted AL code to class 45: Improvements of window to AL code class 45. Baseline equipment is an aluminum-framed non-tinted code window.

Windows- tinted AL code to class 36: Improvements of window to AL code class 36. Baseline equipment is an aluminum-framed tinted code window.

Windows- tinted AL code to class 40: Improvements of window to AL code class 40. Baseline equipment is an aluminum-framed tinted code window.

9.2.3.3 Water Heating

Refrigeration system superheat recovery: A superheat recovery system recovers concentrated high temperature heat from compressor condenser discharge and pumps the recovered heat into a hot water tank to save on water heating energy.



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Cascade Natural Gas Corporation Assessment of Achievable Potential & Program Evaluation Volume 3: Appendices

Submitted to Cascade Natural Gas Corporation
Submitted by Nexant, Inc.

February 25, 2014

The Nexant logo features a stylized blue flame icon to the left of the word "Nexant" in a bold, blue, sans-serif font. The logo is set against a large, light blue, semi-transparent flame graphic that serves as a background for the text.

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Appendix A

MODELING ASSUMPTIONS & AVOIDED COSTS

- **Annual Avoided Energy Costs (Current):**

Year	Avoided Cost (\$)	Year	Avoided Cost (\$)
2014	\$0.460	2029	\$0.720
2015	\$0.510	2030	\$0.750
2016	\$0.510	2031	\$0.800
2017	\$0.510	2032	\$0.820
2018	\$0.520	2033	\$0.840
2019	\$0.550	2034	\$0.860
2020	\$0.560	2035	\$0.880
2021	\$0.570	2036	\$0.900
2022	\$0.620	2037	\$0.930
2023	\$0.630	2038	\$0.950
2024	\$0.650	2039	\$0.980
2025	\$0.650	2040	\$1.000
2026	\$0.690	2041	\$1.030
2027	\$0.720	2042	\$1.050
2028	\$0.730	2043	\$1.080

- **Avoided Capacity Costs:** n/a
- **Inflation Rate:** 2.60%
- **Discount Rate (s):** Commercial and Industrial: 8.55% UCT and TRC
Residential: 3.4% TRC, 8.55% UCT
- **Distribution Loss Rate:** 0.1959%

Appendix B Detailed Measure Assumptions

Details on each of the residential, commercial and industrial measures researched with savings, costs and EULs for all measure permutations are presented below. While Nexant modeled energy savings potential at the premise (i.e. building) level, measure savings (therms) and costs are presented at both the premise as well as the incremental unit level to aid with program planning. Measures in the tables below are organized by sector – residential, commercial, then industrial. Within each sector, measures are sorted alphabetically first by end use, then measure name, then segment, and finally vintage. Definitions for each vintage category are provided below:

- **Turnover:** A measure is installed at the end of existing equipment’s expected useful life (EUL). In other words, the existing measure is replaced on burn-out. For this measure vintage, measure savings are calculated compared to code (where applicable). Costs are calculated as the incremental cost over the code minimum cost.
- **New:** A measure is installed as a new building is constructed. For this measure vintage, measure savings are calculated compared to code (where applicable). Costs are calculated as the incremental cost over the code minimum cost.
- **Early Retirement:** A measure is installed before the end of the existing equipment’s expected useful life (EUL). In other words, the customer replaces the equipment while it’s still operational. For this measure vintage, measure savings are calculated compared to the existing equipment or non-equipment baseline energy consumption (generally lower than code). Costs are estimated as the full cost of the installed measure.

It should be noted that the measure costs utilized for the purposes of this potential assessment reflect average installation costs across various implementation scenarios and therefore may be at a lower resolution than costs available to Cascade for program planning. For program planning purposes Cascade may opt to refine costs to better reflect costs in their specific service territory.

B.1 Residential Sector Measures

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Clothes Washer	Residential	Early Retirement	Mfg_CZ1	1	Clothes Drying	11.0	55.0%	per premise	6	\$1,056	per unit	6	\$1,056
Residential Clothes Washer	Residential	Turnover	Mfg_CZ1	1	Clothes Drying	11.0	55.0%	per premise	6	\$396	per unit	6	\$396
Residential Clothes Washer	Residential	Early Retirement	Mfg_CZ2	2	Clothes Drying	11.0	55.0%	per premise	6	\$1,056	per unit	6	\$1,056
Residential Clothes Washer	Residential	Turnover	Mfg_CZ2	2	Clothes Drying	11.0	55.0%	per premise	6	\$396	per unit	6	\$396
Residential Clothes Washer	Residential	Early Retirement	Mfg_CZ3	3	Clothes Drying	11.0	55.0%	per premise	6	\$1,056	per unit	6	\$1,056
Residential Clothes Washer	Residential	Turnover	Mfg_CZ3	3	Clothes Drying	11.0	55.0%	per premise	6	\$396	per unit	6	\$396
Residential Clothes Washer	Residential	Early Retirement	Multi_CZ1	1	Clothes Drying	11.0	55.0%	per premise	5	\$1,056	per unit	5	\$1,056
Residential Clothes Washer	Residential	Turnover	Multi_CZ1	1	Clothes Drying	11.0	55.0%	per premise	5	\$396	per unit	5	\$396
Residential Clothes Washer	Residential	Early Retirement	Multi_CZ2	2	Clothes Drying	11.0	55.0%	per premise	5	\$1,056	per unit	5	\$1,056
Residential Clothes Washer	Residential	Turnover	Multi_CZ2	2	Clothes Drying	11.0	55.0%	per premise	5	\$396	per unit	5	\$396
Residential Clothes Washer	Residential	Early Retirement	Multi_CZ3	3	Clothes Drying	11.0	55.0%	per premise	5	\$1,056	per unit	5	\$1,056
Residential Clothes Washer	Residential	Turnover	Multi_CZ3	3	Clothes Drying	11.0	55.0%	per premise	5	\$396	per unit	5	\$396
Residential Clothes Washer	Residential	Early Retirement	Single_CZ_1	1	Clothes Drying	11.0	55.0%	per premise	7	\$1,056	per unit	7	\$1,056
Residential Clothes Washer	Residential	Turnover	Single_CZ_1	1	Clothes Drying	11.0	55.0%	per premise	7	\$396	per unit	7	\$396
Residential Clothes Washer	Residential	Early Retirement	Single_CZ_2	2	Clothes Drying	11.0	55.0%	per premise	7	\$1,056	per unit	7	\$1,056

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Clothes Washer	Residential	Turnover	Single_CZ_2	2	Clothes Drying	11.0	55.0%	per premise	7	\$396	per unit	7	\$396
Residential Clothes Washer	Residential	Early Retirement	Single_CZ_3	3	Clothes Drying	11.0	55.0%	per premise	7	\$1,056	per unit	7	\$1,056
Residential Clothes Washer	Residential	Turnover	Single_CZ_3	3	Clothes Drying	11.0	55.0%	per premise	7	\$396	per unit	7	\$396
Residential Energy Star Clothes Washer	Residential	New	Mfg_CZ1	1	Clothes Drying	11.0	55.0%	per premise	6	\$396	per unit	6	\$396
Residential Energy Star Clothes Washer	Residential	New	Mfg_CZ2	2	Clothes Drying	11.0	55.0%	per premise	6	\$396	per unit	6	\$396
Residential Energy Star Clothes Washer	Residential	New	Mfg_CZ3	3	Clothes Drying	11.0	55.0%	per premise	6	\$396	per unit	6	\$396
Residential Energy Star Clothes Washer	Residential	New	Multi_CZ1	1	Clothes Drying	11.0	55.0%	per premise	5	\$396	per unit	5	\$396
Residential Energy Star Clothes Washer	Residential	New	Multi_CZ2	2	Clothes Drying	11.0	55.0%	per premise	5	\$396	per unit	5	\$396
Residential Energy Star Clothes Washer	Residential	New	Multi_CZ3	3	Clothes Drying	11.0	55.0%	per premise	5	\$396	per unit	5	\$396
Residential Energy Star Clothes Washer	Residential	New	Single_CZ_1	1	Clothes Drying	11.0	55.0%	per premise	7	\$396	per unit	7	\$396
Residential Energy Star Clothes Washer	Residential	New	Single_CZ_2	2	Clothes Drying	11.0	55.0%	per premise	7	\$396	per unit	7	\$396
Residential Energy Star Clothes Washer	Residential	New	Single_CZ_3	3	Clothes Drying	11.0	55.0%	per premise	7	\$396	per unit	7	\$396
High Efficiency Spa / Pool Heating Boiler	Residential	Turnover	Single_CZ_1	1	Other	20.0	11.1%	per premise	498	\$630	per unit	498	\$630
High Efficiency Spa / Pool Heating Boiler	Residential	Turnover	Single_CZ_2	2	Other	20.0	11.1%	per premise	584	\$630	per unit	584	\$630
High Efficiency Spa / Pool Heating Boiler	Residential	Turnover	Single_CZ_3	3	Other	20.0	11.1%	per premise	563	\$630	per unit	563	\$630

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Mfg_CZ1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Mfg_CZ1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Mfg_CZ1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Mfg_CZ2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Mfg_CZ2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Mfg_CZ2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Mfg_CZ3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Mfg_CZ3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Mfg_CZ3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Multi_CZ1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Multi_CZ1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Multi_CZ1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Multi_CZ2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Multi_CZ2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Multi_CZ2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Multi_CZ3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Multi_CZ3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Multi_CZ3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Single_CZ 1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Single_CZ 1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Single_CZ 1	1	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Single_CZ 2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Single_CZ 2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Single_CZ 2	2	Room Heating	20.0	11.1%	per premise	74	\$600	per unit	74	\$600
High Efficiency Hearth - 80% AFUE	Residential	Early Retirement	Single_CZ 3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	New	Single_CZ 3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
High Efficiency Hearth - 80% AFUE	Residential	Turnover	Single_CZ 3	3	Room Heating	20.0	11.1%	per premise	76	\$600	per unit	76	\$600
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Mfg_CZ1	1	Space Heating	27.5	27.5%	per premise	116	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Mfg_CZ1	1	Space Heating	27.5	27.9%	per premise	110	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Mfg_CZ2	2	Space Heating	27.5	26.3%	per premise	111	\$461	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Attic/Ceiling Insulation R-0 to R49	Residential	New	Mfg_CZ2	2	Space Heating	27.5	26.7%	per premise	106	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Mfg_CZ3	3	Space Heating	27.5	31.0%	per premise	131	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Mfg_CZ3	3	Space Heating	27.5	31.4%	per premise	124	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Multi_CZ1	1	Space Heating	27.5	21.6%	per premise	116	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Multi_CZ1	1	Space Heating	27.5	21.9%	per premise	110	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Multi_CZ2	2	Space Heating	27.5	20.7%	per premise	111	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Multi_CZ2	2	Space Heating	27.5	20.9%	per premise	106	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Multi_CZ3	3	Space Heating	27.5	24.4%	per premise	131	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Multi_CZ3	3	Space Heating	27.5	24.6%	per premise	124	\$461	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Single_CZ 1	1	Space Heating	27.5	34.0%	per premise	194	\$768	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Single_CZ 1	1	Space Heating	27.5	34.4%	per premise	184	\$768	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Single_CZ 2	2	Space Heating	27.5	32.5%	per premise	185	\$768	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Single_CZ 2	2	Space Heating	27.5	32.9%	per premise	176	\$768	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	Existing	Single_CZ 3	3	Space Heating	27.5	38.3%	per premise	218	\$768	per sf installed	0	\$1
Attic/Ceiling Insulation R-0 to R49	Residential	New	Single_CZ 3	3	Space Heating	27.5	38.8%	per premise	207	\$768	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Mfg_CZ1	1	Space Heating	27.5	8.5%	per premise	36	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Mfg_CZ1	1	Space Heating	27.5	8.6%	per premise	34	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Mfg_CZ2	2	Space Heating	27.5	8.1%	per premise	34	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Mfg_CZ2	2	Space Heating	27.5	8.2%	per premise	32	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Mfg_CZ3	3	Space Heating	27.5	9.5%	per premise	40	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Mfg_CZ3	3	Space Heating	27.5	9.6%	per premise	38	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Multi_CZ1	1	Space Heating	27.5	6.6%	per premise	36	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Multi_CZ1	1	Space Heating	27.5	6.7%	per premise	34	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Multi_CZ2	2	Space Heating	27.5	6.3%	per premise	34	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Multi_CZ2	2	Space Heating	27.5	6.4%	per premise	32	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Multi_CZ3	3	Space Heating	27.5	7.5%	per premise	40	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Multi_CZ3	3	Space Heating	27.5	7.6%	per premise	38	\$372	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Single_CZ_1	1	Space Heating	27.5	10.4%	per premise	59	\$621	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Single_CZ_1	1	Space Heating	27.5	10.6%	per premise	56	\$621	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Single_CZ_2	2	Space Heating	27.5	10.0%	per premise	57	\$621	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Attic/Ceiling Insulation R-11 to R49	Residential	New	Single_CZ2	2	Space Heating	27.5	10.1%	per premise	54	\$621	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	Existing	Single_CZ3	3	Space Heating	27.5	11.8%	per premise	67	\$621	per sf installed	0	\$1
Attic/Ceiling Insulation R-11 to R49	Residential	New	Single_CZ3	3	Space Heating	27.5	11.9%	per premise	64	\$621	per sf installed	0	\$1
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Mfg_CZ1	1	Space Heating	27.5	3.5%	per premise	15	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Mfg_CZ1	1	Space Heating	27.5	3.6%	per premise	14	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Mfg_CZ2	2	Space Heating	27.5	3.4%	per premise	14	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Mfg_CZ2	2	Space Heating	27.5	3.4%	per premise	13	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Mfg_CZ3	3	Space Heating	27.5	4.0%	per premise	17	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Mfg_CZ3	3	Space Heating	27.5	4.0%	per premise	16	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Multi_CZ1	1	Space Heating	27.5	2.8%	per premise	15	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Multi_CZ1	1	Space Heating	27.5	2.8%	per premise	14	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Multi_CZ2	2	Space Heating	27.5	2.6%	per premise	14	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Multi_CZ2	2	Space Heating	27.5	2.7%	per premise	13	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Multi_CZ3	3	Space Heating	27.5	3.1%	per premise	17	\$196	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Multi_CZ3	3	Space Heating	27.5	3.1%	per premise	16	\$196	per sf installed	0	\$0

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Single_CZ_1	1	Space Heating	27.5	4.3%	per premise	25	\$327	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Single_CZ_1	1	Space Heating	27.5	4.4%	per premise	23	\$327	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Single_CZ_2	2	Space Heating	27.5	4.1%	per premise	24	\$327	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Single_CZ_2	2	Space Heating	27.5	4.2%	per premise	22	\$327	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	Existing	Single_CZ_3	3	Space Heating	27.5	4.9%	per premise	28	\$327	per sf installed	0	\$0
Attic/Ceiling Insulation R-18 to R38	Residential	New	Single_CZ_3	3	Space Heating	27.5	4.9%	per premise	26	\$327	per sf installed	0	\$0
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Mfg_CZ1	1	Space Heating	27.5	3.9%	per premise	16	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Mfg_CZ2	2	Space Heating	27.5	3.7%	per premise	16	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Mfg_CZ3	3	Space Heating	27.5	4.4%	per premise	18	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Multi_CZ1	1	Space Heating	27.5	3.0%	per premise	16	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	New	Multi_CZ1	1	Space Heating	27.5	3.1%	per premise	15	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Multi_CZ2	2	Space Heating	27.5	2.9%	per premise	16	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	New	Multi_CZ2	2	Space Heating	27.5	3.5%	per premise	17	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Multi_CZ3	3	Space Heating	27.5	3.4%	per premise	18	\$294	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	New	Multi_CZ3	3	Space Heating	27.5	3.5%	per premise	17	\$294	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Single_CZ_1	1	Space Heating	27.5	4.8%	per premise	27	\$490	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Single_CZ_2	2	Space Heating	27.5	4.6%	per premise	26	\$490	per sf installed	0	\$1
Attic/Ceiling Insulation R-19 to R49	Residential	Existing	Single_CZ_3	3	Space Heating	27.5	5.4%	per premise	31	\$490	per sf installed	0	\$1
Basement Insulation, Side Wall	Residential	Existing	Mfg_CZ1	1	Space Heating	27.5	19.3%	per premise	81	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Mfg_CZ2	2	Space Heating	27.5	18.5%	per premise	78	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Mfg_CZ3	3	Space Heating	27.5	21.8%	per premise	92	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Multi_CZ1	1	Space Heating	27.5	15.1%	per premise	81	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Multi_CZ2	2	Space Heating	27.5	14.5%	per premise	78	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Multi_CZ3	3	Space Heating	27.5	17.1%	per premise	92	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Single_CZ_1	1	Space Heating	27.5	14.3%	per premise	81	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Single_CZ_2	2	Space Heating	27.5	13.7%	per premise	78	\$87	per sf installed	0	\$0
Basement Insulation, Side Wall	Residential	Existing	Single_CZ_3	3	Space Heating	27.5	16.1%	per premise	92	\$87	per sf installed	0	\$0
Boiler Controls	Residential	Existing	Mfg_CZ1	1	Space Heating	20.0	10.6%	per premise	63	\$599	per unit	63	\$599
Boiler Controls	Residential	New	Mfg_CZ1	1	Space Heating	20.0	10.6%	per premise	60	\$599	per unit	60	\$599
Boiler Controls	Residential	Existing	Mfg_CZ2	2	Space Heating	20.0	10.6%	per premise	61	\$599	per unit	61	\$599

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Boiler Controls	Residential	New	Mfg_CZ2	2	Space Heating	20.0	10.6%	per premise	58	\$599	per unit	58	\$599
Boiler Controls	Residential	Existing	Mfg_CZ3	3	Space Heating	20.0	10.6%	per premise	64	\$599	per unit	64	\$599
Boiler Controls	Residential	New	Mfg_CZ3	3	Space Heating	20.0	10.6%	per premise	60	\$599	per unit	60	\$599
Boiler Controls	Residential	Existing	Multi_CZ1	1	Space Heating	20.0	10.6%	per premise	56	\$599	per unit	56	\$599
Boiler Controls	Residential	New	Multi_CZ1	1	Space Heating	20.0	10.6%	per premise	53	\$599	per unit	53	\$599
Boiler Controls	Residential	Existing	Multi_CZ2	2	Space Heating	20.0	10.6%	per premise	55	\$599	per unit	55	\$599
Boiler Controls	Residential	New	Multi_CZ2	2	Space Heating	20.0	10.6%	per premise	52	\$599	per unit	52	\$599
Boiler Controls	Residential	Existing	Multi_CZ3	3	Space Heating	20.0	10.6%	per premise	56	\$599	per unit	56	\$599
Boiler Controls	Residential	New	Multi_CZ3	3	Space Heating	20.0	10.6%	per premise	54	\$599	per unit	54	\$599
Boiler Controls	Residential	Existing	Single_CZ_1	1	Space Heating	20.0	10.6%	per premise	84	\$599	per unit	84	\$599
Boiler Controls	Residential	New	Single_CZ_1	1	Space Heating	20.0	10.6%	per premise	80	\$599	per unit	80	\$599
Boiler Controls	Residential	Existing	Single_CZ_2	2	Space Heating	20.0	10.6%	per premise	82	\$599	per unit	82	\$599
Boiler Controls	Residential	New	Single_CZ_2	2	Space Heating	20.0	10.6%	per premise	78	\$599	per unit	78	\$599
Boiler Controls	Residential	Existing	Single_CZ_3	3	Space Heating	20.0	10.6%	per premise	85	\$599	per unit	85	\$599
Boiler Controls	Residential	New	Single_CZ_3	3	Space Heating	20.0	10.6%	per premise	80	\$599	per unit	80	\$599

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Boiler Repair/Tune-Up	Residential	Existing	Mfg_CZ1	1	Space Heating	4.0	2.1%	per premise	13	\$150	per unit	13	\$150
Boiler Repair/Tune-Up	Residential	Existing	Mfg_CZ2	2	Space Heating	4.0	2.1%	per premise	12	\$150	per unit	12	\$150
Boiler Repair/Tune-Up	Residential	Existing	Mfg_CZ3	3	Space Heating	4.0	2.1%	per premise	13	\$150	per unit	13	\$150
Boiler Repair/Tune-Up	Residential	Existing	Multi_CZ1	1	Space Heating	4.0	2.4%	per premise	13	\$150	per unit	13	\$150
Boiler Repair/Tune-Up	Residential	Existing	Multi_CZ2	2	Space Heating	4.0	2.4%	per premise	12	\$150	per unit	12	\$150
Boiler Repair/Tune-Up	Residential	Existing	Multi_CZ3	3	Space Heating	4.0	2.4%	per premise	13	\$150	per unit	13	\$150
Boiler Repair/Tune-Up	Residential	Existing	Single_CZ_1	1	Space Heating	4.0	1.6%	per premise	13	\$150	per unit	13	\$150
Boiler Repair/Tune-Up	Residential	Existing	Single_CZ_2	2	Space Heating	4.0	1.6%	per premise	12	\$150	per unit	12	\$150
Boiler Repair/Tune-Up	Residential	Existing	Single_CZ_3	3	Space Heating	4.0	1.6%	per premise	13	\$150	per unit	13	\$150
Condensing Boiler	Residential	Early Retirement	Mfg_CZ1	1	Space Heating	21.0	20.8%	per premise	125	\$3,279	per unit	125	\$3,279
Condensing Boiler	Residential	New	Mfg_CZ1	1	Space Heating	21.0	16.7%	per premise	95	\$1,747	per unit	95	\$1,747
Condensing Boiler	Residential	Turnover	Mfg_CZ1	1	Space Heating	21.0	16.7%	per premise	95	\$1,747	per unit	95	\$1,747
Condensing Boiler	Residential	Early Retirement	Mfg_CZ2	2	Space Heating	21.0	20.8%	per premise	121	\$3,279	per unit	121	\$3,279
Condensing Boiler	Residential	New	Mfg_CZ2	2	Space Heating	21.0	16.7%	per premise	92	\$1,747	per unit	92	\$1,747
Condensing Boiler	Residential	Turnover	Mfg_CZ2	2	Space Heating	21.0	16.7%	per premise	92	\$1,747	per unit	92	\$1,747

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Condensing Boiler	Residential	Early Retirement	Mfg_CZ3	3	Space Heating	21.0	20.8%	per premise	125	\$3,279	per unit	125	\$3,279
Condensing Boiler	Residential	New	Mfg_CZ3	3	Space Heating	21.0	16.7%	per premise	95	\$1,747	per unit	95	\$1,747
Condensing Boiler	Residential	Turnover	Mfg_CZ3	3	Space Heating	21.0	16.7%	per premise	95	\$1,747	per unit	95	\$1,747
Condensing Boiler	Residential	Early Retirement	Multi_CZ1	1	Space Heating	21.0	20.8%	per premise	111	\$3,279	per unit	111	\$3,279
Condensing Boiler	Residential	New	Multi_CZ1	1	Space Heating	21.0	16.7%	per premise	84	\$1,747	per unit	84	\$1,747
Condensing Boiler	Residential	Turnover	Multi_CZ1	1	Space Heating	21.0	16.7%	per premise	84	\$1,747	per unit	84	\$1,747
Condensing Boiler	Residential	Early Retirement	Multi_CZ2	2	Space Heating	21.0	20.8%	per premise	108	\$3,279	per unit	108	\$3,279
Condensing Boiler	Residential	New	Multi_CZ2	2	Space Heating	21.0	16.7%	per premise	82	\$1,747	per unit	82	\$1,747
Condensing Boiler	Residential	Turnover	Multi_CZ2	2	Space Heating	21.0	16.7%	per premise	82	\$1,747	per unit	82	\$1,747
Condensing Boiler	Residential	Early Retirement	Multi_CZ3	3	Space Heating	21.0	20.8%	per premise	111	\$3,279	per unit	111	\$3,279
Condensing Boiler	Residential	New	Multi_CZ3	3	Space Heating	21.0	16.7%	per premise	85	\$1,747	per unit	85	\$1,747
Condensing Boiler	Residential	Turnover	Multi_CZ3	3	Space Heating	21.0	16.7%	per premise	85	\$1,747	per unit	85	\$1,747
Condensing Boiler	Residential	Early Retirement	Single_CZ_1	1	Space Heating	21.0	20.8%	per premise	166	\$3,279	per unit	166	\$3,279
Condensing Boiler	Residential	New	Single_CZ_1	1	Space Heating	21.0	16.7%	per premise	126	\$1,747	per unit	126	\$1,747
Condensing Boiler	Residential	Turnover	Single_CZ_1	1	Space Heating	21.0	16.7%	per premise	126	\$1,747	per unit	126	\$1,747

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Condensing Boiler	Residential	Early Retirement	Single_CZ_2	2	Space Heating	21.0	20.8%	per premise	162	\$3,279	per unit	162	\$3,279
Condensing Boiler	Residential	New	Single_CZ_2	2	Space Heating	21.0	16.7%	per premise	123	\$1,747	per unit	123	\$1,747
Condensing Boiler	Residential	Turnover	Single_CZ_2	2	Space Heating	21.0	16.7%	per premise	123	\$1,747	per unit	123	\$1,747
Condensing Boiler	Residential	Early Retirement	Single_CZ_3	3	Space Heating	21.0	20.8%	per premise	167	\$3,279	per unit	167	\$3,279
Condensing Boiler	Residential	New	Single_CZ_3	3	Space Heating	21.0	16.7%	per premise	127	\$1,747	per unit	127	\$1,747
Condensing Boiler	Residential	Turnover	Single_CZ_3	3	Space Heating	21.0	16.7%	per premise	127	\$1,747	per unit	127	\$1,747
Duct Sealing & Insulation	Residential	Existing	Mfg_CZ1	1	Space Heating	20.0	6.1%	per premise	26	\$704	per sf installed	0	\$2
Duct Sealing & Insulation	Residential	New	Mfg_CZ1	1	Space Heating	20.0	1.3%	per premise	5	\$704	per sf installed	0	\$2
Duct Sealing & Insulation	Residential	Existing	Mfg_CZ2	2	Space Heating	20.0	5.9%	per premise	25	\$704	per sf installed	0	\$2
Duct Sealing & Insulation	Residential	New	Mfg_CZ2	2	Space Heating	20.0	1.3%	per premise	5	\$704	per sf installed	0	\$2
Duct Sealing & Insulation	Residential	Existing	Mfg_CZ3	3	Space Heating	20.0	6.1%	per premise	26	\$704	per sf installed	0	\$2
Duct Sealing & Insulation	Residential	New	Mfg_CZ3	3	Space Heating	20.0	1.3%	per premise	5	\$704	per sf installed	0	\$2
Duct Sealing & Insulation	Residential	Existing	Multi_CZ1	1	Space Heating	20.0	4.8%	per premise	26	\$480	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	New	Multi_CZ1	1	Space Heating	20.0	1.0%	per premise	5	\$480	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	Existing	Multi_CZ2	2	Space Heating	20.0	4.6%	per premise	25	\$480	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Duct Sealing & Insulation	Residential	New	Multi_CZ2	2	Space Heating	20.0	1.0%	per premise	5	\$480	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	Existing	Multi_CZ3	3	Space Heating	20.0	4.8%	per premise	26	\$480	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	New	Multi_CZ3	3	Space Heating	20.0	1.0%	per premise	5	\$480	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	Existing	Single_CZ_1	1	Space Heating	20.0	4.9%	per premise	28	\$749	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	New	Single_CZ_1	1	Space Heating	20.0	1.0%	per premise	6	\$749	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	Existing	Single_CZ_2	2	Space Heating	20.0	4.7%	per premise	27	\$749	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	New	Single_CZ_2	2	Space Heating	20.0	1.0%	per premise	5	\$749	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	Existing	Single_CZ_3	3	Space Heating	20.0	4.9%	per premise	28	\$749	per sf installed	0	\$1
Duct Sealing & Insulation	Residential	New	Single_CZ_3	3	Space Heating	20.0	1.0%	per premise	6	\$749	per sf installed	0	\$1
Energy Star Home	Residential	New	Single_CZ_1	1	Space Heating	7.5	27.0%	per premise	206	\$1,142	per building	206	\$1,142
Energy Star Home	Residential	New	Single_CZ_2	2	Space Heating	7.5	27.0%	per premise	200	\$1,142	per building	200	\$1,142
Energy Star Home	Residential	New	Single_CZ_3	3	Space Heating	7.5	27.0%	per premise	207	\$1,142	per building	207	\$1,142
Entryway Door	Residential	Existing	Mfg_CZ1	1	Space Heating	25.0	2.3%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Mfg_CZ1	1	Space Heating	25.0	2.4%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Mfg_CZ2	2	Space Heating	25.0	2.4%	per premise	13	\$200	per unit	13	\$200

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Entryway Door	Residential	New	Mfg_CZ2	2	Space Heating	25.0	2.5%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Mfg_CZ3	3	Space Heating	25.0	2.0%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Mfg_CZ3	3	Space Heating	25.0	2.2%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Multi_CZ1	1	Space Heating	25.0	2.3%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Multi_CZ1	1	Space Heating	25.0	2.4%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Multi_CZ2	2	Space Heating	25.0	2.4%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Multi_CZ2	2	Space Heating	25.0	2.5%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Multi_CZ3	3	Space Heating	25.0	2.0%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Multi_CZ3	3	Space Heating	25.0	2.2%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Single_CZ_1	1	Space Heating	25.0	2.3%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Single_CZ_1	1	Space Heating	25.0	2.4%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Single_CZ_2	2	Space Heating	25.0	2.4%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Single_CZ_2	2	Space Heating	25.0	2.5%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	Existing	Single_CZ_3	3	Space Heating	25.0	2.0%	per premise	13	\$200	per unit	13	\$200
Entryway Door	Residential	New	Single_CZ_3	3	Space Heating	25.0	2.2%	per premise	13	\$200	per unit	13	\$200

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Mfg_CZ1	1	Space Heating	25.0	25.5%	per premise	108	\$1,998	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Mfg_CZ2	2	Space Heating	25.0	24.4%	per premise	103	\$1,998	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Mfg_CZ3	3	Space Heating	25.0	28.8%	per premise	121	\$1,998	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Multi_CZ1	1	Space Heating	25.0	19.3%	per premise	104	\$1,929	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Multi_CZ2	2	Space Heating	25.0	18.5%	per premise	99	\$1,929	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Multi_CZ3	3	Space Heating	25.0	21.8%	per premise	117	\$1,929	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Single_CZ 1	1	Space Heating	25.0	20.6%	per premise	117	\$2,171	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Single_CZ 2	2	Space Heating	25.0	19.7%	per premise	112	\$2,171	per sf installed	0	\$2
Floor & Crawlspace Insulation R-4.94 to R30	Residential	Existing	Single_CZ 3	3	Space Heating	25.0	23.2%	per premise	132	\$2,171	per sf installed	0	\$2
Furnace Repair/Tune-Up	Residential	Existing	Mfg_CZ1	1	Space Heating	4.0	5.8%	per premise	33	\$150	per furnace	33	\$150
Furnace Repair/Tune-Up	Residential	Existing	Mfg_CZ2	2	Space Heating	4.0	5.8%	per premise	32	\$150	per furnace	32	\$150
Furnace Repair/Tune-Up	Residential	Existing	Mfg_CZ3	3	Space Heating	4.0	5.8%	per premise	33	\$150	per furnace	33	\$150
Furnace Repair/Tune-Up	Residential	Existing	Multi_CZ1	1	Space Heating	4.0	6.5%	per premise	33	\$150	per furnace	33	\$150
Furnace Repair/Tune-Up	Residential	Existing	Multi_CZ2	2	Space Heating	4.0	5.8%	per premise	28	\$150	per furnace	28	\$150
Furnace Repair/Tune-Up	Residential	Existing	Multi_CZ3	3	Space Heating	4.0	5.8%	per premise	29	\$150	per furnace	29	\$150

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Furnace Repair/Tune-Up	Residential	Existing	Single_CZ1	1	Space Heating	4.0	5.8%	per premise	44	\$150	per furnace	44	\$150
Furnace Repair/Tune-Up	Residential	Existing	Single_CZ2	2	Space Heating	4.0	5.8%	per premise	43	\$150	per furnace	43	\$150
Furnace Repair/Tune-Up	Residential	Existing	Single_CZ3	3	Space Heating	4.0	5.8%	per premise	44	\$150	per furnace	44	\$150
Heat Recovery Ventilator	Residential	Existing	Mfg_CZ1	1	Space Heating	20.0	12.9%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Mfg_CZ1	1	Space Heating	20.0	13.5%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	Existing	Mfg_CZ2	2	Space Heating	20.0	13.2%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Mfg_CZ2	2	Space Heating	20.0	13.9%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	Existing	Mfg_CZ3	3	Space Heating	20.0	12.9%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Mfg_CZ3	3	Space Heating	20.0	13.6%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	Existing	Multi_CZ1	1	Space Heating	20.0	14.5%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Multi_CZ1	1	Space Heating	20.0	15.2%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	Existing	Multi_CZ2	2	Space Heating	20.0	14.9%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Multi_CZ2	2	Space Heating	20.0	15.7%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	Existing	Multi_CZ3	3	Space Heating	20.0	14.5%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Multi_CZ3	3	Space Heating	20.0	15.3%	per premise	77	\$442	per unit	77	\$442

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Heat Recovery Ventilator	Residential	Existing	Single_CZ_1	1	Space Heating	20.0	9.6%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Single_CZ_1	1	Space Heating	20.0	10.1%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	Existing	Single_CZ_2	2	Space Heating	20.0	9.9%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Single_CZ_2	2	Space Heating	20.0	10.5%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	Existing	Single_CZ_3	3	Space Heating	20.0	9.7%	per premise	77	\$442	per unit	77	\$442
Heat Recovery Ventilator	Residential	New	Single_CZ_3	3	Space Heating	20.0	10.2%	per premise	77	\$442	per unit	77	\$442
High Efficiency Boiler	Residential	Early Retirement	Mfg_CZ1	1	Space Heating	20.0	15.6%	per premise	93	\$1,706	per unit	93	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Mfg_CZ1	1	Space Heating	20.0	15.6%	per premise	93	\$1,706	per unit	93	\$1,706
High Efficiency Boiler	Residential	New	Mfg_CZ1	1	Space Heating	20.0	11.1%	per premise	63	\$630	per unit	63	\$630
High Efficiency Boiler	Residential	New	Mfg_CZ1	1	Space Heating	20.0	11.1%	per premise	63	\$630	per unit	63	\$630
High Efficiency Boiler	Residential	Turnover	Mfg_CZ1	1	Space Heating	20.0	11.1%	per premise	63	\$630	per unit	63	\$630
High Efficiency Boiler	Residential	Turnover	Mfg_CZ1	1	Space Heating	20.0	11.1%	per premise	63	\$630	per unit	63	\$630
High Efficiency Boiler	Residential	Early Retirement	Mfg_CZ2	2	Space Heating	20.0	15.6%	per premise	90	\$1,706	per unit	90	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Mfg_CZ2	2	Space Heating	20.0	15.6%	per premise	90	\$1,706	per unit	90	\$1,706
High Efficiency Boiler	Residential	New	Mfg_CZ2	2	Space Heating	20.0	11.1%	per premise	61	\$630	per unit	61	\$630

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Boiler	Residential	New	Mfg_CZ2	2	Space Heating	20.0	11.1%	per premise	61	\$630	per unit	61	\$630
High Efficiency Boiler	Residential	Turnover	Mfg_CZ2	2	Space Heating	20.0	11.1%	per premise	61	\$630	per unit	61	\$630
High Efficiency Boiler	Residential	Turnover	Mfg_CZ2	2	Space Heating	20.0	11.1%	per premise	61	\$630	per unit	61	\$630
High Efficiency Boiler	Residential	Early Retirement	Mfg_CZ3	3	Space Heating	20.0	15.6%	per premise	94	\$1,706	per unit	94	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Mfg_CZ3	3	Space Heating	20.0	15.6%	per premise	94	\$1,706	per unit	94	\$1,706
High Efficiency Boiler	Residential	New	Mfg_CZ3	3	Space Heating	20.0	11.1%	per premise	64	\$630	per unit	64	\$630
High Efficiency Boiler	Residential	New	Mfg_CZ3	3	Space Heating	20.0	11.1%	per premise	64	\$630	per unit	64	\$630
High Efficiency Boiler	Residential	Turnover	Mfg_CZ3	3	Space Heating	20.0	11.1%	per premise	64	\$630	per unit	64	\$630
High Efficiency Boiler	Residential	Turnover	Mfg_CZ3	3	Space Heating	20.0	11.1%	per premise	64	\$630	per unit	64	\$630
High Efficiency Boiler	Residential	Early Retirement	Multi_CZ1	1	Space Heating	20.0	15.6%	per premise	83	\$1,706	per unit	83	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Multi_CZ1	1	Space Heating	20.0	15.6%	per premise	83	\$1,706	per unit	83	\$1,706
High Efficiency Boiler	Residential	New	Multi_CZ1	1	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630
High Efficiency Boiler	Residential	New	Multi_CZ1	1	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630
High Efficiency Boiler	Residential	Turnover	Multi_CZ1	1	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630
High Efficiency Boiler	Residential	Turnover	Multi_CZ1	1	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Boiler	Residential	Early Retirement	Multi_CZ2	2	Space Heating	20.0	15.6%	per premise	80	\$1,706	per unit	80	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Multi_CZ2	2	Space Heating	20.0	15.6%	per premise	80	\$1,706	per unit	80	\$1,706
High Efficiency Boiler	Residential	New	Multi_CZ2	2	Space Heating	20.0	11.1%	per premise	55	\$630	per unit	55	\$630
High Efficiency Boiler	Residential	New	Multi_CZ2	2	Space Heating	20.0	11.1%	per premise	55	\$630	per unit	55	\$630
High Efficiency Boiler	Residential	Turnover	Multi_CZ2	2	Space Heating	20.0	11.1%	per premise	55	\$630	per unit	55	\$630
High Efficiency Boiler	Residential	Turnover	Multi_CZ2	2	Space Heating	20.0	11.1%	per premise	55	\$630	per unit	55	\$630
High Efficiency Boiler	Residential	Early Retirement	Multi_CZ3	3	Space Heating	20.0	15.6%	per premise	83	\$1,706	per unit	83	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Multi_CZ3	3	Space Heating	20.0	15.6%	per premise	83	\$1,706	per unit	83	\$1,706
High Efficiency Boiler	Residential	New	Multi_CZ3	3	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630
High Efficiency Boiler	Residential	New	Multi_CZ3	3	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630
High Efficiency Boiler	Residential	Turnover	Multi_CZ3	3	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630
High Efficiency Boiler	Residential	Turnover	Multi_CZ3	3	Space Heating	20.0	11.1%	per premise	56	\$630	per unit	56	\$630
High Efficiency Boiler	Residential	Early Retirement	Single_CZ 1	1	Space Heating	20.0	15.6%	per premise	124	\$1,706	per unit	124	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Single_CZ 1	1	Space Heating	20.0	15.6%	per premise	124	\$1,706	per unit	124	\$1,706
High Efficiency Boiler	Residential	New	Single_CZ 1	1	Space Heating	20.0	11.1%	per premise	84	\$630	per unit	84	\$630

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Boiler	Residential	New	Single_CZ_1	1	Space Heating	20.0	11.1%	per premise	84	\$630	per unit	84	\$630
High Efficiency Boiler	Residential	Turnover	Single_CZ_1	1	Space Heating	20.0	11.1%	per premise	84	\$630	per unit	84	\$630
High Efficiency Boiler	Residential	Turnover	Single_CZ_1	1	Space Heating	20.0	11.1%	per premise	84	\$630	per unit	84	\$630
High Efficiency Boiler	Residential	Early Retirement	Single_CZ_2	2	Space Heating	20.0	15.6%	per premise	121	\$1,706	per unit	121	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Single_CZ_2	2	Space Heating	20.0	15.6%	per premise	121	\$1,706	per unit	121	\$1,706
High Efficiency Boiler	Residential	New	Single_CZ_2	2	Space Heating	20.0	11.1%	per premise	82	\$630	per unit	82	\$630
High Efficiency Boiler	Residential	New	Single_CZ_2	2	Space Heating	20.0	11.1%	per premise	82	\$630	per unit	82	\$630
High Efficiency Boiler	Residential	Turnover	Single_CZ_2	2	Space Heating	20.0	11.1%	per premise	82	\$630	per unit	82	\$630
High Efficiency Boiler	Residential	Turnover	Single_CZ_2	2	Space Heating	20.0	11.1%	per premise	82	\$630	per unit	82	\$630
High Efficiency Boiler	Residential	Early Retirement	Single_CZ_3	3	Space Heating	20.0	15.6%	per premise	125	\$1,706	per unit	125	\$1,706
High Efficiency Boiler	Residential	Early Retirement	Single_CZ_3	3	Space Heating	20.0	15.6%	per premise	125	\$1,706	per unit	125	\$1,706
High Efficiency Boiler	Residential	New	Single_CZ_3	3	Space Heating	20.0	11.1%	per premise	85	\$630	per unit	85	\$630
High Efficiency Boiler	Residential	New	Single_CZ_3	3	Space Heating	20.0	11.1%	per premise	85	\$630	per unit	85	\$630
High Efficiency Boiler	Residential	Turnover	Single_CZ_3	3	Space Heating	20.0	11.1%	per premise	85	\$630	per unit	85	\$630
High Efficiency Boiler	Residential	Turnover	Single_CZ_3	3	Space Heating	20.0	11.1%	per premise	85	\$630	per unit	85	\$630

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Mfg_CZ1	1	Space Heating	21.0	49.8%	per premise	490	\$11,978	per unit	490	\$11,978
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	New	Mfg_CZ1	1	Space Heating	21.0	46.7%	per premise	433	\$971	per unit	433	\$971
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Mfg_CZ1	1	Space Heating	21.0	46.7%	per premise	433	\$10,458	per unit	433	\$10,458
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Mfg_CZ2	2	Space Heating	21.0	50.1%	per premise	482	\$11,978	per unit	482	\$11,978
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	New	Mfg_CZ2	2	Space Heating	21.0	47.1%	per premise	426	\$971	per unit	426	\$971
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Mfg_CZ2	2	Space Heating	21.0	47.1%	per premise	426	\$10,458	per unit	426	\$10,458
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Mfg_CZ3	3	Space Heating	21.0	49.7%	per premise	491	\$11,978	per unit	491	\$11,978
High efficiency combination domestic hot water and hydronic space heating system	Residential	New	Mfg_CZ3	3	Space Heating	21.0	46.6%	per premise	434	\$971	per unit	434	\$971

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
using pre-approved tankless water heater													
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Mfg_CZ3	3	Space Heating	21.0	46.6%	per premise	434	\$10,458	per unit	434	\$10,458
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Multi_CZ1	1	Space Heating	21.0	46.9%	per premise	436	\$14,061	per unit	436	\$14,061
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	New	Multi_CZ1	1	Space Heating	21.0	43.7%	per premise	384	\$971	per unit	384	\$971
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Multi_CZ1	1	Space Heating	21.0	43.7%	per premise	384	\$12,541	per unit	384	\$12,541
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Multi_CZ2	2	Space Heating	21.0	47.2%	per premise	429	\$14,061	per unit	429	\$14,061
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	New	Multi_CZ2	2	Space Heating	21.0	44.0%	per premise	377	\$971	per unit	377	\$971
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Multi_CZ2	2	Space Heating	21.0	44.0%	per premise	377	\$12,541	per unit	377	\$12,541

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Multi_CZ3	3	Space Heating	21.0	46.9%	per premise	438	\$14,061	per unit	438	\$14,061
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	New	Multi_CZ3	3	Space Heating	21.0	43.7%	per premise	385	\$971	per unit	385	\$971
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Multi_CZ3	3	Space Heating	21.0	43.7%	per premise	385	\$12,541	per unit	385	\$12,541
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Single_CZ 1	1	Space Heating	21.0	50.2%	per premise	537	\$27,163	per unit	537	\$27,163
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	New	Single_CZ 1	1	Space Heating	21.0	47.2%	per premise	475	\$1,716	per unit	475	\$1,716
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Single_CZ 1	1	Space Heating	21.0	47.2%	per premise	475	\$25,643	per unit	475	\$25,643
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Single_CZ 2	2	Space Heating	21.0	50.6%	per premise	529	\$27,163	per unit	529	\$27,163
High efficiency combination domestic hot water and hydronic space heating system	Residential	New	Single_CZ 2	2	Space Heating	21.0	47.5%	per premise	468	\$1,716	per unit	468	\$1,716

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
using pre-approved tankless water heater													
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Single_CZ_2	2	Space Heating	21.0	47.5%	per premise	468	\$25,643	per unit	468	\$25,643
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Early Retirement	Single_CZ_3	3	Space Heating	21.0	50.2%	per premise	539	\$27,163	per unit	539	\$27,163
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	New	Single_CZ_3	3	Space Heating	21.0	47.1%	per premise	476	\$1,716	per unit	476	\$1,716
High efficiency combination domestic hot water and hydronic space heating system using pre-approved tankless water heater	Residential	Turnover	Single_CZ_3	3	Space Heating	21.0	47.1%	per premise	476	\$25,643	per unit	476	\$25,643
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Mfg_CZ1	1	Space Heating	18.0	11.7%	per premise	90	\$1,282	per unit	90	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Mfg_CZ1	1	Space Heating	18.0	9.7%	per premise	71	\$465	per unit	71	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Mfg_CZ1	1	Space Heating	18.0	9.7%	per premise	71	\$465	per unit	71	\$465
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Mfg_CZ2	2	Space Heating	18.0	11.7%	per premise	90	\$1,282	per unit	90	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Mfg_CZ2	2	Space Heating	18.0	9.8%	per premise	71	\$465	per unit	71	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Mfg_CZ2	2	Space Heating	18.0	9.8%	per premise	71	\$465	per unit	71	\$465

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Mfg_CZ3	3	Space Heating	18.0	11.7%	per premise	91	\$1,282	per unit	91	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Mfg_CZ3	3	Space Heating	18.0	9.7%	per premise	71	\$465	per unit	71	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Mfg_CZ3	3	Space Heating	18.0	9.7%	per premise	71	\$465	per unit	71	\$465
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Multi_CZ1	1	Space Heating	18.0	11.5%	per premise	93	\$1,282	per unit	93	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Multi_CZ1	1	Space Heating	18.0	9.5%	per premise	73	\$465	per unit	73	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Multi_CZ1	1	Space Heating	18.0	9.5%	per premise	73	\$465	per unit	73	\$465
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Multi_CZ2	2	Space Heating	18.0	11.6%	per premise	92	\$1,282	per unit	92	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Multi_CZ2	2	Space Heating	18.0	9.6%	per premise	73	\$465	per unit	73	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Multi_CZ2	2	Space Heating	18.0	9.6%	per premise	73	\$465	per unit	73	\$465
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Multi_CZ3	3	Space Heating	18.0	11.5%	per premise	93	\$1,282	per unit	93	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Multi_CZ3	3	Space Heating	18.0	9.5%	per premise	73	\$465	per unit	73	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Multi_CZ3	3	Space Heating	18.0	9.5%	per premise	73	\$465	per unit	73	\$465
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Single_CZ_1	1	Space Heating	18.0	11.1%	per premise	101	\$1,282	per unit	101	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Single_CZ_1	1	Space Heating	18.0	9.1%	per premise	78	\$465	per unit	78	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Single_CZ_1	1	Space Heating	18.0	9.1%	per premise	78	\$465	per unit	78	\$465

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Single_CZ 2	2	Space Heating	18.0	11.2%	per premise	100	\$1,282	per unit	100	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Single_CZ 2	2	Space Heating	18.0	9.1%	per premise	78	\$465	per unit	78	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Single_CZ 2	2	Space Heating	18.0	9.1%	per premise	78	\$465	per unit	78	\$465
High Efficiency Furnace 90 AFUE	Residential	Early Retirement	Single_CZ 3	3	Space Heating	18.0	11.1%	per premise	101	\$1,282	per unit	101	\$1,282
High Efficiency Furnace 90 AFUE	Residential	New	Single_CZ 3	3	Space Heating	18.0	9.1%	per premise	78	\$465	per unit	78	\$465
High Efficiency Furnace 90 AFUE	Residential	Turnover	Single_CZ 3	3	Space Heating	18.0	9.1%	per premise	78	\$465	per unit	78	\$465
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Mfg_CZ1	1	Space Heating	18.0	15.5%	per premise	120	\$1,874	per unit	120	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Mfg_CZ1	1	Space Heating	18.0	13.7%	per premise	101	\$1,024	per unit	101	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Mfg_CZ1	1	Space Heating	18.0	13.7%	per premise	101	\$1,024	per unit	101	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Mfg_CZ2	2	Space Heating	18.0	15.6%	per premise	119	\$1,874	per unit	119	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Mfg_CZ2	2	Space Heating	18.0	13.8%	per premise	100	\$1,024	per unit	100	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Mfg_CZ2	2	Space Heating	18.0	13.8%	per premise	100	\$1,024	per unit	100	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Mfg_CZ3	3	Space Heating	18.0	15.5%	per premise	120	\$1,874	per unit	120	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Mfg_CZ3	3	Space Heating	18.0	13.7%	per premise	101	\$1,024	per unit	101	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Mfg_CZ3	3	Space Heating	18.0	13.7%	per premise	101	\$1,024	per unit	101	\$1,024

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Multi_CZ1	1	Space Heating	18.0	15.3%	per premise	123	\$1,874	per unit	123	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Multi_CZ1	1	Space Heating	18.0	13.5%	per premise	103	\$1,024	per unit	103	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Multi_CZ1	1	Space Heating	18.0	13.5%	per premise	103	\$1,024	per unit	103	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Multi_CZ2	2	Space Heating	18.0	15.4%	per premise	123	\$1,874	per unit	123	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Multi_CZ2	2	Space Heating	18.0	13.6%	per premise	103	\$1,024	per unit	103	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Multi_CZ2	2	Space Heating	18.0	13.6%	per premise	103	\$1,024	per unit	103	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Multi_CZ3	3	Space Heating	18.0	15.3%	per premise	124	\$1,874	per unit	124	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Multi_CZ3	3	Space Heating	18.0	13.5%	per premise	104	\$1,024	per unit	104	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Multi_CZ3	3	Space Heating	18.0	13.5%	per premise	104	\$1,024	per unit	104	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Single_CZ 1	1	Space Heating	18.0	14.7%	per premise	133	\$1,874	per unit	133	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Single_CZ 1	1	Space Heating	18.0	12.9%	per premise	111	\$1,024	per unit	111	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Single_CZ 1	1	Space Heating	18.0	12.9%	per premise	111	\$1,024	per unit	111	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Single_CZ 2	2	Space Heating	18.0	14.8%	per premise	132	\$1,874	per unit	132	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Single_CZ 2	2	Space Heating	18.0	13.0%	per premise	110	\$1,024	per unit	110	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Single_CZ 2	2	Space Heating	18.0	13.0%	per premise	110	\$1,024	per unit	110	\$1,024

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Furnace 95 AFUE	Residential	Early Retirement	Single_CZ3	3	Space Heating	18.0	14.7%	per premise	134	\$1,874	per unit	134	\$1,874
High Efficiency Furnace 95 AFUE	Residential	New	Single_CZ3	3	Space Heating	18.0	12.9%	per premise	111	\$1,024	per unit	111	\$1,024
High Efficiency Furnace 95 AFUE	Residential	Turnover	Single_CZ3	3	Space Heating	18.0	12.9%	per premise	111	\$1,024	per unit	111	\$1,024
Natural Gas Heat Pump	Residential	Early Retirement	Mfg_CZ1	1	Space Heating	21.0	36.7%	per premise	220	\$8,026	per unit	220	\$8,026
Natural Gas Heat Pump	Residential	New	Mfg_CZ1	1	Space Heating	21.0	33.3%	per premise	190	\$6,787	per unit	190	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Mfg_CZ1	1	Space Heating	21.0	33.3%	per premise	190	\$6,787	per unit	190	\$6,787
Natural Gas Heat Pump	Residential	Early Retirement	Mfg_CZ2	2	Space Heating	21.0	36.7%	per premise	213	\$8,026	per unit	213	\$8,026
Natural Gas Heat Pump	Residential	New	Mfg_CZ2	2	Space Heating	21.0	33.3%	per premise	184	\$6,787	per unit	184	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Mfg_CZ2	2	Space Heating	21.0	33.3%	per premise	184	\$6,787	per unit	184	\$6,787
Natural Gas Heat Pump	Residential	Early Retirement	Mfg_CZ3	3	Space Heating	21.0	36.7%	per premise	221	\$8,026	per unit	221	\$8,026
Natural Gas Heat Pump	Residential	New	Mfg_CZ3	3	Space Heating	21.0	33.3%	per premise	191	\$6,787	per unit	191	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Mfg_CZ3	3	Space Heating	21.0	33.3%	per premise	191	\$6,787	per unit	191	\$6,787
Natural Gas Heat Pump	Residential	Early Retirement	Multi_CZ1	1	Space Heating	21.0	36.7%	per premise	195	\$8,026	per unit	195	\$8,026
Natural Gas Heat Pump	Residential	New	Multi_CZ1	1	Space Heating	21.0	33.3%	per premise	169	\$6,787	per unit	169	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Multi_CZ1	1	Space Heating	21.0	33.3%	per premise	169	\$6,787	per unit	169	\$6,787

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Natural Gas Heat Pump	Residential	Early Retirement	Multi_CZ2	2	Space Heating	21.0	36.7%	per premise	190	\$8,026	per unit	190	\$8,026
Natural Gas Heat Pump	Residential	New	Multi_CZ2	2	Space Heating	21.0	33.3%	per premise	164	\$6,787	per unit	164	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Multi_CZ2	2	Space Heating	21.0	33.3%	per premise	164	\$6,787	per unit	164	\$6,787
Natural Gas Heat Pump	Residential	Early Retirement	Multi_CZ3	3	Space Heating	21.0	36.7%	per premise	196	\$8,026	per unit	196	\$8,026
Natural Gas Heat Pump	Residential	New	Multi_CZ3	3	Space Heating	21.0	33.3%	per premise	169	\$6,787	per unit	169	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Multi_CZ3	3	Space Heating	21.0	33.3%	per premise	169	\$6,787	per unit	169	\$6,787
Natural Gas Heat Pump	Residential	Early Retirement	Single_CZ_1	1	Space Heating	21.0	36.7%	per premise	293	\$8,026	per unit	293	\$8,026
Natural Gas Heat Pump	Residential	New	Single_CZ_1	1	Space Heating	21.0	33.3%	per premise	253	\$6,787	per unit	253	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Single_CZ_1	1	Space Heating	21.0	33.3%	per premise	253	\$6,787	per unit	253	\$6,787
Natural Gas Heat Pump	Residential	Early Retirement	Single_CZ_2	2	Space Heating	21.0	36.7%	per premise	284	\$8,026	per unit	284	\$8,026
Natural Gas Heat Pump	Residential	New	Single_CZ_2	2	Space Heating	21.0	33.3%	per premise	246	\$6,787	per unit	246	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Single_CZ_2	2	Space Heating	21.0	33.3%	per premise	246	\$6,787	per unit	246	\$6,787
Natural Gas Heat Pump	Residential	Early Retirement	Single_CZ_3	3	Space Heating	21.0	36.7%	per premise	294	\$8,026	per unit	294	\$8,026
Natural Gas Heat Pump	Residential	New	Single_CZ_3	3	Space Heating	21.0	33.3%	per premise	254	\$6,787	per unit	254	\$6,787
Natural Gas Heat Pump	Residential	Turnover	Single_CZ_3	3	Space Heating	21.0	33.3%	per premise	254	\$6,787	per unit	254	\$6,787

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Programmable Thermostat	Residential	Existing	Mfg_CZ1	1	Space Heating	11.0	2.4%	per premise	10	\$52	per unit	10	\$52
Programmable Thermostat	Residential	New	Mfg_CZ1	1	Space Heating	11.0	1.9%	per premise	8	\$22	per unit	8	\$22
Programmable Thermostat	Residential	Existing	Mfg_CZ2	2	Space Heating	11.0	2.3%	per premise	10	\$52	per unit	10	\$52
Programmable Thermostat	Residential	New	Mfg_CZ2	2	Space Heating	11.0	1.9%	per premise	7	\$22	per unit	7	\$22
Programmable Thermostat	Residential	Existing	Mfg_CZ3	3	Space Heating	11.0	2.7%	per premise	12	\$52	per unit	12	\$52
Programmable Thermostat	Residential	New	Mfg_CZ3	3	Space Heating	11.0	2.2%	per premise	9	\$22	per unit	9	\$22
Programmable Thermostat	Residential	Existing	Multi_CZ1	1	Space Heating	11.0	1.9%	per premise	10	\$52	per unit	10	\$52
Programmable Thermostat	Residential	New	Multi_CZ1	1	Space Heating	11.0	1.5%	per premise	8	\$22	per unit	8	\$22
Programmable Thermostat	Residential	Existing	Multi_CZ2	2	Space Heating	11.0	1.8%	per premise	10	\$52	per unit	10	\$52
Programmable Thermostat	Residential	New	Multi_CZ2	2	Space Heating	11.0	1.5%	per premise	7	\$22	per unit	7	\$22
Programmable Thermostat	Residential	Existing	Multi_CZ3	3	Space Heating	11.0	2.2%	per premise	12	\$52	per unit	12	\$52
Programmable Thermostat	Residential	New	Multi_CZ3	3	Space Heating	11.0	1.7%	per premise	9	\$22	per unit	9	\$22
Programmable Thermostat	Residential	Existing	Single_CZ_1	1	Space Heating	11.0	7.1%	per premise	40	\$52	per unit	40	\$52
Programmable Thermostat	Residential	New	Single_CZ_1	1	Space Heating	11.0	5.6%	per premise	30	\$22	per unit	30	\$22
Programmable Thermostat	Residential	Existing	Single_CZ_2	2	Space Heating	11.0	6.8%	per premise	38	\$52	per unit	38	\$52

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Programmable Thermostat	Residential	New	Single_CZ_2	2	Space Heating	11.0	5.4%	per premise	29	\$22	per unit	29	\$22
Programmable Thermostat	Residential	Existing	Single_CZ_3	3	Space Heating	11.0	8.0%	per premise	45	\$52	per unit	45	\$52
Programmable Thermostat	Residential	New	Single_CZ_3	3	Space Heating	11.0	6.4%	per premise	34	\$22	per unit	34	\$22
Residential Air Sealing	Residential	Existing	Mfg_CZ1	1	Space Heating	13.0	17.7%	per premise	75	\$750	per building	75	\$750
Residential Air Sealing	Residential	New	Mfg_CZ1	1	Space Heating	13.0	0.9%	per premise	4	\$750	per building	4	\$750
Residential Air Sealing	Residential	Existing	Mfg_CZ2	2	Space Heating	13.0	16.9%	per premise	71	\$750	per building	71	\$750
Residential Air Sealing	Residential	New	Mfg_CZ2	2	Space Heating	13.0	0.9%	per premise	3	\$750	per building	3	\$750
Residential Air Sealing	Residential	Existing	Mfg_CZ3	3	Space Heating	13.0	19.9%	per premise	84	\$750	per building	84	\$750
Residential Air Sealing	Residential	New	Mfg_CZ3	3	Space Heating	13.0	1.0%	per premise	4	\$750	per building	4	\$750
Residential Air Sealing	Residential	Existing	Multi_CZ1	1	Space Heating	13.0	13.9%	per premise	75	\$750	per building	75	\$750
Residential Air Sealing	Residential	New	Multi_CZ1	1	Space Heating	13.0	0.7%	per premise	4	\$750	per building	4	\$750
Residential Air Sealing	Residential	Existing	Multi_CZ2	2	Space Heating	13.0	13.3%	per premise	71	\$750	per building	71	\$750
Residential Air Sealing	Residential	New	Multi_CZ2	2	Space Heating	13.0	0.7%	per premise	3	\$750	per building	3	\$750
Residential Air Sealing	Residential	Existing	Multi_CZ3	3	Space Heating	13.0	15.6%	per premise	84	\$750	per building	84	\$750
Residential Air Sealing	Residential	New	Multi_CZ3	3	Space Heating	13.0	0.8%	per premise	4	\$750	per building	4	\$750

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Air Sealing	Residential	Existing	Single_CZ_1	1	Space Heating	13.0	13.1%	per premise	75	\$750	per building	75	\$750
Residential Air Sealing	Residential	New	Single_CZ_1	1	Space Heating	13.0	0.7%	per premise	4	\$750	per building	4	\$750
Residential Air Sealing	Residential	Existing	Single_CZ_2	2	Space Heating	13.0	12.5%	per premise	71	\$750	per building	71	\$750
Residential Air Sealing	Residential	New	Single_CZ_2	2	Space Heating	13.0	0.6%	per premise	3	\$750	per building	3	\$750
Residential Air Sealing	Residential	Existing	Single_CZ_3	3	Space Heating	13.0	14.8%	per premise	84	\$750	per building	84	\$750
Residential Air Sealing	Residential	New	Single_CZ_3	3	Space Heating	13.0	0.7%	per premise	4	\$750	per building	4	\$750
Residential Built Green Home	Residential	New	Single_CZ_1	1	Space Heating	7.5	27.4%	per premise	209	\$1,142	per building	209	\$1,142
Residential Built Green Home	Residential	New	Single_CZ_2	2	Space Heating	7.5	27.4%	per premise	203	\$1,142	per building	203	\$1,142
Residential Built Green Home	Residential	New	Single_CZ_3	3	Space Heating	7.5	27.4%	per premise	210	\$1,142	per building	210	\$1,142
Residential Slab Insulation	Residential	Existing	Mfg_CZ1	1	Space Heating	30.0	5.7%	per premise	24	\$369	per home	24	\$369
Residential Slab Insulation	Residential	New	Mfg_CZ1	1	Space Heating	30.0	6.1%	per premise	24	\$260	per home	24	\$260
Residential Slab Insulation	Residential	Existing	Mfg_CZ2	2	Space Heating	30.0	5.5%	per premise	23	\$369	per home	23	\$369
Residential Slab Insulation	Residential	New	Mfg_CZ2	2	Space Heating	30.0	5.8%	per premise	23	\$260	per home	23	\$260
Residential Slab Insulation	Residential	Existing	Mfg_CZ3	3	Space Heating	30.0	6.5%	per premise	27	\$369	per home	27	\$369
Residential Slab Insulation	Residential	New	Mfg_CZ3	3	Space Heating	30.0	6.9%	per premise	27	\$260	per home	27	\$260

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Slab Insulation	Residential	Existing	Multi_CZ1	1	Space Heating	30.0	4.5%	per premise	24	\$335	per home	24	\$335
Residential Slab Insulation	Residential	New	Multi_CZ1	1	Space Heating	30.0	4.8%	per premise	24	\$292	per home	24	\$292
Residential Slab Insulation	Residential	Existing	Multi_CZ2	2	Space Heating	30.0	4.3%	per premise	23	\$335	per home	23	\$335
Residential Slab Insulation	Residential	New	Multi_CZ2	2	Space Heating	30.0	4.6%	per premise	23	\$292	per home	23	\$292
Residential Slab Insulation	Residential	Existing	Multi_CZ3	3	Space Heating	30.0	5.1%	per premise	27	\$335	per home	27	\$335
Residential Slab Insulation	Residential	New	Multi_CZ3	3	Space Heating	30.0	5.4%	per premise	27	\$292	per home	27	\$292
Residential Slab Insulation	Residential	Existing	Single_CZ_1	1	Space Heating	30.0	3.6%	per premise	21	\$396	per home	21	\$396
Residential Slab Insulation	Residential	New	Single_CZ_1	1	Space Heating	30.0	3.8%	per premise	21	\$322	per home	21	\$322
Residential Slab Insulation	Residential	Existing	Single_CZ_2	2	Space Heating	30.0	3.5%	per premise	20	\$396	per home	20	\$396
Residential Slab Insulation	Residential	New	Single_CZ_2	2	Space Heating	30.0	3.7%	per premise	20	\$322	per home	20	\$322
Residential Slab Insulation	Residential	Existing	Single_CZ_3	3	Space Heating	30.0	4.1%	per premise	23	\$396	per home	23	\$396
Residential Slab Insulation	Residential	New	Single_CZ_3	3	Space Heating	30.0	4.3%	per premise	23	\$322	per home	23	\$322
Residential Wall Insulation - R11	Residential	Existing	Mfg_CZ1	1	Space Heating	27.5	27.0%	per premise	114	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Mfg_CZ1	1	Space Heating	27.5	27.3%	per premise	108	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Mfg_CZ2	2	Space Heating	27.5	25.8%	per premise	109	\$476	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Wall Insulation - R11	Residential	New	Mfg_CZ2	2	Space Heating	27.5	26.1%	per premise	103	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Mfg_CZ3	3	Space Heating	27.5	30.4%	per premise	128	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Mfg_CZ3	3	Space Heating	27.5	30.8%	per premise	122	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Multi_CZ1	1	Space Heating	27.5	21.2%	per premise	114	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Multi_CZ1	1	Space Heating	27.5	21.4%	per premise	108	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Multi_CZ2	2	Space Heating	27.5	20.3%	per premise	109	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Multi_CZ2	2	Space Heating	27.5	20.5%	per premise	103	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Multi_CZ3	3	Space Heating	27.5	23.9%	per premise	128	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Multi_CZ3	3	Space Heating	27.5	24.2%	per premise	122	\$476	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Single_CZ 1	1	Space Heating	27.5	33.3%	per premise	190	\$793	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Single_CZ 1	1	Space Heating	27.5	33.7%	per premise	180	\$793	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Single_CZ 2	2	Space Heating	27.5	31.9%	per premise	181	\$793	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Single_CZ 2	2	Space Heating	27.5	32.3%	per premise	172	\$793	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	Existing	Single_CZ 3	3	Space Heating	27.5	37.6%	per premise	214	\$793	per sf installed	0	\$1
Residential Wall Insulation - R11	Residential	New	Single_CZ 3	3	Space Heating	27.5	38.0%	per premise	203	\$793	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Wall Insulation - R13	Residential	Existing	Mfg_CZ1	1	Space Heating	27.5	29.4%	per premise	124	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Mfg_CZ1	1	Space Heating	27.5	4.0%	per premise	16	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Mfg_CZ2	2	Space Heating	27.5	28.1%	per premise	118	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Mfg_CZ2	2	Space Heating	27.5	3.8%	per premise	15	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Mfg_CZ3	3	Space Heating	27.5	33.1%	per premise	140	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Mfg_CZ3	3	Space Heating	27.5	4.5%	per premise	18	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Multi_CZ1	1	Space Heating	27.5	23.0%	per premise	124	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Multi_CZ1	1	Space Heating	27.5	3.1%	per premise	16	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Multi_CZ2	2	Space Heating	27.5	22.0%	per premise	118	\$793	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Multi_CZ2	2	Space Heating	27.5	3.0%	per premise	15	\$793	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Multi_CZ3	3	Space Heating	27.5	26.0%	per premise	140	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Multi_CZ3	3	Space Heating	27.5	3.5%	per premise	18	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Single_CZ_1	1	Space Heating	27.5	36.3%	per premise	206	\$793	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Single_CZ_1	1	Space Heating	27.5	4.9%	per premise	26	\$793	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Single_CZ_2	2	Space Heating	27.5	34.7%	per premise	197	\$476	per sf installed	0	\$1

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Wall Insulation - R13	Residential	New	Single_CZ2	2	Space Heating	27.5	4.7%	per premise	25	\$476	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	Existing	Single_CZ3	3	Space Heating	27.5	40.9%	per premise	233	\$793	per sf installed	0	\$1
Residential Wall Insulation - R13	Residential	New	Single_CZ3	3	Space Heating	27.5	5.5%	per premise	29	\$793	per sf installed	0	\$1
Residential Window Upgrade	Residential	Existing	Mfg_CZ1	1	Space Heating	24.3	1.4%	per premise	6	\$4,500	per home	6	\$4,500
Residential Window Upgrade	Residential	New	Mfg_CZ1	1	Space Heating	24.3	0.8%	per premise	3	\$453	per installed sf	0	\$3
Residential Window Upgrade	Residential	Existing	Mfg_CZ2	2	Space Heating	24.3	1.5%	per premise	7	\$4,500	per home	7	\$4,500
Residential Window Upgrade	Residential	New	Mfg_CZ2	2	Space Heating	24.3	0.7%	per premise	3	\$453	per installed sf	0	\$3
Residential Window Upgrade	Residential	Existing	Mfg_CZ3	3	Space Heating	24.3	1.7%	per premise	7	\$4,500	per home	7	\$4,500
Residential Window Upgrade	Residential	New	Mfg_CZ3	3	Space Heating	24.3	0.8%	per premise	3	\$453	per installed sf	0	\$3
Residential Window Upgrade	Residential	Existing	Multi_CZ1	1	Space Heating	24.3	0.5%	per premise	3	\$4,500	per home	3	\$4,500
Residential Window Upgrade	Residential	New	Multi_CZ1	1	Space Heating	24.3	0.3%	per premise	2	\$453	per installed sf	0	\$6
Residential Window Upgrade	Residential	Existing	Multi_CZ2	2	Space Heating	24.3	0.6%	per premise	3	\$4,500	per home	3	\$4,500
Residential Window Upgrade	Residential	New	Multi_CZ2	2	Space Heating	24.3	0.3%	per premise	1	\$453	per installed sf	0	\$6
Residential Window Upgrade	Residential	Existing	Multi_CZ3	3	Space Heating	24.3	0.6%	per premise	3	\$4,500	per home	3	\$4,500

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Window Upgrade	Residential	New	Multi_CZ3	3	Space Heating	24.3	0.3%	per premise	2	\$453	per installed sf	0	\$6
Residential Window Upgrade	Residential	Existing	Single_CZ_1	1	Space Heating	24.3	1.5%	per premise	9	\$4,500	per home	9	\$4,500
Residential Window Upgrade	Residential	New	Single_CZ_1	1	Space Heating	24.3	0.8%	per premise	5	\$453	per installed sf	0	\$2
Residential Window Upgrade	Residential	Existing	Single_CZ_2	2	Space Heating	24.3	1.7%	per premise	10	\$4,500	per home	10	\$4,500
Residential Window Upgrade	Residential	New	Single_CZ_2	2	Space Heating	24.3	0.8%	per premise	4	\$453	per installed sf	0	\$2
Residential Window Upgrade	Residential	Existing	Single_CZ_3	3	Space Heating	24.3	1.8%	per premise	10	\$4,500	per home	10	\$4,500
Residential Window Upgrade	Residential	New	Single_CZ_3	3	Space Heating	24.3	0.9%	per premise	5	\$453	per installed sf	0	\$2
Window Glazing	Residential	Existing	Mfg_CZ1	1	Space Heating	10.0	0.6%	per premise	3	\$800	per installed sf	(2)	\$5
Window Glazing	Residential	Existing	Mfg_CZ2	2	Space Heating	10.0	0.8%	per premise	3	\$800	per installed sf	(2)	\$5
Window Glazing	Residential	Existing	Mfg_CZ3	3	Space Heating	10.0	0.8%	per premise	3	\$800	per installed sf	(2)	\$5
Window Glazing	Residential	Existing	Multi_CZ1	1	Space Heating	10.0	0.2%	per premise	1	\$800	per installed sf	(5)	\$10
Window Glazing	Residential	Existing	Multi_CZ2	2	Space Heating	10.0	0.3%	per premise	2	\$800	per installed sf	(5)	\$10
Window Glazing	Residential	Existing	Multi_CZ3	3	Space Heating	10.0	0.3%	per premise	2	\$800	per installed sf	(5)	\$10

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Window Glazing	Residential	Existing	Single_CZ_1	1	Space Heating	10.0	0.6%	per premise	4	\$800	per installed sf	(1)	\$3
Window Glazing	Residential	Existing	Single_CZ_2	2	Space Heating	10.0	0.8%	per premise	5	\$800	per installed sf	(1)	\$3
Window Glazing	Residential	Existing	Single_CZ_3	3	Space Heating	10.0	0.9%	per premise	5	\$800	per installed sf	(1)	\$3
Combination Boiler and Hot Water Heater	Residential	New	Multi_CZ1	1	Water Heating	20.0	11.4%	per premise	5,036	\$23,452	per unit	5,036	\$23,452
Combination Boiler and Hot Water Heater	Residential	Turnover	Multi_CZ2	2	Water Heating	20.0	11.4%	per premise	5,036	\$23,452	per unit	5,036	\$23,452
Combination Boiler and Hot Water Heater	Residential	Early Retirement	Multi_CZ3	3	Water Heating	20.0	11.4%	per premise	5,036	\$23,452	per unit	5,036	\$23,452
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Mfg_CZ1	1	Water Heating	18.0	28.0%	per premise	62	\$1,364	per unit	62	\$1,364
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Mfg_CZ1	1	Water Heating	18.0	17.0%	per premise	34	\$733	per unit	34	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Mfg_CZ1	1	Water Heating	18.0	17.0%	per premise	34	\$733	per unit	34	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Mfg_CZ2	2	Water Heating	18.0	28.0%	per premise	62	\$1,364	per unit	62	\$1,364
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Mfg_CZ2	2	Water Heating	18.0	17.0%	per premise	34	\$733	per unit	34	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Mfg_CZ2	2	Water Heating	18.0	17.0%	per premise	34	\$733	per unit	34	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Mfg_CZ3	3	Water Heating	18.0	28.0%	per premise	62	\$1,364	per unit	62	\$1,364

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Mfg_CZ3	3	Water Heating	18.0	17.0%	per premise	34	\$733	per unit	34	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Mfg_CZ3	3	Water Heating	18.0	17.0%	per premise	34	\$733	per unit	34	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Multi_CZ1	1	Water Heating	18.0	28.0%	per premise	47	\$1,364	per unit	47	\$1,364
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Multi_CZ1	1	Water Heating	18.0	17.0%	per premise	26	\$733	per unit	26	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Multi_CZ1	1	Water Heating	18.0	17.0%	per premise	26	\$733	per unit	26	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Multi_CZ2	2	Water Heating	18.0	28.0%	per premise	47	\$1,364	per unit	47	\$1,364
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Multi_CZ2	2	Water Heating	18.0	17.0%	per premise	26	\$733	per unit	26	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Multi_CZ2	2	Water Heating	18.0	17.0%	per premise	26	\$733	per unit	26	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Multi_CZ3	3	Water Heating	18.0	28.0%	per premise	47	\$1,364	per unit	47	\$1,364
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Multi_CZ3	3	Water Heating	18.0	17.0%	per premise	26	\$733	per unit	26	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Multi_CZ3	3	Water Heating	18.0	17.0%	per premise	26	\$733	per unit	26	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Single_CZ1	1	Water Heating	18.0	28.0%	per premise	62	\$1,364	per unit	62	\$1,364

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Single_CZ_1	1	Water Heating	18.0	17.0%	per premise	33	\$733	per unit	33	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Single_CZ_1	1	Water Heating	18.0	17.0%	per premise	33	\$733	per unit	33	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Single_CZ_2	2	Water Heating	18.0	28.0%	per premise	62	\$1,364	per unit	62	\$1,364
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Single_CZ_2	2	Water Heating	18.0	17.0%	per premise	33	\$733	per unit	33	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Single_CZ_2	2	Water Heating	18.0	17.0%	per premise	33	\$733	per unit	33	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Early Retirement	Single_CZ_3	3	Water Heating	18.0	28.0%	per premise	62	\$1,364	per unit	62	\$1,364
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	New	Single_CZ_3	3	Water Heating	18.0	17.0%	per premise	33	\$733	per unit	33	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.82 EF)	Residential	Turnover	Single_CZ_3	3	Water Heating	18.0	17.0%	per premise	33	\$733	per unit	33	\$733
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Mfg_CZ1	1	Water Heating	18.0	37.0%	per premise	82	\$1,739	per unit	82	\$1,739
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Mfg_CZ1	1	Water Heating	18.0	28.0%	per premise	54	\$1,171	per unit	54	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Mfg_CZ1	1	Water Heating	18.0	28.0%	per premise	54	\$1,171	per unit	54	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Mfg_CZ2	2	Water Heating	18.0	37.0%	per premise	82	\$1,739	per unit	82	\$1,739

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Mfg_CZ2	2	Water Heating	18.0	28.0%	per premise	54	\$1,171	per unit	54	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Mfg_CZ2	2	Water Heating	18.0	28.0%	per premise	54	\$1,171	per unit	54	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Mfg_CZ3	3	Water Heating	18.0	37.0%	per premise	82	\$1,739	per unit	82	\$1,739
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Mfg_CZ3	3	Water Heating	18.0	28.0%	per premise	54	\$1,171	per unit	54	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Mfg_CZ3	3	Water Heating	18.0	28.0%	per premise	54	\$1,171	per unit	54	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Multi_CZ1	1	Water Heating	18.0	37.0%	per premise	63	\$1,739	per unit	63	\$1,739
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Multi_CZ1	1	Water Heating	18.0	28.0%	per premise	41	\$1,171	per unit	41	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Multi_CZ1	1	Water Heating	18.0	28.0%	per premise	41	\$1,171	per unit	41	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Multi_CZ2	2	Water Heating	18.0	37.0%	per premise	63	\$1,739	per unit	63	\$1,739
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Multi_CZ2	2	Water Heating	18.0	28.0%	per premise	41	\$1,171	per unit	41	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Multi_CZ2	2	Water Heating	18.0	28.0%	per premise	41	\$1,171	per unit	41	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Multi_CZ3	3	Water Heating	18.0	37.0%	per premise	63	\$1,739	per unit	63	\$1,739

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Multi_CZ3	3	Water Heating	18.0	28.0%	per premise	41	\$1,171	per unit	41	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Multi_CZ3	3	Water Heating	18.0	28.0%	per premise	41	\$1,171	per unit	41	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Single_CZ 1	1	Water Heating	18.0	37.0%	per premise	82	\$1,739	per unit	82	\$1,739
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Single_CZ 1	1	Water Heating	18.0	28.0%	per premise	53	\$1,171	per unit	53	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Single_CZ 1	1	Water Heating	18.0	28.0%	per premise	53	\$1,171	per unit	53	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Single_CZ 2	2	Water Heating	18.0	37.0%	per premise	82	\$1,739	per unit	82	\$1,739
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Single_CZ 2	2	Water Heating	18.0	28.0%	per premise	53	\$1,171	per unit	53	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Single_CZ 2	2	Water Heating	18.0	28.0%	per premise	53	\$1,171	per unit	53	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Early Retirement	Single_CZ 3	3	Water Heating	18.0	37.0%	per premise	82	\$1,739	per unit	82	\$1,739
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	New	Single_CZ 3	3	Water Heating	18.0	28.0%	per premise	53	\$1,171	per unit	53	\$1,171
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Residential	Turnover	Single_CZ 3	3	Water Heating	18.0	28.0%	per premise	53	\$1,171	per unit	53	\$1,171
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Mfg_CZ1	1	Water Heating	16.0	15.6%	per premise	35	\$540	per unit	35	\$540

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Mfg_CZ1	1	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Mfg_CZ1	1	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Mfg_CZ2	2	Water Heating	16.0	15.6%	per premise	35	\$540	per unit	35	\$540
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Mfg_CZ2	2	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Mfg_CZ2	2	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Mfg_CZ3	3	Water Heating	16.0	15.6%	per premise	35	\$540	per unit	35	\$540
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Mfg_CZ3	3	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Mfg_CZ3	3	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Multi_CZ1	1	Water Heating	16.0	15.6%	per premise	26	\$540	per unit	26	\$540
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Multi_CZ1	1	Water Heating	16.0	3.1%	per premise	5	\$10	per unit	5	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Multi_CZ1	1	Water Heating	16.0	3.1%	per premise	5	\$10	per unit	5	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Multi_CZ2	2	Water Heating	16.0	15.6%	per premise	26	\$540	per unit	26	\$540

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Multi_CZ2	2	Water Heating	16.0	3.1%	per premise	5	\$10	per unit	5	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Multi_CZ2	2	Water Heating	16.0	3.1%	per premise	5	\$10	per unit	5	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Multi_CZ3	3	Water Heating	16.0	15.6%	per premise	26	\$540	per unit	26	\$540
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Multi_CZ3	3	Water Heating	16.0	3.1%	per premise	5	\$10	per unit	5	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Multi_CZ3	3	Water Heating	16.0	3.1%	per premise	5	\$10	per unit	5	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Single_CZ 1	1	Water Heating	16.0	15.6%	per premise	35	\$540	per unit	35	\$540
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Single_CZ 1	1	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Single_CZ 1	1	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Single_CZ 2	2	Water Heating	16.0	15.6%	per premise	35	\$540	per unit	35	\$540
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Single_CZ 2	2	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Single_CZ 2	2	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Early Retirement	Single_CZ 3	3	Water Heating	16.0	15.6%	per premise	35	\$540	per unit	35	\$540

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	New	Single_CZ3	3	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.64)	Residential	Turnover	Single_CZ3	3	Water Heating	16.0	3.1%	per premise	6	\$10	per unit	6	\$10
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Mfg_CZ1	1	Water Heating	16.0	19.4%	per premise	43	\$768	per unit	43	\$768
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Mfg_CZ1	1	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Mfg_CZ1	1	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Mfg_CZ2	2	Water Heating	16.0	19.4%	per premise	43	\$768	per unit	43	\$768
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Mfg_CZ2	2	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Mfg_CZ2	2	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Mfg_CZ3	3	Water Heating	16.0	19.4%	per premise	43	\$768	per unit	43	\$768
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Mfg_CZ3	3	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Mfg_CZ3	3	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Multi_CZ1	1	Water Heating	16.0	19.4%	per premise	33	\$768	per unit	33	\$768

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Multi_CZ1	1	Water Heating	16.0	7.5%	per premise	11	\$139	per unit	11	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Multi_CZ1	1	Water Heating	16.0	7.5%	per premise	11	\$139	per unit	11	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Multi_CZ2	2	Water Heating	16.0	19.4%	per premise	33	\$768	per unit	33	\$768
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Multi_CZ2	2	Water Heating	16.0	7.5%	per premise	11	\$139	per unit	11	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Multi_CZ2	2	Water Heating	16.0	7.5%	per premise	11	\$139	per unit	11	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Multi_CZ3	3	Water Heating	16.0	19.4%	per premise	33	\$768	per unit	33	\$768
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Multi_CZ3	3	Water Heating	16.0	7.5%	per premise	11	\$139	per unit	11	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Multi_CZ3	3	Water Heating	16.0	7.5%	per premise	11	\$139	per unit	11	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Single_CZ 1	1	Water Heating	16.0	19.4%	per premise	43	\$768	per unit	43	\$768
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Single_CZ 1	1	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Single_CZ 1	1	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Single_CZ 2	2	Water Heating	16.0	19.4%	per premise	43	\$768	per unit	43	\$768

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Single_CZ_2	2	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Single_CZ_2	2	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Early Retirement	Single_CZ_3	3	Water Heating	16.0	19.4%	per premise	43	\$768	per unit	43	\$768
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	New	Single_CZ_3	3	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Conventional High Efficiency Natural Gas Water Heater (EF=.67)	Residential	Turnover	Single_CZ_3	3	Water Heating	16.0	7.5%	per premise	14	\$139	per unit	14	\$139
Drain Water Heat Recovery	Residential	Existing	Mfg_CZ1	1	Water Heating	30.0	16.5%	per premise	30	\$645	per unit	30	\$645
Drain Water Heat Recovery	Residential	New	Mfg_CZ1	1	Water Heating	30.0	14.0%	per premise	23	\$645	per unit	23	\$645
Drain Water Heat Recovery	Residential	Existing	Mfg_CZ2	2	Water Heating	30.0	16.5%	per premise	30	\$645	per unit	30	\$645
Drain Water Heat Recovery	Residential	New	Mfg_CZ2	2	Water Heating	30.0	14.0%	per premise	23	\$645	per unit	23	\$645
Drain Water Heat Recovery	Residential	Existing	Mfg_CZ3	3	Water Heating	30.0	16.5%	per premise	30	\$645	per unit	30	\$645
Drain Water Heat Recovery	Residential	New	Mfg_CZ3	3	Water Heating	30.0	14.0%	per premise	23	\$645	per unit	23	\$645
Drain Water Heat Recovery	Residential	Existing	Multi_CZ1	1	Water Heating	30.0	8.3%	per premise	15	\$645	per unit	15	\$645
Drain Water Heat Recovery	Residential	New	Multi_CZ1	1	Water Heating	30.0	7.0%	per premise	11	\$645	per unit	11	\$645
Drain Water Heat Recovery	Residential	Existing	Multi_CZ2	2	Water Heating	30.0	8.3%	per premise	15	\$645	per unit	15	\$645

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Drain Water Heat Recovery	Residential	New	Multi_CZ2	2	Water Heating	30.0	7.0%	per premise	11	\$645	per unit	11	\$645
Drain Water Heat Recovery	Residential	Existing	Multi_CZ3	3	Water Heating	30.0	8.3%	per premise	15	\$645	per unit	15	\$645
Drain Water Heat Recovery	Residential	New	Multi_CZ3	3	Water Heating	30.0	7.0%	per premise	11	\$645	per unit	11	\$645
Drain Water Heat Recovery	Residential	Existing	Single_CZ_1	1	Water Heating	30.0	15.5%	per premise	30	\$645	per unit	30	\$645
Drain Water Heat Recovery	Residential	New	Single_CZ_1	1	Water Heating	30.0	13.1%	per premise	23	\$645	per unit	23	\$645
Drain Water Heat Recovery	Residential	Existing	Single_CZ_2	2	Water Heating	30.0	15.5%	per premise	30	\$645	per unit	30	\$645
Drain Water Heat Recovery	Residential	New	Single_CZ_2	2	Water Heating	30.0	13.1%	per premise	23	\$645	per unit	23	\$645
Drain Water Heat Recovery	Residential	Existing	Single_CZ_3	3	Water Heating	30.0	15.5%	per premise	30	\$645	per unit	30	\$645
Drain Water Heat Recovery	Residential	New	Single_CZ_3	3	Water Heating	30.0	13.1%	per premise	23	\$645	per unit	23	\$645
Energy Star Dishwasher	Residential	Existing	Mfg_CZ1	1	Water Heating	11.0	4.1%	per premise	8	\$505	per unit	8	\$505
Energy Star Dishwasher	Residential	New	Mfg_CZ1	1	Water Heating	11.0	3.4%	per premise	5	\$100	per unit	5	\$100
Energy Star Dishwasher	Residential	Existing	Mfg_CZ2	2	Water Heating	11.0	4.1%	per premise	8	\$505	per unit	8	\$505
Energy Star Dishwasher	Residential	New	Mfg_CZ2	2	Water Heating	11.0	3.4%	per premise	5	\$100	per unit	5	\$100
Energy Star Dishwasher	Residential	Existing	Mfg_CZ3	3	Water Heating	11.0	4.1%	per premise	8	\$505	per unit	8	\$505
Energy Star Dishwasher	Residential	New	Mfg_CZ3	3	Water Heating	11.0	3.4%	per premise	5	\$100	per unit	5	\$100

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Energy Star Dishwasher	Residential	Existing	Multi_CZ1	1	Water Heating	11.0	3.1%	per premise	6	\$505	per unit	6	\$505
Energy Star Dishwasher	Residential	New	Multi_CZ1	1	Water Heating	11.0	2.6%	per premise	4	\$100	per unit	4	\$100
Energy Star Dishwasher	Residential	Existing	Multi_CZ2	2	Water Heating	11.0	3.1%	per premise	6	\$505	per unit	6	\$505
Energy Star Dishwasher	Residential	New	Multi_CZ2	2	Water Heating	11.0	2.6%	per premise	4	\$100	per unit	4	\$100
Energy Star Dishwasher	Residential	Existing	Multi_CZ3	3	Water Heating	11.0	3.1%	per premise	6	\$505	per unit	6	\$505
Energy Star Dishwasher	Residential	New	Multi_CZ3	3	Water Heating	11.0	2.6%	per premise	4	\$100	per unit	4	\$100
Energy Star Dishwasher	Residential	Existing	Single_CZ_1	1	Water Heating	11.0	4.3%	per premise	8	\$505	per unit	8	\$505
Energy Star Dishwasher	Residential	New	Single_CZ_1	1	Water Heating	11.0	3.6%	per premise	6	\$100	per unit	6	\$100
Energy Star Dishwasher	Residential	Existing	Single_CZ_2	2	Water Heating	11.0	4.3%	per premise	8	\$505	per unit	8	\$505
Energy Star Dishwasher	Residential	New	Single_CZ_2	2	Water Heating	11.0	3.6%	per premise	6	\$100	per unit	6	\$100
Energy Star Dishwasher	Residential	Existing	Single_CZ_3	3	Water Heating	11.0	4.3%	per premise	8	\$505	per unit	8	\$505
Energy Star Dishwasher	Residential	New	Single_CZ_3	3	Water Heating	11.0	3.6%	per premise	6	\$100	per unit	6	\$100
Faucet Aerators	Residential	Existing	Mfg_CZ1	1	Water Heating	10.0	2.7%	per premise	5	\$10	per unit	2	\$5
Faucet Aerators	Residential	New	Mfg_CZ1	1	Water Heating	10.0	1.2%	per premise	2	\$10	per unit	1	\$5
Faucet Aerators	Residential	Existing	Mfg_CZ2	2	Water Heating	10.0	2.7%	per premise	5	\$10	per unit	2	\$5

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Faucet Aerators	Residential	New	Mfg_CZ2	2	Water Heating	10.0	1.2%	per premise	2	\$10	per unit	1	\$5
Faucet Aerators	Residential	Existing	Mfg_CZ3	3	Water Heating	10.0	2.7%	per premise	5	\$10	per unit	2	\$5
Faucet Aerators	Residential	New	Mfg_CZ3	3	Water Heating	10.0	1.2%	per premise	2	\$10	per unit	1	\$5
Faucet Aerators	Residential	Existing	Multi_CZ1	1	Water Heating	10.0	2.0%	per premise	4	\$10	per unit	2	\$5
Faucet Aerators	Residential	New	Multi_CZ1	1	Water Heating	10.0	0.9%	per premise	1	\$10	per unit	1	\$5
Faucet Aerators	Residential	Existing	Multi_CZ2	2	Water Heating	10.0	2.0%	per premise	4	\$10	per unit	2	\$5
Faucet Aerators	Residential	New	Multi_CZ2	2	Water Heating	10.0	0.9%	per premise	1	\$10	per unit	1	\$5
Faucet Aerators	Residential	Existing	Multi_CZ3	3	Water Heating	10.0	2.0%	per premise	4	\$10	per unit	2	\$5
Faucet Aerators	Residential	New	Multi_CZ3	3	Water Heating	10.0	0.9%	per premise	1	\$10	per unit	1	\$5
Faucet Aerators	Residential	Existing	Single_CZ_1	1	Water Heating	10.0	2.5%	per premise	5	\$17	per unit	1	\$5
Faucet Aerators	Residential	New	Single_CZ_1	1	Water Heating	10.0	1.1%	per premise	2	\$17	per unit	1	\$5
Faucet Aerators	Residential	Existing	Single_CZ_2	2	Water Heating	10.0	2.5%	per premise	5	\$17	per unit	1	\$5
Faucet Aerators	Residential	New	Single_CZ_2	2	Water Heating	10.0	1.1%	per premise	2	\$17	per unit	1	\$5
Faucet Aerators	Residential	Existing	Single_CZ_3	3	Water Heating	10.0	2.5%	per premise	5	\$17	per unit	1	\$5
Faucet Aerators	Residential	New	Single_CZ_3	3	Water Heating	10.0	1.1%	per premise	2	\$17	per unit	1	\$5

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Heat Pump Water Heater	Residential	Early Retirement	Mfg_CZ1	1	Water Heating	16.0	65.2%	per premise	145	\$5,147	per unit	145	\$5,147
Heat Pump Water Heater	Residential	New	Mfg_CZ1	1	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Turnover	Mfg_CZ1	1	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Early Retirement	Mfg_CZ2	2	Water Heating	16.0	65.2%	per premise	145	\$5,147	per unit	145	\$5,147
Heat Pump Water Heater	Residential	New	Mfg_CZ2	2	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Turnover	Mfg_CZ2	2	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Early Retirement	Mfg_CZ3	3	Water Heating	16.0	65.2%	per premise	145	\$5,147	per unit	145	\$5,147
Heat Pump Water Heater	Residential	New	Mfg_CZ3	3	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Turnover	Mfg_CZ3	3	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Early Retirement	Multi_CZ1	1	Water Heating	16.0	65.2%	per premise	110	\$5,147	per unit	110	\$5,147
Heat Pump Water Heater	Residential	New	Multi_CZ1	1	Water Heating	16.0	60.0%	per premise	89	\$4,486	per unit	89	\$4,486
Heat Pump Water Heater	Residential	Turnover	Multi_CZ1	1	Water Heating	16.0	60.0%	per premise	89	\$4,486	per unit	89	\$4,486
Heat Pump Water Heater	Residential	Early Retirement	Multi_CZ2	2	Water Heating	16.0	65.2%	per premise	110	\$5,147	per unit	110	\$5,147
Heat Pump Water Heater	Residential	New	Multi_CZ2	2	Water Heating	16.0	60.0%	per premise	89	\$4,486	per unit	89	\$4,486
Heat Pump Water Heater	Residential	Turnover	Multi_CZ2	2	Water Heating	16.0	60.0%	per premise	89	\$4,486	per unit	89	\$4,486

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Heat Pump Water Heater	Residential	Early Retirement	Multi_CZ3	3	Water Heating	16.0	65.2%	per premise	110	\$5,147	per unit	110	\$5,147
Heat Pump Water Heater	Residential	New	Multi_CZ3	3	Water Heating	16.0	60.0%	per premise	89	\$4,486	per unit	89	\$4,486
Heat Pump Water Heater	Residential	Turnover	Multi_CZ3	3	Water Heating	16.0	60.0%	per premise	89	\$4,486	per unit	89	\$4,486
Heat Pump Water Heater	Residential	Early Retirement	Single_CZ 1	1	Water Heating	16.0	65.2%	per premise	144	\$5,147	per unit	144	\$5,147
Heat Pump Water Heater	Residential	New	Single_CZ 1	1	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Turnover	Single_CZ 1	1	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Early Retirement	Single_CZ 2	2	Water Heating	16.0	65.2%	per premise	144	\$5,147	per unit	144	\$5,147
Heat Pump Water Heater	Residential	New	Single_CZ 2	2	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Turnover	Single_CZ 2	2	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Early Retirement	Single_CZ 3	3	Water Heating	16.0	65.2%	per premise	144	\$5,147	per unit	144	\$5,147
Heat Pump Water Heater	Residential	New	Single_CZ 3	3	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
Heat Pump Water Heater	Residential	Turnover	Single_CZ 3	3	Water Heating	16.0	60.0%	per premise	116	\$4,486	per unit	116	\$4,486
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Mfg_CZ1	1	Water Heating	15.0	40.7%	per premise	89	\$1,813	per unit	89	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Mfg_CZ1	1	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater	Residential	Turnover	Mfg_CZ1	1	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
(0.90 EF), 40 gallon													
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Mfg_CZ2	2	Water Heating	15.0	40.7%	per premise	89	\$1,813	per unit	89	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Mfg_CZ2	2	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Mfg_CZ2	2	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Mfg_CZ3	3	Water Heating	15.0	40.7%	per premise	89	\$1,813	per unit	89	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Mfg_CZ3	3	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Mfg_CZ3	3	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Multi_CZ1	1	Water Heating	15.0	40.7%	per premise	68	\$1,813	per unit	68	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Multi_CZ1	1	Water Heating	15.0	31.9%	per premise	53	\$1,185	per unit	53	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Multi_CZ1	1	Water Heating	15.0	31.9%	per premise	53	\$1,185	per unit	53	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Multi_CZ2	2	Water Heating	15.0	40.7%	per premise	68	\$1,813	per unit	68	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Multi_CZ2	2	Water Heating	15.0	31.9%	per premise	53	\$1,185	per unit	53	\$1,185

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Multi_CZ2	2	Water Heating	15.0	31.9%	per premise	53	\$1,185	per unit	53	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Multi_CZ3	3	Water Heating	15.0	40.7%	per premise	68	\$1,813	per unit	68	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Multi_CZ3	3	Water Heating	15.0	31.9%	per premise	53	\$1,185	per unit	53	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Multi_CZ3	3	Water Heating	15.0	31.9%	per premise	53	\$1,185	per unit	53	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Single_CZ 1	1	Water Heating	15.0	40.7%	per premise	88	\$1,813	per unit	88	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Single_CZ 1	1	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Single_CZ 1	1	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Single_CZ 2	2	Water Heating	15.0	40.7%	per premise	88	\$1,813	per unit	88	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Single_CZ 2	2	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Single_CZ 2	2	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Early Retirement	Single_CZ 3	3	Water Heating	15.0	40.7%	per premise	88	\$1,813	per unit	88	\$1,813
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	New	Single_CZ 3	3	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
High Efficiency Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Residential	Turnover	Single_CZ_3	3	Water Heating	15.0	31.9%	per premise	70	\$1,185	per unit	70	\$1,185
Hot Water Heater Temperature Setback	Residential	Existing	Mfg_CZ1	1	Water Heating	2.0	17.4%	per premise	32	\$5	per water heater	32	\$5
Hot Water Heater Temperature Setback	Residential	New	Mfg_CZ1	1	Water Heating	2.0	1.9%	per premise	3	\$5	per water heater	3	\$5
Hot Water Heater Temperature Setback	Residential	Existing	Mfg_CZ2	2	Water Heating	2.0	17.4%	per premise	32	\$5	per water heater	32	\$5
Hot Water Heater Temperature Setback	Residential	New	Mfg_CZ2	2	Water Heating	2.0	1.9%	per premise	3	\$5	per water heater	3	\$5
Hot Water Heater Temperature Setback	Residential	Existing	Mfg_CZ3	3	Water Heating	2.0	17.4%	per premise	32	\$5	per water heater	32	\$5
Hot Water Heater Temperature Setback	Residential	New	Mfg_CZ3	3	Water Heating	2.0	1.9%	per premise	3	\$5	per water heater	3	\$5
Hot Water Heater Temperature Setback	Residential	Existing	Multi_CZ1	1	Water Heating	2.0	13.2%	per premise	24	\$5	per water heater	24	\$5
Hot Water Heater Temperature Setback	Residential	New	Multi_CZ1	1	Water Heating	2.0	1.4%	per premise	2	\$5	per water heater	2	\$5
Hot Water Heater Temperature Setback	Residential	Existing	Multi_CZ2	2	Water Heating	2.0	13.2%	per premise	24	\$5	per water heater	24	\$5
Hot Water Heater Temperature Setback	Residential	New	Multi_CZ2	2	Water Heating	2.0	1.4%	per premise	2	\$5	per water heater	2	\$5
Hot Water Heater Temperature Setback	Residential	Existing	Multi_CZ3	3	Water Heating	2.0	13.2%	per premise	24	\$5	per water heater	24	\$5
Hot Water Heater Temperature Setback	Residential	New	Multi_CZ3	3	Water Heating	2.0	1.4%	per premise	2	\$5	per water heater	2	\$5
Hot Water Heater Temperature Setback	Residential	Existing	Single_CZ_1	1	Water Heating	2.0	16.2%	per premise	32	\$5	per water heater	32	\$5
Hot Water Heater Temperature Setback	Residential	New	Single_CZ_1	1	Water Heating	2.0	1.8%	per premise	3	\$5	per water heater	3	\$5

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Hot Water Heater Temperature Setback	Residential	Existing	Single_CZ2	2	Water Heating	2.0	16.2%	per premise	32	\$5	per water heater	32	\$5
Hot Water Heater Temperature Setback	Residential	New	Single_CZ2	2	Water Heating	2.0	1.8%	per premise	3	\$5	per water heater	3	\$5
Hot Water Heater Temperature Setback	Residential	Existing	Single_CZ3	3	Water Heating	2.0	16.2%	per premise	32	\$5	per water heater	32	\$5
Hot Water Heater Temperature Setback	Residential	New	Single_CZ3	3	Water Heating	2.0	1.8%	per premise	3	\$5	per water heater	3	\$5
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Mfg_CZ1	1	Water Heating	10.0	29.0%	per premise	53	\$53	per unit	53	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Mfg_CZ1	1	Water Heating	10.0	14.0%	per premise	22	\$53	per unit	22	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Mfg_CZ2	2	Water Heating	10.0	29.0%	per premise	53	\$53	per unit	53	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Mfg_CZ2	2	Water Heating	10.0	14.0%	per premise	22	\$53	per unit	22	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Mfg_CZ3	3	Water Heating	10.0	29.0%	per premise	53	\$53	per unit	53	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Mfg_CZ3	3	Water Heating	10.0	14.0%	per premise	22	\$53	per unit	22	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Multi_CZ1	1	Water Heating	10.0	22.0%	per premise	40	\$45	per unit	86	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Multi_CZ1	1	Water Heating	10.0	10.0%	per premise	17	\$45	per unit	54	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Multi_CZ2	2	Water Heating	10.0	22.0%	per premise	40	\$45	per unit	86	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Multi_CZ2	2	Water Heating	10.0	10.0%	per premise	17	\$45	per unit	54	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Multi_CZ3	3	Water Heating	10.0	22.0%	per premise	40	\$45	per unit	86	\$53

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Low Flow Showerhead (1.5 GPM max)	Residential	New	Multi_CZ3	3	Water Heating	10.0	10.0%	per premise	17	\$45	per unit	54	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Single_CZ 1	1	Water Heating	10.0	27.0%	per premise	52	\$68	per unit	7	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Single_CZ 1	1	Water Heating	10.0	13.0%	per premise	22	\$68	per unit	(12)	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Single_CZ 2	2	Water Heating	10.0	27.0%	per premise	52	\$68	per unit	7	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Single_CZ 2	2	Water Heating	10.0	13.0%	per premise	22	\$68	per unit	(12)	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	Existing	Single_CZ 3	3	Water Heating	10.0	27.0%	per premise	52	\$68	per unit	7	\$53
Low Flow Showerhead (1.5 GPM max)	Residential	New	Single_CZ 3	3	Water Heating	10.0	13.0%	per premise	22	\$68	per unit	(12)	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Mfg_CZ1	1	Water Heating	10.0	21.0%	per premise	51	\$53	per unit	51	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Mfg_CZ1	1	Water Heating	10.0	3.0%	per premise	6	\$53	per unit	6	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Mfg_CZ2	2	Water Heating	10.0	21.0%	per premise	51	\$53	per unit	51	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Mfg_CZ2	2	Water Heating	10.0	3.0%	per premise	6	\$53	per unit	6	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Mfg_CZ3	3	Water Heating	10.0	21.0%	per premise	51	\$53	per unit	51	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Mfg_CZ3	3	Water Heating	10.0	3.0%	per premise	6	\$53	per unit	6	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Multi_CZ1	1	Water Heating	10.0	16.0%	per premise	38	\$45	per unit	84	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Multi_CZ1	1	Water Heating	10.0	2.0%	per premise	5	\$45	per unit	40	\$53

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Multi_CZ2	2	Water Heating	10.0	16.0%	per premise	38	\$45	per unit	84	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Multi_CZ2	2	Water Heating	10.0	2.0%	per premise	5	\$45	per unit	40	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Multi_CZ3	3	Water Heating	10.0	16.0%	per premise	38	\$45	per unit	84	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Multi_CZ3	3	Water Heating	10.0	2.0%	per premise	5	\$45	per unit	40	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Single_CZ_1	1	Water Heating	10.0	20.0%	per premise	50	\$68	per unit	6	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Single_CZ_1	1	Water Heating	10.0	3.0%	per premise	6	\$68	per unit	(25)	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Single_CZ_2	2	Water Heating	10.0	20.0%	per premise	50	\$68	per unit	6	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Single_CZ_2	2	Water Heating	10.0	3.0%	per premise	6	\$68	per unit	(25)	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	Existing	Single_CZ_3	3	Water Heating	10.0	20.0%	per premise	50	\$68	per unit	6	\$53
Low Flow Showerhead (2.0 GPM max)	Residential	New	Single_CZ_3	3	Water Heating	10.0	3.0%	per premise	6	\$68	per unit	(25)	\$53
Residential Hot Water Pipe Insulation	Residential	Existing	Mfg_CZ1	1	Water Heating	10.0	3.3%	per premise	6	\$12	per 6' of pipe insulation	3	\$6
Residential Hot Water Pipe Insulation	Residential	New	Mfg_CZ1	1	Water Heating	10.0	3.7%	per premise	0	\$6	per 6' of pipe insulation	0	\$6
Residential Hot Water Pipe Insulation	Residential	Existing	Mfg_CZ2	2	Water Heating	10.0	3.3%	per premise	6	\$12	per 6' of pipe insulation	3	\$6
Residential Hot Water Pipe Insulation	Residential	New	Mfg_CZ2	2	Water Heating	10.0	0.1%	per premise	0	\$6	per 6' of pipe insulation	0	\$6

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Hot Water Pipe Insulation	Residential	Existing	Mfg_CZ3	3	Water Heating	10.0	3.3%	per premise	6	\$12	per 6' of pipe insulation	3	\$6
Residential Hot Water Pipe Insulation	Residential	New	Mfg_CZ3	3	Water Heating	10.0	0.1%	per premise	0	\$6	per 6' of pipe insulation	0	\$6
Residential Hot Water Pipe Insulation	Residential	Existing	Multi_CZ1	1	Water Heating	10.0	2.5%	per premise	5	\$12	per 6' of pipe insulation	2	\$6
Residential Hot Water Pipe Insulation	Residential	New	Multi_CZ1	1	Water Heating	10.0	3.8%	per premise	0	\$6	per 6' of pipe insulation	0	\$6
Residential Hot Water Pipe Insulation	Residential	Existing	Multi_CZ2	2	Water Heating	10.0	2.5%	per premise	5	\$12	per 6' of pipe insulation	2	\$6
Residential Hot Water Pipe Insulation	Residential	New	Multi_CZ2	2	Water Heating	10.0	0.2%	per premise	0	\$6	per 6' of pipe insulation	0	\$6
Residential Hot Water Pipe Insulation	Residential	Existing	Multi_CZ3	3	Water Heating	10.0	2.5%	per premise	5	\$12	per 6' of pipe insulation	2	\$6
Residential Hot Water Pipe Insulation	Residential	New	Multi_CZ3	3	Water Heating	10.0	0.2%	per premise	0	\$6	per 6' of pipe insulation	0	\$6
Residential Hot Water Pipe Insulation	Residential	Existing	Single_CZ 1	1	Water Heating	10.0	3.1%	per premise	6	\$12	per 6' of pipe insulation	3	\$6
Residential Hot Water Pipe Insulation	Residential	New	Single_CZ 1	1	Water Heating	10.0	3.5%	per premise	0	\$6	per 6' of pipe insulation	0	\$6
Residential Hot Water Pipe Insulation	Residential	Existing	Single_CZ 2	2	Water Heating	10.0	3.1%	per premise	6	\$12	per 6' of pipe insulation	3	\$6
Residential Hot Water Pipe Insulation	Residential	New	Single_CZ 2	2	Water Heating	10.0	0.1%	per premise	0	\$6	per 6' of pipe insulation	0	\$6

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Residential Hot Water Pipe Insulation	Residential	Existing	Single_CZ3	3	Water Heating	10.0	3.1%	per premise	6	\$12	per 6' of pipe insulation	3	\$6
Residential Hot Water Pipe Insulation	Residential	New	Single_CZ3	3	Water Heating	10.0	0.1%	per premise	0	\$6	per 6' of pipe insulation	0	\$6
Solar Hot Water Heater	Residential	Early Retirement	Mfg_CZ1	1	Water Heating	17.5	58.7%	per premise	121	\$6,500	per unit	121	\$6,500
Solar Hot Water Heater	Residential	New	Mfg_CZ1	1	Water Heating	17.5	52.5%	per premise	102	\$6,036	per unit	102	\$6,036
Solar Hot Water Heater	Residential	Turnover	Mfg_CZ1	1	Water Heating	17.5	52.5%	per premise	102	\$6,036	per unit	102	\$6,036
Solar Hot Water Heater	Residential	Early Retirement	Mfg_CZ2	2	Water Heating	17.5	61.8%	per premise	128	\$6,500	per unit	128	\$6,500
Solar Hot Water Heater	Residential	New	Mfg_CZ2	2	Water Heating	17.5	56.1%	per premise	109	\$6,036	per unit	109	\$6,036
Solar Hot Water Heater	Residential	Turnover	Mfg_CZ2	2	Water Heating	17.5	56.1%	per premise	109	\$6,036	per unit	109	\$6,036
Solar Hot Water Heater	Residential	Early Retirement	Mfg_CZ3	3	Water Heating	17.5	72.6%	per premise	152	\$6,500	per unit	152	\$6,500
Solar Hot Water Heater	Residential	New	Mfg_CZ3	3	Water Heating	17.5	68.5%	per premise	133	\$6,036	per unit	133	\$6,036
Solar Hot Water Heater	Residential	Turnover	Mfg_CZ3	3	Water Heating	17.5	68.5%	per premise	133	\$6,036	per unit	133	\$6,036
Solar Hot Water Heater	Residential	Early Retirement	Multi_CZ1	1	Water Heating	17.5	81.4%	per premise	130	\$6,900	per unit	130	\$6,900
Solar Hot Water Heater	Residential	New	Multi_CZ1	1	Water Heating	17.5	78.6%	per premise	116	\$6,436	per unit	116	\$6,436
Solar Hot Water Heater	Residential	Turnover	Multi_CZ1	1	Water Heating	17.5	78.6%	per premise	116	\$6,436	per unit	116	\$6,436
Solar Hot Water Heater	Residential	Early Retirement	Multi_CZ2	2	Water Heating	17.5	84.9%	per premise	136	\$6,900	per unit	136	\$6,900

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings UEC (Thm/Unit) calculated	Incremental Cost (\$/Unit)
Solar Hot Water Heater	Residential	New	Multi_CZ2	2	Water Heating	17.5	82.7%	per premise	122	\$6,436	per unit	122	\$6,436
Solar Hot Water Heater	Residential	Turnover	Multi_CZ2	2	Water Heating	17.5	82.7%	per premise	122	\$6,436	per unit	122	\$6,436
Solar Hot Water Heater	Residential	Early Retirement	Multi_CZ3	3	Water Heating	17.5	99.7%	per premise	161	\$6,900	per unit	161	\$6,900
Solar Hot Water Heater	Residential	New	Multi_CZ3	3	Water Heating	17.5	99.6%	per premise	147	\$6,436	per unit	147	\$6,436
Solar Hot Water Heater	Residential	Turnover	Multi_CZ3	3	Water Heating	17.5	99.6%	per premise	147	\$6,436	per unit	147	\$6,436
Solar Hot Water Heater	Residential	Early Retirement	Single_CZ 1	1	Water Heating	17.5	59.0%	per premise	123	\$6,500	per unit	123	\$6,500
Solar Hot Water Heater	Residential	New	Single_CZ 1	1	Water Heating	17.5	53.0%	per premise	102	\$6,036	per unit	102	\$6,036
Solar Hot Water Heater	Residential	Turnover	Single_CZ 1	1	Water Heating	17.5	53.0%	per premise	102	\$6,036	per unit	102	\$6,036
Solar Hot Water Heater	Residential	Early Retirement	Single_CZ 2	2	Water Heating	17.5	62.2%	per premise	130	\$6,500	per unit	130	\$6,500
Solar Hot Water Heater	Residential	New	Single_CZ 2	2	Water Heating	17.5	56.6%	per premise	109	\$6,036	per unit	109	\$6,036
Solar Hot Water Heater	Residential	Turnover	Single_CZ 2	2	Water Heating	17.5	56.6%	per premise	109	\$6,036	per unit	109	\$6,036
Solar Hot Water Heater	Residential	Early Retirement	Single_CZ 3	3	Water Heating	17.5	73.1%	per premise	154	\$6,500	per unit	154	\$6,500
Solar Hot Water Heater	Residential	New	Single_CZ 3	3	Water Heating	17.5	69.1%	per premise	133	\$6,036	per unit	133	\$6,036
Solar Hot Water Heater	Residential	Turnover	Single_CZ 3	3	Water Heating	17.5	69.1%	per premise	133	\$6,036	per unit	133	\$6,036

B.2 Commercial Sector Measures

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Combination Oven	Commercial	Early Retirement	Education	All	Cooking	12.0	26.3%	per premise	128	\$54,348	per unit	56	\$23,822
Combination Oven	Commercial	New	Education	All	Cooking	12.0	26.3%	per premise	128	\$9,810	per unit	56	\$4,300
Combination Oven	Commercial	Turnover	Education	All	Cooking	12.0	26.3%	per premise	128	\$9,810	per unit	56	\$4,300
Combination Oven	Commercial	Early Retirement	Grocery	All	Cooking	12.0	26.3%	per premise	333	\$23,822	per unit	333	\$23,822
Combination Oven	Commercial	New	Grocery	All	Cooking	12.0	26.3%	per premise	333	\$4,300	per unit	333	\$4,300
Combination Oven	Commercial	Turnover	Grocery	All	Cooking	12.0	26.3%	per premise	333	\$4,300	per unit	333	\$4,300
Combination Oven	Commercial	Early Retirement	Healthcare	All	Cooking	12.0	26.3%	per premise	65	\$32,307	per unit	48	\$23,822
Combination Oven	Commercial	New	Healthcare	All	Cooking	12.0	26.3%	per premise	65	\$5,831	per unit	48	\$4,300
Combination Oven	Commercial	Turnover	Healthcare	All	Cooking	12.0	26.3%	per premise	65	\$5,831	per unit	48	\$4,300
Combination Oven	Commercial	Early Retirement	Misc.	All	Cooking	12.0	26.3%	per premise	21	\$40,332	per unit	12	\$23,822
Combination Oven	Commercial	New	Misc.	All	Cooking	12.0	26.3%	per premise	21	\$7,280	per unit	12	\$4,300
Combination Oven	Commercial	Turnover	Misc.	All	Cooking	12.0	26.3%	per premise	21	\$7,280	per unit	12	\$4,300
Combination Oven	Commercial	Early Retirement	Restaurant	All	Cooking	12.0	26.3%	per premise	587	\$75,876	per unit	184	\$23,822
Combination Oven	Commercial	New	Restaurant	All	Cooking	12.0	26.3%	per premise	587	\$13,696	per unit	184	\$4,300
Combination Oven	Commercial	Turnover	Restaurant	All	Cooking	12.0	26.3%	per premise	587	\$13,696	per unit	184	\$4,300
Conveyor Oven	Commercial	Early Retirement	Education	All	Cooking	16.0	11.0%	per premise	53	\$56,487	per unit	23	\$24,760

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Conveyor Oven	Commercial	New	Education	All	Cooking	16.0	11.0%	per premise	53	\$4,106	per unit	23	\$1,800
Conveyor Oven	Commercial	Turnover	Education	All	Cooking	16.0	11.0%	per premise	53	\$4,106	per unit	23	\$1,800
Conveyor Oven	Commercial	Early Retirement	Grocery	All	Cooking	16.0	11.0%	per premise	139	\$24,760	per unit	139	\$24,760
Conveyor Oven	Commercial	New	Grocery	All	Cooking	16.0	11.0%	per premise	139	\$1,800	per unit	139	\$1,800
Conveyor Oven	Commercial	Turnover	Grocery	All	Cooking	16.0	11.0%	per premise	139	\$1,800	per unit	139	\$1,800
Conveyor Oven	Commercial	Early Retirement	Healthcare	All	Cooking	16.0	11.0%	per premise	27	\$33,578	per unit	20	\$24,760
Conveyor Oven	Commercial	New	Healthcare	All	Cooking	16.0	11.0%	per premise	27	\$2,441	per unit	20	\$1,800
Conveyor Oven	Commercial	Turnover	Healthcare	All	Cooking	16.0	11.0%	per premise	27	\$2,441	per unit	20	\$1,800
Conveyor Oven	Commercial	Early Retirement	Lodging	All	Cooking	16.0	11.0%	per premise	83	\$90,532	per unit	23	\$24,760
Conveyor Oven	Commercial	New	Lodging	All	Cooking	16.0	11.0%	per premise	83	\$6,581	per unit	23	\$1,800
Conveyor Oven	Commercial	Turnover	Lodging	All	Cooking	16.0	11.0%	per premise	83	\$6,581	per unit	23	\$1,800
Conveyor Oven	Commercial	Early Retirement	Misc.	All	Cooking	16.0	11.0%	per premise	9	\$41,919	per unit	5	\$24,760
Conveyor Oven	Commercial	New	Misc.	All	Cooking	16.0	11.0%	per premise	9	\$3,047	per unit	5	\$1,800
Conveyor Oven	Commercial	Turnover	Misc.	All	Cooking	16.0	11.0%	per premise	9	\$3,047	per unit	5	\$1,800
Conveyor Oven	Commercial	Early Retirement	Office	All	Cooking	16.0	11.0%	per premise	3	\$34,931	per unit	2	\$24,760
Conveyor Oven	Commercial	New	Office	All	Cooking	16.0	11.0%	per premise	3	\$2,539	per unit	2	\$1,800

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Conveyor Oven	Commercial	Turnover	Office	All	Cooking	16.0	11.0%	per premise	3	\$2,539	per unit	2	\$1,800
Conveyor Oven	Commercial	Early Retirement	Restaurant	All	Cooking	16.0	11.0%	per premise	246	\$78,862	per unit	77	\$24,760
Conveyor Oven	Commercial	New	Restaurant	All	Cooking	16.0	11.0%	per premise	246	\$5,733	per unit	77	\$1,800
Conveyor Oven	Commercial	Turnover	Restaurant	All	Cooking	16.0	11.0%	per premise	246	\$5,733	per unit	77	\$1,800
ENERGY STAR Convection Oven	Commercial	Early Retirement	Education	All	Cooking	12.0	33.0%	per premise	160	\$6,230	per unit	70	\$2,731
ENERGY STAR Convection Oven	Commercial	New	Education	All	Cooking	12.0	29.1%	per premise	141	\$114	per unit	62	\$50
ENERGY STAR Convection Oven	Commercial	Turnover	Education	All	Cooking	12.0	29.1%	per premise	141	\$114	per unit	62	\$50
ENERGY STAR Convection Oven	Commercial	Early Retirement	Grocery	All	Cooking	12.0	33.0%	per premise	417	\$2,731	per unit	417	\$2,731
ENERGY STAR Convection Oven	Commercial	New	Grocery	All	Cooking	12.0	29.1%	per premise	368	\$50	per unit	368	\$50
ENERGY STAR Convection Oven	Commercial	Turnover	Grocery	All	Cooking	12.0	29.1%	per premise	368	\$50	per unit	368	\$50
ENERGY STAR Convection Oven	Commercial	Early Retirement	Healthcare	All	Cooking	12.0	33.0%	per premise	81	\$3,704	per unit	60	\$2,731
ENERGY STAR Convection Oven	Commercial	New	Healthcare	All	Cooking	12.0	29.1%	per premise	71	\$68	per unit	53	\$50
ENERGY STAR Convection Oven	Commercial	Turnover	Healthcare	All	Cooking	12.0	29.1%	per premise	71	\$68	per unit	53	\$50
ENERGY STAR Convection Oven	Commercial	Early Retirement	Restaurant	All	Cooking	12.0	33.0%	per premise	736	\$8,698	per unit	231	\$2,731
ENERGY STAR Convection Oven	Commercial	New	Restaurant	All	Cooking	12.0	29.1%	per premise	649	\$159	per unit	204	\$50
ENERGY STAR Convection Oven	Commercial	Turnover	Restaurant	All	Cooking	12.0	29.1%	per premise	649	\$159	per unit	204	\$50

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Energy Star Fryer	Commercial	Early Retirement	Education	All	Cooking	12.0	36.9%	per premise	179	\$1,122	per unit	179	\$1,122
Energy Star Fryer	Commercial	New	Education	All	Cooking	12.0	30.7%	per premise	149	\$560	per unit	149	\$560
Energy Star Fryer	Commercial	Turnover	Education	All	Cooking	12.0	30.7%	per premise	149	\$560	per unit	149	\$560
Energy Star Fryer	Commercial	Early Retirement	Grocery	All	Cooking	12.0	36.9%	per premise	466	\$1,122	per unit	466	\$1,122
Energy Star Fryer	Commercial	New	Grocery	All	Cooking	12.0	30.7%	per premise	388	\$560	per unit	388	\$560
Energy Star Fryer	Commercial	Turnover	Grocery	All	Cooking	12.0	30.7%	per premise	388	\$560	per unit	388	\$560
Energy Star Fryer	Commercial	Early Retirement	Healthcare	All	Cooking	12.0	36.9%	per premise	91	\$1,122	per unit	91	\$1,122
Energy Star Fryer	Commercial	New	Healthcare	All	Cooking	12.0	30.7%	per premise	75	\$560	per unit	75	\$560
Energy Star Fryer	Commercial	Turnover	Healthcare	All	Cooking	12.0	30.7%	per premise	75	\$560	per unit	75	\$560
Energy Star Fryer	Commercial	Early Retirement	Restaurant	All	Cooking	12.0	36.9%	per premise	823	\$3,019	per unit	306	\$1,122
Energy Star Fryer	Commercial	New	Restaurant	All	Cooking	12.0	30.7%	per premise	685	\$1,507	per unit	255	\$560
Energy Star Fryer	Commercial	Turnover	Restaurant	All	Cooking	12.0	30.7%	per premise	685	\$1,507	per unit	255	\$560
Energy Star Griddle	Commercial	Early Retirement	Education	All	Cooking	12.0	17.5%	per premise	85	\$6,056	per unit	85	\$6,056
Energy Star Griddle	Commercial	New	Education	All	Cooking	12.0	12.3%	per premise	60	\$360	per unit	60	\$360
Energy Star Griddle	Commercial	Turnover	Education	All	Cooking	12.0	12.3%	per premise	60	\$360	per unit	60	\$360
Energy Star Griddle	Commercial	Early Retirement	Grocery	All	Cooking	12.0	17.5%	per premise	222	\$6,056	per unit	222	\$6,056

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Energy Star Griddle	Commercial	New	Grocery	All	Cooking	12.0	12.3%	per premise	155	\$360	per unit	155	\$360
Energy Star Griddle	Commercial	Turnover	Grocery	All	Cooking	12.0	12.3%	per premise	155	\$360	per unit	155	\$360
Energy Star Griddle	Commercial	Early Retirement	Healthcare	All	Cooking	12.0	17.5%	per premise	43	\$6,056	per unit	43	\$6,056
Energy Star Griddle	Commercial	New	Healthcare	All	Cooking	12.0	12.3%	per premise	30	\$360	per unit	30	\$360
Energy Star Griddle	Commercial	Turnover	Healthcare	All	Cooking	12.0	12.3%	per premise	30	\$360	per unit	30	\$360
Energy Star Griddle	Commercial	Early Retirement	Restaurant	All	Cooking	12.0	17.5%	per premise	391	\$19,289	per unit	123	\$6,056
Energy Star Griddle	Commercial	New	Restaurant	All	Cooking	12.0	12.3%	per premise	274	\$1,147	per unit	86	\$360
Energy Star Griddle	Commercial	Turnover	Restaurant	All	Cooking	12.0	12.3%	per premise	274	\$1,147	per unit	86	\$360
High efficiency steam cooker	Commercial	Early Retirement	Education	All	Cooking	12.0	57.5%	per premise	279	\$8,817	per unit	279	\$8,817
High efficiency steam cooker	Commercial	New	Education	All	Cooking	12.0	52.6%	per premise	256	\$870	per unit	256	\$870
High efficiency steam cooker	Commercial	Turnover	Education	All	Cooking	12.0	52.6%	per premise	256	\$870	per unit	256	\$870
High efficiency steam cooker	Commercial	Early Retirement	Healthcare	All	Cooking	12.0	57.5%	per premise	141	\$8,817	per unit	141	\$8,817
High efficiency steam cooker	Commercial	New	Healthcare	All	Cooking	12.0	52.6%	per premise	129	\$870	per unit	129	\$870
High efficiency steam cooker	Commercial	Turnover	Healthcare	All	Cooking	12.0	52.6%	per premise	129	\$870	per unit	129	\$870
High efficiency steam cooker	Commercial	Early Retirement	Restaurant	All	Cooking	12.0	57.5%	per premise	1,283	\$8,817	per unit	1,283	\$8,817
High efficiency steam cooker	Commercial	New	Restaurant	All	Cooking	12.0	52.6%	per premise	1,174	\$870	per unit	1,174	\$870

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High efficiency steam cooker	Commercial	Turnover	Restaurant	All	Cooking	12.0	52.6%	per premise	1,174	\$870	per unit	1,174	\$870
Pool Cover	Commercial	Existing	Education	All	Other	6.0	55.9%	per premise	1,462	\$8,610	per unit	1,462	\$8,610
Pool Cover	Commercial	New	Education	All	Other	6.0	55.9%	per premise	1,462	\$8,610	per unit	1,462	\$8,610
Pool Cover	Commercial	Existing	Lodging	All	Other	6.0	55.9%	per premise	368	\$8,610	per unit	368	\$8,610
Pool Cover	Commercial	New	Lodging	All	Other	6.0	55.9%	per premise	368	\$8,610	per unit	368	\$8,610
Pool Spa Solar Heat	Commercial	Existing	Education	All	Other	30.0	64.4%	per premise	1,683	\$9,504	per unit	1,683	\$9,504
Pool Spa Solar Heat	Commercial	New	Education	All	Other	30.0	64.4%	per premise	1,683	\$9,504	per unit	1,683	\$9,504
Pool Spa Solar Heat	Commercial	Existing	Lodging	All	Other	30.0	64.4%	per premise	424	\$9,504	per unit	424	\$9,504
Pool Spa Solar Heat	Commercial	New	Lodging	All	Other	30.0	64.4%	per premise	424	\$9,504	per unit	424	\$9,504
Boiler Pipe Insulation	Commercial	Existing	Education	All	Space Heating	20.0	1.8%	per premise	106	\$600	per boiler	53	\$300
Boiler Pipe Insulation	Commercial	Existing	Grocery	All	Space Heating	20.0	1.8%	per premise	72	\$300	per boiler	72	\$300
Boiler Pipe Insulation	Commercial	Existing	Healthcare	All	Space Heating	20.0	1.8%	per premise	62	\$900	per boiler	21	\$300
Boiler Pipe Insulation	Commercial	Existing	Lodging	All	Space Heating	20.0	1.8%	per premise	62	\$600	per boiler	31	\$300
Boiler Pipe Insulation	Commercial	Existing	Misc.	All	Space Heating	20.0	1.8%	per premise	24	\$300	per boiler	24	\$300
Boiler Pipe Insulation	Commercial	Existing	Office	All	Space Heating	20.0	1.8%	per premise	42	\$600	per boiler	21	\$300
Boiler Pipe Insulation	Commercial	Existing	Restaurant	All	Space Heating	20.0	1.8%	per premise	24	\$300	per boiler	24	\$300

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Boiler Pipe Insulation	Commercial	Existing	Warehouse	All	Space Heating	20.0	1.8%	per premise	36	\$300	per boiler	36	\$300
Boiler Power Burner	Commercial	Existing	Education	All	Space Heating	3.5	1.1%	per premise	68	\$600	per boiler	34	\$300
Boiler Power Burner	Commercial	New	Education	All	Space Heating	3.5	1.1%	per premise	68	\$600	per boiler	34	\$300
Boiler Power Burner	Commercial	Existing	Grocery	All	Space Heating	3.5	1.1%	per premise	46	\$300	per boiler	46	\$300
Boiler Power Burner	Commercial	New	Grocery	All	Space Heating	3.5	1.1%	per premise	46	\$300	per boiler	46	\$300
Boiler Power Burner	Commercial	Existing	Healthcare	All	Space Heating	3.5	1.1%	per premise	40	\$900	per boiler	13	\$300
Boiler Power Burner	Commercial	New	Healthcare	All	Space Heating	3.5	1.1%	per premise	40	\$900	per boiler	13	\$300
Boiler Power Burner	Commercial	Existing	Lodging	All	Space Heating	3.5	1.1%	per premise	39	\$600	per boiler	20	\$300
Boiler Power Burner	Commercial	New	Lodging	All	Space Heating	3.5	1.1%	per premise	39	\$600	per boiler	20	\$300
Boiler Power Burner	Commercial	Existing	Misc.	All	Space Heating	3.5	1.1%	per premise	15	\$300	per boiler	15	\$300
Boiler Power Burner	Commercial	New	Misc.	All	Space Heating	3.5	1.1%	per premise	15	\$300	per boiler	15	\$300
Boiler Power Burner	Commercial	Existing	Office	All	Space Heating	3.5	1.1%	per premise	27	\$600	per boiler	14	\$300
Boiler Power Burner	Commercial	New	Office	All	Space Heating	3.5	1.1%	per premise	27	\$600	per boiler	14	\$300
Boiler Power Burner	Commercial	Existing	Retail	All	Space Heating	3.5	1.1%	per premise	28	\$300	per boiler	28	\$300
Boiler Power Burner	Commercial	New	Retail	All	Space Heating	3.5	1.1%	per premise	28	\$300	per boiler	28	\$300
Boiler Power Burner	Commercial	Existing	Warehouse	All	Space Heating	3.5	1.1%	per premise	23	\$300	per boiler	23	\$300

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Boiler Power Burner	Commercial	New	Warehouse	All	Space Heating	3.5	1.1%	per premise	23	\$300	per boiler	23	\$300
Boiler Repair/Maintenance	Commercial	Existing	Education	All	Space Heating	2.0	2.0%	per premise	119	\$2,557	per boiler	60	\$1,278
Boiler Repair/Maintenance	Commercial	Existing	Grocery	All	Space Heating	2.0	2.0%	per premise	81	\$1,278	per boiler	81	\$1,278
Boiler Repair/Maintenance	Commercial	Existing	Healthcare	All	Space Heating	2.0	2.0%	per premise	70	\$3,835	per boiler	23	\$1,278
Boiler Repair/Maintenance	Commercial	Existing	Lodging	All	Space Heating	2.0	2.0%	per premise	69	\$2,557	per boiler	35	\$1,278
Boiler Repair/Maintenance	Commercial	Existing	Misc.	All	Space Heating	2.0	2.0%	per premise	27	\$1,278	per boiler	27	\$1,278
Boiler Repair/Maintenance	Commercial	Existing	Office	All	Space Heating	2.0	2.0%	per premise	48	\$2,557	per boiler	24	\$1,278
Boiler Repair/Maintenance	Commercial	Existing	Retail	All	Space Heating	2.0	2.0%	per premise	48	\$1,278	per boiler	48	\$1,278
Boiler Repair/Maintenance	Commercial	Existing	Warehouse	All	Space Heating	2.0	2.0%	per premise	40	\$1,278	per boiler	40	\$1,278
Boiler Stack Economizer	Commercial	Existing	Education	All	Space Heating	20.0	6.3%	per premise	367	\$15,127	per boiler	184	\$7,564
Boiler Stack Economizer	Commercial	Existing	Grocery	All	Space Heating	20.0	6.3%	per premise	250	\$7,564	per boiler	250	\$7,564
Boiler Stack Economizer	Commercial	Existing	Healthcare	All	Space Heating	20.0	6.3%	per premise	215	\$22,691	per boiler	72	\$7,564
Boiler Stack Economizer	Commercial	Existing	Lodging	All	Space Heating	20.0	6.3%	per premise	215	\$15,127	per boiler	107	\$7,564
Boiler Stack Economizer	Commercial	Existing	Misc.	All	Space Heating	20.0	6.3%	per premise	83	\$7,564	per boiler	83	\$7,564
Boiler Stack Economizer	Commercial	Existing	Office	All	Space Heating	20.0	6.3%	per premise	147	\$15,127	per boiler	74	\$7,564
Boiler Stack Economizer	Commercial	Existing	Retail	All	Space Heating	20.0	6.3%	per premise	150	\$7,564	per boiler	150	\$7,564

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Boiler Stack Economizer	Commercial	Existing	Warehouse	All	Space Heating	20.0	6.3%	per premise	123	\$7,564	per boiler	123	\$7,564
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Commercial	Existing	Education	All	Space Heating	6.0	4.4%	per premise	261	\$500	per boiler	131	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Commercial	Existing	Healthcare	All	Space Heating	6.0	4.4%	per premise	153	\$750	per boiler	51	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Commercial	Existing	Lodging	All	Space Heating	6.0	4.4%	per premise	153	\$500	per boiler	76	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Commercial	Existing	Misc.	All	Space Heating	6.0	4.4%	per premise	59	\$500	per boiler	29	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Commercial	Existing	Office	All	Space Heating	6.0	4.4%	per premise	105	\$250	per boiler	105	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Commercial	Existing	Retail	All	Space Heating	6.0	4.4%	per premise	106	\$250	per boiler	106	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Commercial	Existing	Warehouse	All	Space Heating	6.0	4.4%	per premise	88	\$250	per boiler	88	\$250
Boiler vent damper - min. 1000 kBtu input	Commercial	Existing	Education	All	Space Heating	12.0	1.2%	per premise	73	\$2,000	per boiler	36	\$1,000
Boiler vent damper - min. 1000 kBtu input	Commercial	New	Education	All	Space Heating	12.0	1.2%	per premise	73	\$2,000	per boiler	36	\$1,000

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Boiler vent damper - min. 1000 kBtu input	Commercial	Existing	Healthcare	All	Space Heating	12.0	1.2%	per premise	43	\$3,000	per boiler	14	\$1,000
Boiler vent damper - min. 1000 kBtu input	Commercial	New	Healthcare	All	Space Heating	12.0	1.2%	per premise	43	\$3,000	per boiler	14	\$1,000
Boiler vent damper - min. 1000 kBtu input	Commercial	Existing	Lodging	All	Space Heating	12.0	1.2%	per premise	42	\$2,000	per boiler	21	\$1,000
Boiler vent damper - min. 1000 kBtu input	Commercial	Existing	Misc.	All	Space Heating	12.0	1.2%	per premise	16	\$1,000	per boiler	16	\$1,000
Boiler vent damper - min. 1000 kBtu input	Commercial	Existing	Office	All	Space Heating	12.0	1.2%	per premise	29	\$2,000	per boiler	15	\$1,000
Boiler vent damper - min. 1000 kBtu input	Commercial	Existing	Retail	All	Space Heating	12.0	1.2%	per premise	30	\$1,000	per boiler	30	\$1,000
Boiler vent damper - min. 1000 kBtu input	Commercial	Existing	Warehouse	All	Space Heating	12.0	1.2%	per premise	24	\$1,000	per boiler	24	\$1,000
Boiler Waste Water Heat Exchanger	Commercial	Existing	Education	All	Space Heating	20.0	1.0%	per premise	59	\$18,000	per boiler	59	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	New	Education	All	Space Heating	20.0	1.0%	per premise	59	\$18,000	per boiler	59	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	Existing	Healthcare	All	Space Heating	20.0	1.0%	per premise	34	\$18,000	per boiler	34	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	New	Healthcare	All	Space Heating	20.0	1.0%	per premise	34	\$18,000	per boiler	34	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	Existing	Lodging	All	Space Heating	20.0	1.0%	per premise	34	\$18,000	per boiler	34	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	New	Lodging	All	Space Heating	20.0	1.0%	per premise	34	\$18,000	per boiler	34	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	Existing	Misc.	All	Space Heating	20.0	1.0%	per premise	13	\$18,000	per boiler	13	\$18,000

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Boiler Waste Water Heat Exchanger	Commercial	New	Misc.	All	Space Heating	20.0	1.0%	per premise	13	\$18,000	per boiler	13	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	Existing	Office	All	Space Heating	20.0	1.0%	per premise	24	\$18,000	per boiler	24	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	New	Office	All	Space Heating	20.0	1.0%	per premise	24	\$18,000	per boiler	24	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	Existing	Retail	All	Space Heating	20.0	1.0%	per premise	24	\$18,000	per boiler	24	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	New	Retail	All	Space Heating	20.0	1.0%	per premise	24	\$18,000	per boiler	24	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	Existing	Warehouse	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per boiler	20	\$18,000
Boiler Waste Water Heat Exchanger	Commercial	New	Warehouse	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per boiler	20	\$18,000
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Education	All	Space Heating	20.0	16.6%	per premise	974	\$85,720	per unit	487	\$42,860
Combination Boiler and Hot Water Heater	Commercial	New	Education	All	Space Heating	20.0	11.3%	per premise	666	\$46,904	per unit	666	\$46,904
Combination Boiler and Hot Water Heater	Commercial	Turnover	Education	All	Space Heating	20.0	11.3%	per premise	666	\$46,904	per unit	333	\$23,452
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Grocery	All	Space Heating	20.0	16.6%	per premise	663	\$42,860	per unit	332	\$21,430
Combination Boiler and Hot Water Heater	Commercial	New	Grocery	All	Space Heating	20.0	11.3%	per premise	454	\$23,452	per unit	227	\$11,726
Combination Boiler and Hot Water Heater	Commercial	Turnover	Grocery	All	Space Heating	20.0	11.3%	per premise	454	\$23,452	per unit	227	\$11,726
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Healthcare	All	Space Heating	20.0	16.6%	per premise	571	\$128,581	per unit	571	\$128,581

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Combination Boiler and Hot Water Heater	Commercial	New	Healthcare	All	Space Heating	20.0	11.3%	per premise	390	\$70,355	per unit	195	\$35,178
Combination Boiler and Hot Water Heater	Commercial	Turnover	Healthcare	All	Space Heating	20.0	11.3%	per premise	390	\$70,355	per unit	390	\$70,355
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Lodging	All	Space Heating	20.0	16.6%	per premise	569	\$85,720	per unit	569	\$85,720
Combination Boiler and Hot Water Heater	Commercial	New	Lodging	All	Space Heating	20.0	11.3%	per premise	389	\$46,904	per unit	389	\$46,904
Combination Boiler and Hot Water Heater	Commercial	Turnover	Lodging	All	Space Heating	20.0	11.3%	per premise	389	\$46,904	per unit	389	\$46,904
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Misc.	All	Space Heating	20.0	16.6%	per premise	219	\$42,860	per unit	73	\$14,287
Combination Boiler and Hot Water Heater	Commercial	New	Misc.	All	Space Heating	20.0	11.2%	per premise	149	\$23,452	per unit	149	\$23,452
Combination Boiler and Hot Water Heater	Commercial	Turnover	Misc.	All	Space Heating	20.0	11.2%	per premise	149	\$23,452	per unit	50	\$7,817
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Office	All	Space Heating	20.0	16.6%	per premise	390	\$85,720	per unit	390	\$85,720
Combination Boiler and Hot Water Heater	Commercial	New	Office	All	Space Heating	20.0	11.3%	per premise	267	\$46,904	per unit	89	\$15,635
Combination Boiler and Hot Water Heater	Commercial	Turnover	Office	All	Space Heating	20.0	11.3%	per premise	267	\$46,904	per unit	267	\$46,904
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Restaurant	All	Space Heating	20.0	16.6%	per premise	220	\$42,860	per unit	110	\$21,430

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Combination Boiler and Hot Water Heater	Commercial	New	Restaurant	All	Space Heating	20.0	11.2%	per premise	149	\$23,452	per unit	149	\$23,452
Combination Boiler and Hot Water Heater	Commercial	Turnover	Restaurant	All	Space Heating	20.0	11.2%	per premise	149	\$23,452	per unit	75	\$11,726
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Retail	All	Space Heating	20.0	16.6%	per premise	220	\$42,860	per unit	220	\$42,860
Combination Boiler and Hot Water Heater	Commercial	New	Retail	All	Space Heating	20.0	11.3%	per premise	271	\$23,452	per unit	136	\$11,726
Combination Boiler and Hot Water Heater	Commercial	Turnover	Retail	All	Space Heating	20.0	11.3%	per premise	271	\$23,452	per unit	271	\$23,452
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Warehouse	All	Space Heating	20.0	16.6%	per premise	327	\$42,860	per unit	327	\$42,860
Combination Boiler and Hot Water Heater	Commercial	New	Warehouse	All	Space Heating	20.0	11.2%	per premise	222	\$23,452	per unit	222	\$23,452
Combination Boiler and Hot Water Heater	Commercial	Turnover	Warehouse	All	Space Heating	20.0	11.2%	per premise	222	\$23,452	per unit	222	\$23,452
Demand Controlled Ventilation	Commercial	Existing	Education	All	Space Heating	12.0	16.8%	per premise	991	\$1,708	per unit	991	\$1,708
Demand Controlled Ventilation	Commercial	Existing	Grocery	All	Space Heating	12.0	16.8%	per premise	675	\$1,708	per unit	675	\$1,708
Demand Controlled Ventilation	Commercial	Existing	Healthcare	All	Space Heating	12.0	16.8%	per premise	581	\$1,708	per unit	581	\$1,708
Demand Controlled Ventilation	Commercial	Existing	Lodging	All	Space Heating	12.0	16.8%	per premise	578	\$1,708	per unit	578	\$1,708
Demand Controlled Ventilation	Commercial	Existing	Misc.	All	Space Heating	12.0	16.8%	per premise	223	\$1,708	per unit	223	\$1,708
Demand Controlled Ventilation	Commercial	Existing	Office	All	Space Heating	12.0	16.8%	per premise	397	\$1,708	per unit	397	\$1,708

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Demand Controlled Ventilation	Commercial	Existing	Restaurant	All	Space Heating	12.0	16.8%	per premise	224	\$1,708	per unit	224	\$1,708
Demand Controlled Ventilation	Commercial	Existing	Retail	All	Space Heating	12.0	16.8%	per premise	403	\$1,708	per unit	403	\$1,708
Demand Controlled Ventilation	Commercial	Existing	Warehouse	All	Space Heating	12.0	16.8%	per premise	333	\$1,708	per unit	333	\$1,708
Direct Fired Radiant Heater	Commercial	Early Retirement	Education	All	Space Heating	17.0	23.5%	per premise	1,382	\$2,532	per unit	1,382	\$2,532
Direct Fired Radiant Heater	Commercial	New	Education	All	Space Heating	17.0	23.5%	per premise	1,382	\$812	per unit	1,382	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Education	All	Space Heating	17.0	23.5%	per premise	1,382	\$812	per unit	1,382	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Grocery	All	Space Heating	17.0	23.5%	per premise	941	\$2,532	per unit	941	\$2,532
Direct Fired Radiant Heater	Commercial	New	Grocery	All	Space Heating	17.0	23.5%	per premise	941	\$812	per unit	941	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Grocery	All	Space Heating	17.0	23.5%	per premise	941	\$812	per unit	941	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Healthcare	All	Space Heating	17.0	23.5%	per premise	810	\$2,532	per unit	810	\$2,532
Direct Fired Radiant Heater	Commercial	New	Healthcare	All	Space Heating	17.0	23.5%	per premise	810	\$812	per unit	810	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Healthcare	All	Space Heating	17.0	23.5%	per premise	810	\$812	per unit	810	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Lodging	All	Space Heating	17.0	23.5%	per premise	807	\$2,532	per unit	807	\$2,532
Direct Fired Radiant Heater	Commercial	New	Lodging	All	Space Heating	17.0	23.5%	per premise	807	\$812	per unit	807	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Lodging	All	Space Heating	17.0	23.5%	per premise	807	\$812	per unit	807	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Misc.	All	Space Heating	17.0	23.5%	per premise	311	\$2,532	per unit	311	\$2,532

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Direct Fired Radiant Heater	Commercial	New	Misc.	All	Space Heating	17.0	23.5%	per premise	311	\$812	per unit	311	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Misc.	All	Space Heating	17.0	23.5%	per premise	311	\$812	per unit	311	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Office	All	Space Heating	17.0	23.5%	per premise	553	\$2,532	per unit	553	\$2,532
Direct Fired Radiant Heater	Commercial	New	Office	All	Space Heating	17.0	23.5%	per premise	553	\$812	per unit	553	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Office	All	Space Heating	17.0	23.5%	per premise	553	\$812	per unit	553	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Restaurant	All	Space Heating	17.0	23.5%	per premise	312	\$2,532	per unit	312	\$2,532
Direct Fired Radiant Heater	Commercial	New	Restaurant	All	Space Heating	17.0	23.5%	per premise	312	\$812	per unit	312	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Restaurant	All	Space Heating	17.0	23.5%	per premise	312	\$812	per unit	312	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Retail	All	Space Heating	17.0	23.5%	per premise	562	\$2,532	per unit	562	\$2,532
Direct Fired Radiant Heater	Commercial	New	Retail	All	Space Heating	17.0	23.5%	per premise	562	\$812	per unit	562	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Retail	All	Space Heating	17.0	23.5%	per premise	562	\$812	per unit	562	\$812
Direct Fired Radiant Heater	Commercial	Early Retirement	Warehouse	All	Space Heating	17.0	23.5%	per premise	464	\$2,532	per unit	464	\$2,532
Direct Fired Radiant Heater	Commercial	New	Warehouse	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	464	\$812
Direct Fired Radiant Heater	Commercial	Turnover	Warehouse	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	464	\$812
Duct Sealing and Insulation	Commercial	Existing	Education	All	Space Heating	19.0	10.5%	per premise	619	\$21,966	per sf facility	0	\$1

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Duct Sealing and Insulation	Commercial	Existing	Grocery	All	Space Heating	19.0	10.5%	per premise	422	\$11,523	per sf facility	0	\$1
Duct Sealing and Insulation	Commercial	Existing	Healthcare	All	Space Heating	19.0	10.5%	per premise	363	\$15,234	per sf facility	0	\$1
Duct Sealing and Insulation	Commercial	Existing	Lodging	All	Space Heating	19.0	10.5%	per premise	361	\$18,957	per sf facility	0	\$1
Duct Sealing and Insulation	Commercial	Existing	Misc.	All	Space Heating	19.0	10.5%	per premise	139	\$5,434	per sf facility	0	\$1
Duct Sealing and Insulation	Commercial	Existing	Office	All	Space Heating	19.0	10.5%	per premise	248	\$11,886	per sf facility	0	\$1
Duct Sealing and Insulation	Commercial	Existing	Restaurant	All	Space Heating	19.0	10.5%	per premise	140	\$3,024	per sf facility	0	\$1
Duct Sealing and Insulation	Commercial	Existing	Retail	All	Space Heating	19.0	10.5%	per premise	252	\$9,702	per sf facility	0	\$1
Duct Sealing and Insulation	Commercial	Existing	Warehouse	All	Space Heating	19.0	10.5%	per premise	208	\$14,273	per sf facility	0	\$1
Floor Insulation	Commercial	Existing	Education	All	Space Heating	25.0	3.5%	per premise	204	\$36,352	per sf installed	0	\$2
Floor Insulation	Commercial	Existing	Grocery	All	Space Heating	25.0	3.5%	per premise	139	\$24,517	per sf installed	0	\$2
Floor Insulation	Commercial	Existing	Healthcare	All	Space Heating	25.0	3.5%	per premise	120	\$25,210	per sf installed	0	\$2

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Floor Insulation	Commercial	Existing	Lodging	All	Space Heating	25.0	3.5%	per premise	119	\$33,217	per sf installed	0	\$2
Floor Insulation	Commercial	Existing	Misc.	All	Space Heating	25.0	3.5%	per premise	46	\$9,521	per sf installed	0	\$2
Floor Insulation	Commercial	Existing	Office	All	Space Heating	25.0	3.5%	per premise	82	\$19,670	per sf installed	0	\$2
Floor Insulation	Commercial	Existing	Restaurant	All	Space Heating	25.0	3.5%	per premise	46	\$5,629	per sf installed	0	\$2
Floor Insulation	Commercial	Existing	Retail	All	Space Heating	25.0	3.5%	per premise	83	\$20,643	per sf installed	0	\$2
Floor Insulation	Commercial	Existing	Warehouse	All	Space Heating	25.0	3.5%	per premise	69	\$38,650	per sf installed	0	\$2
Heat Recovery	Commercial	Existing	Education	All	Space Heating	15.0	16.2%	per premise	954	\$62,693	per sf facility	0	\$2
Heat Recovery	Commercial	New	Education	All	Space Heating	15.0	16.2%	per premise	954	\$62,693	per sf facility	0	\$2
Heat Recovery	Commercial	Existing	Grocery	All	Space Heating	15.0	16.2%	per premise	650	\$32,886	per sf facility	0	\$2
Heat Recovery	Commercial	New	Grocery	All	Space Heating	15.0	16.2%	per premise	650	\$32,886	per sf facility	0	\$2
Heat Recovery	Commercial	Existing	Lodging	All	Space Heating	15.0	16.2%	per premise	557	\$54,104	per sf facility	0	\$2

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Heat Recovery	Commercial	New	Lodging	All	Space Heating	15.0	16.2%	per premise	557	\$54,104	per sf facility	0	\$2
Heat Recovery	Commercial	Existing	Office	All	Space Heating	15.0	16.2%	per premise	382	\$33,923	per sf facility	0	\$2
Heat Recovery	Commercial	New	Office	All	Space Heating	15.0	16.2%	per premise	382	\$33,923	per sf facility	0	\$2
Heat Recovery	Commercial	Existing	Restaurant	All	Space Heating	15.0	16.2%	per premise	216	\$8,629	per sf facility	0	\$2
Heat Recovery	Commercial	New	Restaurant	All	Space Heating	15.0	16.2%	per premise	216	\$8,629	per sf facility	0	\$2
Heat Recovery	Commercial	Existing	Retail	All	Space Heating	15.0	16.2%	per premise	388	\$27,691	per sf facility	0	\$2
Heat Recovery	Commercial	New	Retail	All	Space Heating	15.0	16.2%	per premise	388	\$27,691	per sf facility	0	\$2
Heat Recovery	Commercial	Existing	Warehouse	All	Space Heating	15.0	16.2%	per premise	320	\$40,735	per sf facility	0	\$2
Heat Recovery	Commercial	New	Warehouse	All	Space Heating	15.0	16.2%	per premise	320	\$40,735	per sf facility	0	\$2
High Efficiency Condensing Boiler	Commercial	Early Retirement	Education	All	Space Heating	20.0	16.7%	per premise	980	\$85,720	per unit	490	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Education	All	Space Heating	20.0	16.7%	per premise	980	\$85,720	per unit	490	\$42,860

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Boiler	Commercial	New	Education	All	Space Heating	20.0	11.4%	per premise	672	\$46,904	per unit	336	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Education	All	Space Heating	20.0	11.4%	per premise	672	\$46,904	per unit	336	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Education	All	Space Heating	20.0	11.4%	per premise	672	\$46,904	per unit	336	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Education	All	Space Heating	20.0	11.4%	per premise	672	\$46,904	per unit	336	\$23,452
High Efficiency Condensing Boiler	Commercial	Early Retirement	Grocery	All	Space Heating	20.0	16.7%	per premise	667	\$42,860	per unit	667	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Grocery	All	Space Heating	20.0	16.7%	per premise	667	\$42,860	per unit	667	\$42,860
High Efficiency Condensing Boiler	Commercial	New	Grocery	All	Space Heating	20.0	11.4%	per premise	458	\$23,452	per unit	458	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Grocery	All	Space Heating	20.0	11.4%	per premise	458	\$23,452	per unit	458	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Grocery	All	Space Heating	20.0	11.4%	per premise	458	\$23,452	per unit	458	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Grocery	All	Space Heating	20.0	11.4%	per premise	458	\$23,452	per unit	458	\$23,452
High Efficiency Condensing Boiler	Commercial	Early Retirement	Healthcare	All	Space Heating	20.0	16.7%	per premise	574	\$128,581	per unit	191	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Healthcare	All	Space Heating	20.0	16.7%	per premise	574	\$128,581	per unit	191	\$42,860
High Efficiency Condensing Boiler	Commercial	New	Healthcare	All	Space Heating	20.0	11.4%	per premise	394	\$70,355	per unit	131	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Healthcare	All	Space Heating	20.0	11.4%	per premise	394	\$70,355	per unit	131	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Healthcare	All	Space Heating	20.0	11.4%	per premise	394	\$70,355	per unit	131	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Healthcare	All	Space Heating	20.0	11.4%	per premise	394	\$70,355	per unit	131	\$23,452

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Boiler	Commercial	Early Retirement	Lodging	All	Space Heating	20.0	16.7%	per premise	572	\$85,720	per unit	286	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Lodging	All	Space Heating	20.0	16.7%	per premise	572	\$85,720	per unit	286	\$42,860
High Efficiency Condensing Boiler	Commercial	New	Lodging	All	Space Heating	20.0	11.4%	per premise	392	\$46,904	per unit	196	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Lodging	All	Space Heating	20.0	11.4%	per premise	392	\$46,904	per unit	196	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Lodging	All	Space Heating	20.0	11.4%	per premise	392	\$46,904	per unit	196	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Lodging	All	Space Heating	20.0	11.4%	per premise	392	\$46,904	per unit	196	\$23,452
High Efficiency Condensing Boiler	Commercial	Early Retirement	Misc.	All	Space Heating	20.0	16.7%	per premise	221	\$42,860	per unit	221	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Misc.	All	Space Heating	20.0	16.7%	per premise	221	\$42,860	per unit	221	\$42,860
High Efficiency Condensing Boiler	Commercial	New	Misc.	All	Space Heating	20.0	11.4%	per premise	151	\$23,452	per unit	151	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Misc.	All	Space Heating	20.0	11.4%	per premise	151	\$23,452	per unit	151	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Misc.	All	Space Heating	20.0	11.4%	per premise	151	\$23,452	per unit	151	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Misc.	All	Space Heating	20.0	11.4%	per premise	151	\$23,452	per unit	151	\$23,452
High Efficiency Condensing Boiler	Commercial	Early Retirement	Office	All	Space Heating	20.0	16.7%	per premise	392	\$85,720	per unit	196	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Office	All	Space Heating	20.0	16.7%	per premise	392	\$85,720	per unit	196	\$42,860
High Efficiency Condensing Boiler	Commercial	New	Office	All	Space Heating	20.0	11.4%	per premise	269	\$46,904	per unit	135	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Office	All	Space Heating	20.0	11.4%	per premise	269	\$46,904	per unit	135	\$23,452

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Boiler	Commercial	Turnover	Office	All	Space Heating	20.0	11.4%	per premise	269	\$46,904	per unit	135	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Office	All	Space Heating	20.0	11.4%	per premise	269	\$46,904	per unit	135	\$23,452
High Efficiency Condensing Boiler	Commercial	Early Retirement	Restaurant	All	Space Heating	20.0	16.7%	per premise	222	\$42,860	per unit	222	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Restaurant	All	Space Heating	20.0	16.7%	per premise	222	\$42,860	per unit	222	\$42,860
High Efficiency Condensing Boiler	Commercial	New	Restaurant	All	Space Heating	20.0	11.4%	per premise	152	\$23,452	per unit	152	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Restaurant	All	Space Heating	20.0	11.4%	per premise	152	\$23,452	per unit	152	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Restaurant	All	Space Heating	20.0	11.4%	per premise	152	\$23,452	per unit	152	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Restaurant	All	Space Heating	20.0	11.4%	per premise	152	\$23,452	per unit	152	\$23,452
High Efficiency Condensing Boiler	Commercial	Early Retirement	Retail	All	Space Heating	20.0	16.7%	per premise	399	\$42,860	per unit	399	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Retail	All	Space Heating	20.0	16.7%	per premise	399	\$42,860	per unit	399	\$42,860
High Efficiency Condensing Boiler	Commercial	New	Retail	All	Space Heating	20.0	11.4%	per premise	274	\$23,452	per unit	274	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Retail	All	Space Heating	20.0	11.4%	per premise	274	\$23,452	per unit	274	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Retail	All	Space Heating	20.0	11.4%	per premise	274	\$23,452	per unit	274	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Retail	All	Space Heating	20.0	11.4%	per premise	274	\$23,452	per unit	274	\$23,452
High Efficiency Condensing Boiler	Commercial	Early Retirement	Warehouse	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Commercial	Early Retirement	Warehouse	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Boiler	Commercial	New	Warehouse	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Commercial	New	Warehouse	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Warehouse	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Commercial	Turnover	Warehouse	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Furnace	Commercial	Early Retirement	Education	All	Space Heating	17.0	15.4%	per premise	904	\$16,503	per unit	139	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Education	All	Space Heating	17.0	14.3%	per premise	840	\$5,291	per unit	129	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Education	All	Space Heating	17.0	14.3%	per premise	840	\$5,291	per unit	129	\$812
High Efficiency Condensing Furnace	Commercial	Early Retirement	Grocery	All	Space Heating	17.0	15.4%	per premise	616	\$8,657	per unit	180	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Grocery	All	Space Heating	17.0	14.3%	per premise	572	\$2,776	per unit	167	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Grocery	All	Space Heating	17.0	14.3%	per premise	572	\$2,776	per unit	167	\$812
High Efficiency Condensing Furnace	Commercial	Early Retirement	Healthcare	All	Space Heating	17.0	15.4%	per premise	530	\$11,445	per unit	117	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Healthcare	All	Space Heating	17.0	14.3%	per premise	492	\$3,670	per unit	109	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Healthcare	All	Space Heating	17.0	14.3%	per premise	492	\$3,670	per unit	109	\$812
High Efficiency Condensing Furnace	Commercial	Early Retirement	Lodging	All	Space Heating	17.0	15.4%	per premise	528	\$14,242	per unit	94	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Lodging	All	Space Heating	17.0	14.3%	per premise	490	\$4,567	per unit	87	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Lodging	All	Space Heating	17.0	14.3%	per premise	490	\$4,567	per unit	87	\$812

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Furnace	Commercial	Early Retirement	Misc.	All	Space Heating	17.0	15.4%	per premise	204	\$4,082	per unit	126	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Misc.	All	Space Heating	17.0	14.3%	per premise	189	\$1,309	per unit	117	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Misc.	All	Space Heating	17.0	14.3%	per premise	189	\$1,309	per unit	117	\$812
High Efficiency Condensing Furnace	Commercial	Early Retirement	Office	All	Space Heating	17.0	15.4%	per premise	362	\$8,930	per unit	103	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Office	All	Space Heating	17.0	14.3%	per premise	336	\$2,863	per unit	95	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Office	All	Space Heating	17.0	14.3%	per premise	336	\$2,863	per unit	95	\$812
High Efficiency Condensing Furnace	Commercial	Early Retirement	Restaurant	All	Space Heating	17.0	15.4%	per premise	204	\$2,272	per unit	228	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Restaurant	All	Space Heating	17.0	14.3%	per premise	190	\$728	per unit	212	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Restaurant	All	Space Heating	17.0	14.3%	per premise	190	\$728	per unit	212	\$812
High Efficiency Condensing Furnace	Commercial	Early Retirement	Retail	All	Space Heating	17.0	15.4%	per premise	368	\$7,289	per unit	128	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Retail	All	Space Heating	17.0	14.3%	per premise	342	\$2,337	per unit	119	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Retail	All	Space Heating	17.0	14.3%	per premise	342	\$2,337	per unit	119	\$812
High Efficiency Condensing Furnace	Commercial	Early Retirement	Warehouse	All	Space Heating	17.0	15.4%	per premise	304	\$10,723	per unit	72	\$2,532
High Efficiency Condensing Furnace	Commercial	New	Warehouse	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812
High Efficiency Condensing Furnace	Commercial	Turnover	Warehouse	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Education	All	Space Heating	18.0	23.2%	per premise	1,361	\$20,580	per unit	218	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Education	All	Space Heating	18.0	13.0%	per premise	767	\$12,459	per unit	123	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Education	All	Space Heating	18.0	13.0%	per premise	767	\$12,459	per unit	123	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Grocery	All	Space Heating	18.0	23.2%	per premise	927	\$10,796	per unit	282	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Grocery	All	Space Heating	18.0	13.0%	per premise	522	\$6,535	per unit	159	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Grocery	All	Space Heating	18.0	13.0%	per premise	522	\$6,535	per unit	159	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Healthcare	All	Space Heating	18.0	23.2%	per premise	798	\$14,273	per unit	184	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Healthcare	All	Space Heating	18.0	13.0%	per premise	449	\$8,640	per unit	104	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Healthcare	All	Space Heating	18.0	13.0%	per premise	449	\$8,640	per unit	104	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Lodging	All	Space Heating	18.0	23.2%	per premise	795	\$17,761	per unit	147	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Lodging	All	Space Heating	18.0	13.0%	per premise	448	\$10,752	per unit	83	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Lodging	All	Space Heating	18.0	13.0%	per premise	448	\$10,752	per unit	83	\$1,991

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Misc.	All	Space Heating	18.0	23.2%	per premise	307	\$5,091	per unit	198	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Misc.	All	Space Heating	18.0	13.0%	per premise	173	\$3,082	per unit	112	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Misc.	All	Space Heating	18.0	13.0%	per premise	173	\$3,082	per unit	112	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Office	All	Space Heating	18.0	23.2%	per premise	545	\$11,136	per unit	161	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Office	All	Space Heating	18.0	13.0%	per premise	307	\$6,741	per unit	91	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Office	All	Space Heating	18.0	13.0%	per premise	307	\$6,741	per unit	91	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Restaurant	All	Space Heating	18.0	23.2%	per premise	308	\$3,289	per unit	308	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Restaurant	All	Space Heating	18.0	13.0%	per premise	173	\$1,991	per unit	173	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Restaurant	All	Space Heating	18.0	13.0%	per premise	173	\$1,991	per unit	173	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Retail	All	Space Heating	18.0	23.2%	per premise	554	\$9,090	per unit	200	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Retail	All	Space Heating	18.0	13.0%	per premise	312	\$5,503	per unit	113	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Retail	All	Space Heating	18.0	13.0%	per premise	312	\$5,503	per unit	113	\$1,991

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Early Retirement	Warehouse	All	Space Heating	18.0	23.2%	per premise	457	\$13,372	per unit	112	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	New	Warehouse	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Commercial	Turnover	Warehouse	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Education	All	Space Heating	18.0	17.8%	per premise	1,046	\$19,641	per unit	167	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Education	All	Space Heating	18.0	7.0%	per premise	410	\$11,519	per unit	66	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Education	All	Space Heating	18.0	7.0%	per premise	410	\$11,519	per unit	66	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Grocery	All	Space Heating	18.0	17.8%	per premise	712	\$10,303	per unit	217	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Grocery	All	Space Heating	18.0	7.0%	per premise	279	\$6,043	per unit	85	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Grocery	All	Space Heating	18.0	7.0%	per premise	279	\$6,043	per unit	85	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Healthcare	All	Space Heating	18.0	17.8%	per premise	613	\$13,621	per unit	141	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Healthcare	All	Space Heating	18.0	7.0%	per premise	240	\$7,989	per unit	55	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Healthcare	All	Space Heating	18.0	7.0%	per premise	240	\$7,989	per unit	55	\$1,841

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Lodging	All	Space Heating	18.0	17.8%	per premise	611	\$16,950	per unit	113	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Lodging	All	Space Heating	18.0	7.0%	per premise	239	\$9,941	per unit	44	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Lodging	All	Space Heating	18.0	7.0%	per premise	239	\$9,941	per unit	44	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Misc.	All	Space Heating	18.0	17.8%	per premise	236	\$4,859	per unit	152	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Misc.	All	Space Heating	18.0	7.0%	per premise	92	\$2,849	per unit	60	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Misc.	All	Space Heating	18.0	7.0%	per premise	92	\$2,849	per unit	60	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Office	All	Space Heating	18.0	17.8%	per premise	419	\$10,628	per unit	124	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Office	All	Space Heating	18.0	7.0%	per premise	164	\$6,233	per unit	49	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Office	All	Space Heating	18.0	7.0%	per premise	164	\$6,233	per unit	49	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Restaurant	All	Space Heating	18.0	17.8%	per premise	236	\$3,139	per unit	236	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Restaurant	All	Space Heating	18.0	7.0%	per premise	93	\$1,841	per unit	93	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Restaurant	All	Space Heating	18.0	7.0%	per premise	93	\$1,841	per unit	93	\$1,841

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Retail	All	Space Heating	18.0	17.8%	per premise	426	\$8,675	per unit	154	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Retail	All	Space Heating	18.0	7.0%	per premise	167	\$5,088	per unit	60	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Retail	All	Space Heating	18.0	7.0%	per premise	167	\$5,088	per unit	60	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Early Retirement	Warehouse	All	Space Heating	18.0	17.8%	per premise	351	\$12,762	per unit	86	\$3,139
High Efficiency Non-Condensing Unit Heater	Commercial	New	Warehouse	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841
High Efficiency Non-Condensing Unit Heater	Commercial	Turnover	Warehouse	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841
Hot Water Temperature Reset	Commercial	Existing	Education	All	Space Heating	20.0	3.6%	per premise	212	\$5,254	per water heater	33	\$806
Hot Water Temperature Reset	Commercial	Existing	Grocery	All	Space Heating	20.0	3.6%	per premise	145	\$2,756	per water heater	42	\$806
Hot Water Temperature Reset	Commercial	Existing	Healthcare	All	Space Heating	20.0	3.6%	per premise	125	\$3,644	per water heater	28	\$806
Hot Water Temperature Reset	Commercial	Existing	Lodging	All	Space Heating	20.0	3.6%	per premise	124	\$4,534	per water heater	22	\$806

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Hot Water Temperature Reset	Commercial	Existing	Misc.	All	Space Heating	20.0	3.6%	per premise	48	\$1,300	per water heater	30	\$806
Hot Water Temperature Reset	Commercial	Existing	Office	All	Space Heating	20.0	3.6%	per premise	85	\$2,843	per water heater	24	\$806
Hot Water Temperature Reset	Commercial	Existing	Restaurant	All	Space Heating	20.0	3.6%	per premise	48	\$806	per water heater	48	\$806
Hot Water Temperature Reset	Commercial	Existing	Retail	All	Space Heating	20.0	3.6%	per premise	86	\$2,320	per water heater	30	\$806
Hot Water Temperature Reset	Commercial	Existing	Warehouse	All	Space Heating	20.0	3.6%	per premise	71	\$3,414	per water heater	17	\$806
HVAC Controls	Commercial	Existing	Education	All	Space Heating	11.0	8.8%	per premise	517	\$9,587	per building	517	\$9,587
HVAC Controls	Commercial	New	Education	All	Space Heating	11.0	8.8%	per premise	517	\$9,587	per building	517	\$9,587
HVAC Controls	Commercial	Existing	Grocery	All	Space Heating	11.0	8.8%	per premise	352	\$9,587	per building	352	\$9,587
HVAC Controls	Commercial	New	Grocery	All	Space Heating	11.0	8.8%	per premise	352	\$9,587	per building	352	\$9,587

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
HVAC Controls	Commercial	Existing	Healthcare	All	Space Heating	11.0	8.8%	per premise	303	\$9,587	per building	303	\$9,587
HVAC Controls	Commercial	New	Healthcare	All	Space Heating	11.0	8.8%	per premise	303	\$9,587	per building	303	\$9,587
HVAC Controls	Commercial	Existing	Lodging	All	Space Heating	11.0	8.8%	per premise	302	\$9,587	per building	302	\$9,587
HVAC Controls	Commercial	New	Lodging	All	Space Heating	11.0	8.8%	per premise	302	\$9,587	per building	302	\$9,587
HVAC Controls	Commercial	Existing	Misc.	All	Space Heating	11.0	8.8%	per premise	117	\$9,587	per building	117	\$9,587
HVAC Controls	Commercial	New	Misc.	All	Space Heating	11.0	8.8%	per premise	117	\$9,587	per building	117	\$9,587
HVAC Controls	Commercial	Existing	Office	All	Space Heating	11.0	8.8%	per premise	207	\$9,587	per building	207	\$9,587
HVAC Controls	Commercial	New	Office	All	Space Heating	11.0	8.8%	per premise	207	\$9,587	per building	207	\$9,587
HVAC Controls	Commercial	Existing	Restaurant	All	Space Heating	11.0	8.8%	per premise	117	\$9,587	per building	117	\$9,587
HVAC Controls	Commercial	New	Restaurant	All	Space Heating	11.0	8.8%	per premise	117	\$9,587	per building	117	\$9,587
HVAC Controls	Commercial	Existing	Retail	All	Space Heating	11.0	8.8%	per premise	211	\$9,587	per building	211	\$9,587

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
HVAC Controls	Commercial	New	Retail	All	Space Heating	11.0	8.8%	per premise	211	\$9,587	per building	211	\$9,587
HVAC Controls	Commercial	Existing	Warehouse	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC Controls	Commercial	New	Warehouse	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC System Commissioning	Commercial	Existing	Education	All	Space Heating	5.0	5.5%	per premise	321	\$9,567	per building	321	\$9,567
HVAC System Commissioning	Commercial	Existing	Grocery	All	Space Heating	5.0	5.5%	per premise	219	\$9,567	per building	219	\$9,567
HVAC System Commissioning	Commercial	Existing	Healthcare	All	Space Heating	5.0	5.5%	per premise	188	\$9,567	per building	188	\$9,567
HVAC System Commissioning	Commercial	Existing	Lodging	All	Space Heating	5.0	5.5%	per premise	187	\$9,567	per building	187	\$9,567
HVAC System Commissioning	Commercial	Existing	Misc.	All	Space Heating	5.0	5.5%	per premise	72	\$9,567	per building	72	\$9,567
HVAC System Commissioning	Commercial	Existing	Office	All	Space Heating	5.0	5.5%	per premise	129	\$9,567	per building	129	\$9,567
HVAC System Commissioning	Commercial	Existing	Restaurant	All	Space Heating	5.0	5.5%	per premise	73	\$9,567	per building	73	\$9,567
HVAC System Commissioning	Commercial	Existing	Retail	All	Space Heating	5.0	5.5%	per premise	131	\$9,567	per building	131	\$9,567

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
HVAC System Commissioning	Commercial	Existing	Warehouse	All	Space Heating	5.0	5.5%	per premise	108	\$9,567	per building	108	\$9,567
Natural Gas Heat Pump	Commercial	Early Retirement	Education	All	Space Heating	20.0	37.5%	per premise	2,205	\$118,779	per unit	1,102	\$59,390
Natural Gas Heat Pump	Commercial	New	Education	All	Space Heating	20.0	33.6%	per premise	1,974	\$79,963	per unit	987	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Education	All	Space Heating	20.0	33.6%	per premise	1,974	\$79,963	per unit	987	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Grocery	All	Space Heating	20.0	37.5%	per premise	1,502	\$59,390	per unit	1,502	\$59,390
Natural Gas Heat Pump	Commercial	New	Grocery	All	Space Heating	20.0	33.6%	per premise	1,344	\$39,981	per unit	1,344	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Grocery	All	Space Heating	20.0	33.6%	per premise	1,344	\$39,981	per unit	1,344	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Healthcare	All	Space Heating	20.0	37.5%	per premise	1,292	\$178,169	per unit	431	\$59,390
Natural Gas Heat Pump	Commercial	New	Healthcare	All	Space Heating	20.0	33.6%	per premise	1,157	\$119,944	per unit	386	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Healthcare	All	Space Heating	20.0	33.6%	per premise	1,157	\$119,944	per unit	386	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Lodging	All	Space Heating	20.0	37.5%	per premise	1,287	\$118,779	per unit	644	\$59,390
Natural Gas Heat Pump	Commercial	New	Lodging	All	Space Heating	20.0	33.6%	per premise	1,152	\$79,963	per unit	576	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Lodging	All	Space Heating	20.0	33.6%	per premise	1,152	\$79,963	per unit	576	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Misc.	All	Space Heating	20.0	37.5%	per premise	497	\$59,390	per unit	497	\$59,390
Natural Gas Heat Pump	Commercial	New	Misc.	All	Space Heating	20.0	33.6%	per premise	445	\$39,981	per unit	445	\$39,981

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Natural Gas Heat Pump	Commercial	Turnover	Misc.	All	Space Heating	20.0	33.6%	per premise	445	\$39,981	per unit	445	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Office	All	Space Heating	20.0	37.5%	per premise	883	\$118,779	per unit	442	\$59,390
Natural Gas Heat Pump	Commercial	New	Office	All	Space Heating	20.0	33.6%	per premise	791	\$79,963	per unit	395	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Office	All	Space Heating	20.0	33.6%	per premise	791	\$79,963	per unit	395	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Restaurant	All	Space Heating	20.0	37.5%	per premise	498	\$59,390	per unit	498	\$59,390
Natural Gas Heat Pump	Commercial	New	Restaurant	All	Space Heating	20.0	33.6%	per premise	446	\$39,981	per unit	446	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Restaurant	All	Space Heating	20.0	33.6%	per premise	446	\$39,981	per unit	446	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Retail	All	Space Heating	20.0	37.5%	per premise	897	\$59,390	per unit	897	\$59,390
Natural Gas Heat Pump	Commercial	New	Retail	All	Space Heating	20.0	33.6%	per premise	803	\$39,981	per unit	803	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Retail	All	Space Heating	20.0	33.6%	per premise	803	\$39,981	per unit	803	\$39,981
Natural Gas Heat Pump	Commercial	Early Retirement	Warehouse	All	Space Heating	20.0	37.5%	per premise	740	\$59,390	per unit	740	\$59,390
Natural Gas Heat Pump	Commercial	New	Warehouse	All	Space Heating	20.0	33.6%	per premise	663	\$39,981	per unit	663	\$39,981
Natural Gas Heat Pump	Commercial	Turnover	Warehouse	All	Space Heating	20.0	33.6%	per premise	663	\$39,981	per unit	663	\$39,981
Roof insulation (retrofit only) - Tier 1: Min R-30	Commercial	Existing	Lodging	All	Space Heating	27.5	21.7%	per premise	744	\$10,037	per sf installed	0	\$1
Roof insulation (retrofit only) - Tier 1: Min R-30	Commercial	Existing	Office	All	Space Heating	27.5	21.7%	per premise	510	\$5,944	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Roof insulation (retrofit only) - Tier 1: Min R-30	Commercial	Existing	Restaurant	All	Space Heating	27.5	21.7%	per premise	288	\$1,701	per sf installed	0	\$1
Roof insulation (retrofit only) - Tier 1: Min R-30	Commercial	Existing	Retail	All	Space Heating	27.5	21.7%	per premise	518	\$6,238	per sf installed	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Commercial	Existing	Lodging	All	Space Heating	27.5	22.8%	per premise	782	\$15,828	per sf installed	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Commercial	Existing	Office	All	Space Heating	27.5	22.8%	per premise	536	\$9,373	per sf installed	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Commercial	Existing	Restaurant	All	Space Heating	27.5	22.8%	per premise	303	\$2,682	per sf installed	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Commercial	Existing	Retail	All	Space Heating	27.5	22.8%	per premise	545	\$9,837	per sf installed	0	\$1
Solar Wall	Commercial	Existing	Education	All	Space Heating	30.0	9.0%	per premise	527	\$23,161	per sf installed	0	\$11
Solar Wall	Commercial	New	Education	All	Space Heating	30.0	9.0%	per premise	527	\$23,161	per sf installed	0	\$11
Solar Wall	Commercial	Existing	Grocery	All	Space Heating	30.0	9.0%	per premise	359	\$16,775	per sf installed	0	\$11
Solar Wall	Commercial	New	Grocery	All	Space Heating	30.0	9.0%	per premise	359	\$16,775	per sf installed	0	\$11
Solar Wall	Commercial	Existing	Healthcare	All	Space Heating	30.0	9.0%	per premise	309	\$19,288	per sf installed	0	\$11

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Solar Wall	Commercial	New	Healthcare	All	Space Heating	30.0	9.0%	per premise	309	\$19,288	per sf installed	0	\$11
Solar Wall	Commercial	Existing	Lodging	All	Space Heating	30.0	9.0%	per premise	308	\$21,516	per sf installed	0	\$11
Solar Wall	Commercial	New	Lodging	All	Space Heating	30.0	9.0%	per premise	308	\$21,516	per sf installed	0	\$11
Solar Wall	Commercial	Existing	Misc.	All	Space Heating	30.0	9.0%	per premise	119	\$11,520	per sf installed	0	\$11
Solar Wall	Commercial	New	Misc.	All	Space Heating	30.0	9.0%	per premise	119	\$11,520	per sf installed	0	\$11
Solar Wall	Commercial	Existing	Office	All	Space Heating	30.0	9.0%	per premise	211	\$17,037	per sf installed	0	\$11
Solar Wall	Commercial	New	Office	All	Space Heating	30.0	9.0%	per premise	211	\$17,037	per sf installed	0	\$11
Solar Wall	Commercial	Existing	Restaurant	All	Space Heating	30.0	9.0%	per premise	119	\$8,593	per sf installed	0	\$11
Solar Wall	Commercial	New	Restaurant	All	Space Heating	30.0	9.0%	per premise	119	\$8,593	per sf installed	0	\$11
Solar Wall	Commercial	Existing	Retail	All	Space Heating	30.0	9.0%	per premise	215	\$15,393	per sf installed	0	\$11
Solar Wall	Commercial	New	Retail	All	Space Heating	30.0	9.0%	per premise	215	\$15,393	per sf installed	0	\$11

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Solar Wall	Commercial	Existing	Warehouse	All	Space Heating	30.0	9.0%	per premise	177	\$18,670	per sf installed	0	\$11
Solar Wall	Commercial	New	Warehouse	All	Space Heating	30.0	9.0%	per premise	177	\$18,670	per sf installed	0	\$11
Steam System Efficiency Improvements	Commercial	Existing	Education	All	Space Heating	15.0	10.2%	per premise	600	\$10,540	per premise	600	\$10,540
Steam System Efficiency Improvements	Commercial	Existing	Healthcare	All	Space Heating	15.0	10.2%	per premise	351	\$10,540	per premise	351	\$10,540
Steam System Efficiency Improvements	Commercial	Existing	Lodging	All	Space Heating	15.0	10.2%	per premise	350	\$10,540	per premise	350	\$10,540
Steam System Efficiency Improvements	Commercial	Existing	Misc.	All	Space Heating	15.0	10.2%	per premise	135	\$10,540	per premise	135	\$10,540
Steam System Efficiency Improvements	Commercial	Existing	Office	All	Space Heating	15.0	10.2%	per premise	240	\$10,540	per premise	240	\$10,540
Steam System Efficiency Improvements	Commercial	Existing	Retail	All	Space Heating	15.0	10.2%	per premise	244	\$10,540	per premise	244	\$10,540
Steam System Efficiency Improvements	Commercial	Existing	Warehouse	All	Space Heating	15.0	10.2%	per premise	201	\$10,540	per premise	201	\$10,540
Variable Volume Air System	Commercial	Existing	Education	All	Space Heating	15.0	62.7%	per premise	3,685	\$67,748	per sf facility	0	\$3
Variable Volume Air System	Commercial	Existing	Grocery	All	Space Heating	15.0	62.7%	per premise	2,510	\$35,538	per sf facility	0	\$3

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Variable Volume Air System	Commercial	Existing	Healthcare	All	Space Heating	15.0	62.7%	per premise	2,159	\$46,984	per sf facility	0	\$3
Variable Volume Air System	Commercial	Existing	Lodging	All	Space Heating	15.0	62.7%	per premise	2,151	\$58,467	per sf facility	0	\$3
Variable Volume Air System	Commercial	Existing	Misc.	All	Space Heating	15.0	62.7%	per premise	830	\$16,759	per sf facility	0	\$3
Variable Volume Air System	Commercial	Existing	Office	All	Space Heating	15.0	62.7%	per premise	1,476	\$36,659	per sf facility	0	\$3
Variable Volume Air System	Commercial	Existing	Restaurant	All	Space Heating	15.0	62.7%	per premise	833	\$9,325	per sf facility	0	\$3
Variable Volume Air System	Commercial	Existing	Retail	All	Space Heating	15.0	62.7%	per premise	1,500	\$29,923	per sf facility	0	\$3
Variable Volume Air System	Commercial	Existing	Warehouse	All	Space Heating	15.0	62.7%	per premise	1,237	\$44,019	per sf facility	0	\$3
Ventilation Hood / Makeup Air	Commercial	Existing	Education	All	Space Heating	5.0	3.1%	per premise	180	\$3,507	per unit	127	\$2,459
Ventilation Hood / Makeup Air	Commercial	New	Education	All	Space Heating	5.0	3.1%	per premise	180	\$3,507	per unit	127	\$2,459
Ventilation Hood / Makeup Air	Commercial	Existing	Grocery	All	Space Heating	5.0	5.8%	per premise	234	\$3,507	per unit	164	\$2,459
Ventilation Hood / Makeup Air	Commercial	New	Grocery	All	Space Heating	5.0	5.8%	per premise	234	\$3,507	per unit	164	\$2,459
Ventilation Hood / Makeup Air	Commercial	Existing	Healthcare	All	Space Heating	5.0	4.4%	per premise	152	\$3,507	per unit	107	\$2,459

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Ventilation Hood / Makeup Air	Commercial	New	Healthcare	All	Space Heating	5.0	4.4%	per premise	152	\$3,507	per unit	107	\$2,459
Ventilation Hood / Makeup Air	Commercial	Existing	Lodging	All	Space Heating	5.0	3.6%	per premise	122	\$3,507	per unit	86	\$2,459
Ventilation Hood / Makeup Air	Commercial	New	Lodging	All	Space Heating	5.0	3.6%	per premise	122	\$3,507	per unit	86	\$2,459
Ventilation Hood / Makeup Air	Commercial	Existing	Restaurant	All	Space Heating	5.0	22.3%	per premise	296	\$3,507	per unit	208	\$2,459
Ventilation Hood / Makeup Air	Commercial	New	Restaurant	All	Space Heating	5.0	22.3%	per premise	296	\$3,507	per unit	208	\$2,459
Wall insulation - Tier 2: Min R-19	Commercial	Existing	Education	All	Space Heating	27.5	19.7%	per premise	1,160	\$8,118	per sf installed	0	\$1
Wall insulation - Tier 2: Min R-19	Commercial	Existing	Lodging	All	Space Heating	27.5	19.7%	per premise	677	\$7,542	per sf installed	0	\$1
Wall insulation - Tier 2: Min R-19	Commercial	Existing	Misc.	All	Space Heating	27.5	19.7%	per premise	261	\$4,038	per sf installed	0	\$1
Wall insulation - Tier 2: Min R-19	Commercial	Existing	Office	All	Space Heating	27.5	19.7%	per premise	465	\$5,972	per sf installed	0	\$1
Wall insulation - Tier 2: Min R-19	Commercial	Existing	Restaurant	All	Space Heating	27.5	19.7%	per premise	262	\$3,012	per sf installed	0	\$1
Wall insulation - Tier 2: Min R-19	Commercial	Existing	Retail	All	Space Heating	27.5	19.7%	per premise	472	\$5,395	per sf installed	0	\$1
Wall insulation - Tier 2: Min R-19	Commercial	Existing	Warehouse	All	Space Heating	27.5	19.7%	per premise	389	\$6,544	per sf installed	0	\$1

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Commercial	Existing	Education	All	Space Heating	27.5	15.9%	per premise	935	\$7,068	per sf installed	0	\$1
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Commercial	Existing	Lodging	All	Space Heating	27.5	15.9%	per premise	546	\$6,566	per sf installed	0	\$1
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Commercial	Existing	Misc.	All	Space Heating	27.5	15.9%	per premise	211	\$3,515	per sf installed	0	\$1
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Commercial	Existing	Office	All	Space Heating	27.5	15.9%	per premise	375	\$5,199	per sf installed	0	\$1
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Commercial	Existing	Restaurant	All	Space Heating	27.5	15.9%	per premise	211	\$2,622	per sf installed	0	\$1
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Commercial	Existing	Retail	All	Space Heating	27.5	15.9%	per premise	381	\$4,697	per sf installed	0	\$1
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Commercial	Existing	Warehouse	All	Space Heating	27.5	15.9%	per premise	314	\$5,697	per sf installed	0	\$1
Windows - Add Argon to Vinyl Lowe	Commercial	Existing	Education	All	Space Heating	20.0	4.9%	per premise	291	\$1,748	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	New	Education	All	Space Heating	20.0	4.0%	per premise	237	\$1,748	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	Existing	Healthcare	All	Space Heating	20.0	4.9%	per premise	170	\$1,212	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	New	Healthcare	All	Space Heating	20.0	4.0%	per premise	139	\$1,212	per sf facility	0	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Windows - Add Argon to Vinyl Lowe	Commercial	Existing	Misc.	All	Space Heating	20.0	4.9%	per premise	66	\$432	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	New	Misc.	All	Space Heating	20.0	4.0%	per premise	53	\$432	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	Existing	Office	All	Space Heating	20.0	4.9%	per premise	117	\$946	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	New	Office	All	Space Heating	20.0	4.0%	per premise	95	\$946	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	Existing	Restaurant	All	Space Heating	20.0	4.9%	per premise	66	\$241	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	New	Restaurant	All	Space Heating	20.0	4.0%	per premise	54	\$241	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	Existing	Retail	All	Space Heating	20.0	4.9%	per premise	118	\$772	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	New	Retail	All	Space Heating	20.0	4.0%	per premise	96	\$772	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	Existing	Warehouse	All	Space Heating	20.0	4.9%	per premise	98	\$1,136	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Commercial	New	Warehouse	All	Space Heating	20.0	4.0%	per premise	80	\$1,136	per sf facility	0	\$0
Windows - Add Low E and Argon to Vinyl Tint	Commercial	Existing	Office	All	Space Heating	20.0	17.1%	per premise	403	\$350	per sf facility	0	\$0

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Windows - Add Low E and Argon to Vinyl Tint	Commercial	New	Office	All	Space Heating	20.0	13.4%	per premise	316	\$350	per sf facility	0	\$0
Windows - Add Low E and Argon to Vinyl Tint	Commercial	Existing	Retail	All	Space Heating	20.0	17.1%	per premise	409	\$356	per sf facility	0	\$0
Windows - Add Low E and Argon to Vinyl Tint	Commercial	New	Retail	All	Space Heating	20.0	13.4%	per premise	321	\$356	per sf facility	0	\$0
Windows - Add Low E and Argon to Vinyl Tint	Commercial	Existing	Warehouse	All	Space Heating	20.0	17.1%	per premise	337	\$293	per sf facility	0	\$0
Windows - Add Low E and Argon to Vinyl Tint	Commercial	New	Warehouse	All	Space Heating	20.0	13.4%	per premise	265	\$293	per sf facility	0	\$0
Windows - Add Low E to Vinyl Tint	Commercial	Existing	Office	All	Space Heating	20.0	12.2%	per premise	286	\$1,677	per sf facility	0	\$0
Windows - Add Low E to Vinyl Tint	Commercial	New	Office	All	Space Heating	20.0	9.3%	per premise	220	\$1,677	per sf facility	0	\$0
Windows - Add Low E to Vinyl Tint	Commercial	Existing	Retail	All	Space Heating	20.0	12.2%	per premise	291	\$1,369	per sf facility	0	\$0
Windows - Add Low E to Vinyl Tint	Commercial	New	Retail	All	Space Heating	20.0	9.3%	per premise	223	\$1,369	per sf facility	0	\$0
Windows - Add Low E to Vinyl Tint	Commercial	Existing	Warehouse	All	Space Heating	20.0	12.2%	per premise	240	\$2,014	per sf facility	0	\$0
Windows - Add Low E to Vinyl Tint	Commercial	New	Warehouse	All	Space Heating	20.0	9.3%	per premise	184	\$2,014	per sf facility	0	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Education	All	Space Heating	20.0	12.8%	per premise	752	\$11,651	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Grocery	All	Space Heating	20.0	12.8%	per premise	512	\$6,112	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Healthcare	All	Space Heating	20.0	12.8%	per premise	441	\$8,080	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Lodging	All	Space Heating	20.0	12.8%	per premise	439	\$10,055	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Misc.	All	Space Heating	20.0	12.8%	per premise	169	\$2,882	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Office	All	Space Heating	20.0	12.8%	per premise	301	\$6,305	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Retail	All	Space Heating	20.0	12.8%	per premise	306	\$5,146	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Commercial	Existing	Warehouse	All	Space Heating	20.0	12.8%	per premise	252	\$7,570	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Education	All	Space Heating	20.0	8.3%	per premise	488	\$4,661	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Grocery	All	Space Heating	20.0	8.3%	per premise	332	\$2,445	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Healthcare	All	Space Heating	20.0	8.3%	per premise	286	\$3,232	per sf facility	0	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Lodging	All	Space Heating	20.0	8.3%	per premise	285	\$4,022	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Misc.	All	Space Heating	20.0	8.3%	per premise	110	\$1,153	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Office	All	Space Heating	20.0	8.3%	per premise	195	\$2,522	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Restaurant	All	Space Heating	20.0	8.3%	per premise	110	\$642	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Retail	All	Space Heating	20.0	8.3%	per premise	199	\$2,058	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Commercial	Existing	Warehouse	All	Space Heating	20.0	8.3%	per premise	164	\$3,028	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Education	All	Space Heating	20.0	3.1%	per premise	180	\$3,099	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Grocery	All	Space Heating	20.0	3.1%	per premise	122	\$1,626	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Healthcare	All	Space Heating	20.0	3.1%	per premise	105	\$2,149	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Lodging	All	Space Heating	20.0	3.1%	per premise	105	\$2,675	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Misc.	All	Space Heating	20.0	3.1%	per premise	40	\$767	per sf facility	0	\$0

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Office	All	Space Heating	20.0	3.1%	per premise	72	\$1,677	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Restaurant	All	Space Heating	20.0	3.1%	per premise	41	\$427	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Retail	All	Space Heating	20.0	3.1%	per premise	73	\$1,369	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Commercial	Existing	Warehouse	All	Space Heating	20.0	3.1%	per premise	60	\$2,014	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Commercial	Existing	Education	All	Space Heating	20.0	11.0%	per premise	646	\$11,651	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Commercial	Existing	Grocery	All	Space Heating	20.0	11.0%	per premise	440	\$6,112	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Commercial	Existing	Healthcare	All	Space Heating	20.0	11.0%	per premise	379	\$8,080	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Commercial	Existing	Lodging	All	Space Heating	20.0	11.0%	per premise	377	\$10,055	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Commercial	Existing	Misc.	All	Space Heating	20.0	11.0%	per premise	146	\$2,882	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Commercial	Existing	Office	All	Space Heating	20.0	11.0%	per premise	259	\$6,305	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Commercial	Existing	Retail	All	Space Heating	20.0	11.0%	per premise	263	\$5,146	per sf facility	0	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Windows - Tinted AL Code to Class 36	Commercial	Existing	Warehouse	All	Space Heating	20.0	11.0%	per premise	217	\$7,570	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Education	All	Space Heating	20.0	0.6%	per premise	37	\$3,099	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Grocery	All	Space Heating	20.0	0.6%	per premise	25	\$1,626	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Healthcare	All	Space Heating	20.0	0.6%	per premise	22	\$2,149	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Lodging	All	Space Heating	20.0	0.6%	per premise	22	\$2,675	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Misc.	All	Space Heating	20.0	0.6%	per premise	8	\$767	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Office	All	Space Heating	20.0	0.6%	per premise	15	\$1,677	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Retail	All	Space Heating	20.0	0.6%	per premise	15	\$1,369	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Commercial	Existing	Warehouse	All	Space Heating	20.0	0.6%	per premise	12	\$2,014	per sf facility	0	\$0
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Education	All	Water Heating	20.0	16.7%	per premise	514	\$128,581	per unit	257	\$64,290
Combination Boiler and Hot Water Heater	Commercial	New	Education	All	Water Heating	20.0	11.4%	per premise	352	\$70,355	per unit	352	\$70,355

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Combination Boiler and Hot Water Heater	Commercial	Turnover	Education	All	Water Heating	20.0	11.4%	per premise	352	\$70,355	per unit	176	\$35,178
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Grocery	All	Water Heating	20.0	16.7%	per premise	60	\$91,592	per unit	30	\$45,796
Combination Boiler and Hot Water Heater	Commercial	New	Grocery	All	Water Heating	20.0	11.4%	per premise	41	\$50,117	per unit	21	\$25,058
Combination Boiler and Hot Water Heater	Commercial	Turnover	Grocery	All	Water Heating	20.0	11.4%	per premise	41	\$50,117	per unit	21	\$25,058
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Healthcare	All	Water Heating	20.0	16.7%	per premise	311	\$121,092	per unit	311	\$121,092
Combination Boiler and Hot Water Heater	Commercial	New	Healthcare	All	Water Heating	20.0	11.4%	per premise	213	\$66,258	per unit	107	\$33,129
Combination Boiler and Hot Water Heater	Commercial	Turnover	Healthcare	All	Water Heating	20.0	11.4%	per premise	213	\$66,258	per unit	213	\$66,258
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Lodging	All	Water Heating	20.0	16.7%	per premise	1,109	\$150,686	per unit	1,109	\$150,686
Combination Boiler and Hot Water Heater	Commercial	New	Lodging	All	Water Heating	20.0	11.4%	per premise	760	\$82,451	per unit	760	\$82,451
Combination Boiler and Hot Water Heater	Commercial	Turnover	Lodging	All	Water Heating	20.0	11.4%	per premise	760	\$82,451	per unit	760	\$82,451
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Misc.	All	Water Heating	20.0	16.7%	per premise	6	\$43,192	per unit	2	\$14,397
Combination Boiler and Hot Water Heater	Commercial	New	Misc.	All	Water Heating	20.0	11.4%	per premise	4	\$23,634	per unit	4	\$23,634

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Combination Boiler and Hot Water Heater	Commercial	Turnover	Misc.	All	Water Heating	20.0	11.4%	per premise	4	\$23,634	per unit	1	\$7,878
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Office	All	Water Heating	20.0	16.7%	per premise	23	\$94,480	per unit	23	\$94,480
Combination Boiler and Hot Water Heater	Commercial	New	Office	All	Water Heating	20.0	11.4%	per premise	16	\$51,697	per unit	5	\$17,232
Combination Boiler and Hot Water Heater	Commercial	Turnover	Office	All	Water Heating	20.0	11.4%	per premise	16	\$51,697	per unit	16	\$51,697
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Restaurant	All	Water Heating	20.0	16.7%	per premise	227	\$42,860	per unit	114	\$21,430
Combination Boiler and Hot Water Heater	Commercial	New	Restaurant	All	Water Heating	20.0	11.4%	per premise	156	\$23,452	per unit	156	\$23,452
Combination Boiler and Hot Water Heater	Commercial	Turnover	Restaurant	All	Water Heating	20.0	11.4%	per premise	156	\$23,452	per unit	78	\$11,726
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Retail	All	Water Heating	20.0	16.7%	per premise	14	\$77,122	per unit	14	\$77,122
Combination Boiler and Hot Water Heater	Commercial	New	Retail	All	Water Heating	20.0	11.4%	per premise	10	\$42,199	per unit	5	\$21,099
Combination Boiler and Hot Water Heater	Commercial	Turnover	Retail	All	Water Heating	20.0	11.4%	per premise	10	\$42,199	per unit	10	\$42,199
Combination Boiler and Hot Water Heater	Commercial	Early Retirement	Warehouse	All	Water Heating	20.0	16.7%	per premise	11	\$42,860	per unit	11	\$42,860
Combination Boiler and Hot Water Heater	Commercial	New	Warehouse	All	Water Heating	20.0	11.4%	per premise	7	\$23,452	per unit	7	\$23,452

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Combination Boiler and Hot Water Heater	Commercial	Turnover	Warehouse	All	Water Heating	20.0	11.4%	per premise	7	\$23,452	per unit	7	\$23,452
Drainwater Heat Recovery	Commercial	Existing	Education	All	Water Heating	20.0	30.0%	per premise	924	\$3,822	per unit	230	\$949
Drainwater Heat Recovery	Commercial	New	Education	All	Water Heating	20.0	30.0%	per premise	924	\$3,419	per unit	230	\$849
Drainwater Heat Recovery	Commercial	Existing	Grocery	All	Water Heating	20.0	30.0%	per premise	108	\$2,393	per unit	43	\$949
Drainwater Heat Recovery	Commercial	New	Grocery	All	Water Heating	20.0	30.0%	per premise	108	\$2,141	per unit	43	\$849
Drainwater Heat Recovery	Commercial	Existing	Healthcare	All	Water Heating	20.0	30.0%	per premise	560	\$3,378	per unit	157	\$949
Drainwater Heat Recovery	Commercial	New	Healthcare	All	Water Heating	20.0	30.0%	per premise	560	\$3,022	per unit	157	\$849
Drainwater Heat Recovery	Commercial	Existing	Lodging	All	Water Heating	20.0	30.0%	per premise	1,996	\$3,577	per unit	530	\$949
Drainwater Heat Recovery	Commercial	New	Lodging	All	Water Heating	20.0	30.0%	per premise	1,996	\$3,200	per unit	530	\$849
Drainwater Heat Recovery	Commercial	Existing	Misc.	All	Water Heating	20.0	30.0%	per premise	11	\$1,048	per unit	10	\$949
Drainwater Heat Recovery	Commercial	New	Misc.	All	Water Heating	20.0	30.0%	per premise	11	\$938	per unit	10	\$849
Drainwater Heat Recovery	Commercial	Existing	Office	All	Water Heating	20.0	30.0%	per premise	42	\$2,487	per unit	16	\$949

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Drainwater Heat Recovery	Commercial	New	Office	All	Water Heating	20.0	30.0%	per premise	42	\$2,225	per unit	16	\$849
Drainwater Heat Recovery	Commercial	Existing	Restaurant	All	Water Heating	20.0	30.0%	per premise	409	\$949	per unit	409	\$949
Drainwater Heat Recovery	Commercial	New	Restaurant	All	Water Heating	20.0	30.0%	per premise	409	\$849	per unit	409	\$849
Drainwater Heat Recovery	Commercial	Existing	Retail	All	Water Heating	20.0	30.0%	per premise	25	\$1,872	per unit	13	\$949
Drainwater Heat Recovery	Commercial	New	Retail	All	Water Heating	20.0	30.0%	per premise	25	\$1,674	per unit	13	\$849
Drainwater Heat Recovery	Commercial	Existing	Warehouse	All	Water Heating	20.0	30.0%	per premise	20	\$949	per unit	20	\$949
Drainwater Heat Recovery	Commercial	New	Warehouse	All	Water Heating	20.0	30.0%	per premise	20	\$849	per unit	20	\$849
Faucet Aerator	Commercial	Existing	Education	All	Water Heating	9.0	20.8%	per premise	642	\$240	per unit	21	\$8
Faucet Aerator	Commercial	New	Education	All	Water Heating	9.0	11.1%	per premise	342	\$240	per unit	11	\$8
Faucet Aerator	Commercial	Existing	Grocery	All	Water Heating	9.0	20.8%	per premise	75	\$32	per unit	19	\$8
Faucet Aerator	Commercial	New	Grocery	All	Water Heating	9.0	11.1%	per premise	40	\$32	per unit	10	\$8
Faucet Aerator	Commercial	Existing	Healthcare	All	Water Heating	9.0	20.8%	per premise	389	\$160	per unit	19	\$8

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Faucet Aerator	Commercial	New	Healthcare	All	Water Heating	9.0	11.1%	per premise	207	\$160	per unit	10	\$8
Faucet Aerator	Commercial	Existing	Lodging	All	Water Heating	9.0	20.8%	per premise	1,386	\$200	per unit	55	\$8
Faucet Aerator	Commercial	New	Lodging	All	Water Heating	9.0	11.1%	per premise	739	\$200	per unit	30	\$8
Faucet Aerator	Commercial	Existing	Misc.	All	Water Heating	9.0	20.8%	per premise	8	\$16	per unit	4	\$8
Faucet Aerator	Commercial	New	Misc.	All	Water Heating	9.0	11.1%	per premise	4	\$16	per unit	2	\$8
Faucet Aerator	Commercial	Existing	Office	All	Water Heating	9.0	20.8%	per premise	29	\$80	per unit	3	\$8
Faucet Aerator	Commercial	New	Office	All	Water Heating	9.0	11.1%	per premise	15	\$80	per unit	2	\$8
Faucet Aerator	Commercial	Existing	Restaurant	All	Water Heating	9.0	20.8%	per premise	284	\$16	per unit	142	\$8
Faucet Aerator	Commercial	New	Restaurant	All	Water Heating	9.0	11.1%	per premise	152	\$16	per unit	76	\$8
Faucet Aerator	Commercial	Existing	Retail	All	Water Heating	9.0	20.8%	per premise	18	\$16	per unit	9	\$8
Faucet Aerator	Commercial	New	Retail	All	Water Heating	9.0	11.1%	per premise	9	\$16	per unit	5	\$8
Faucet Aerator	Commercial	Existing	Warehouse	All	Water Heating	9.0	20.8%	per premise	14	\$16	per unit	7	\$8

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Faucet Aerator	Commercial	New	Warehouse	All	Water Heating	9.0	11.1%	per premise	7	\$16	per unit	4	\$8
Heat Pump Water Heater	Commercial	Early Retirement	Education	All	Water Heating	12.5	60.0%	per premise	1,849	\$33,549	per unit	284	\$5,147
Heat Pump Water Heater	Commercial	New	Education	All	Water Heating	12.5	56.8%	per premise	1,749	\$29,240	per unit	268	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Education	All	Water Heating	12.5	56.8%	per premise	1,749	\$29,240	per unit	268	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Grocery	All	Water Heating	12.5	60.0%	per premise	216	\$17,599	per unit	63	\$5,147
Heat Pump Water Heater	Commercial	New	Grocery	All	Water Heating	12.5	56.8%	per premise	204	\$15,338	per unit	60	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Grocery	All	Water Heating	12.5	56.8%	per premise	204	\$15,338	per unit	60	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Healthcare	All	Water Heating	12.5	60.0%	per premise	1,119	\$23,267	per unit	248	\$5,147
Heat Pump Water Heater	Commercial	New	Healthcare	All	Water Heating	12.5	56.8%	per premise	1,059	\$20,278	per unit	234	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Healthcare	All	Water Heating	12.5	56.8%	per premise	1,059	\$20,278	per unit	234	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Lodging	All	Water Heating	12.5	60.0%	per premise	3,991	\$28,953	per unit	710	\$5,147
Heat Pump Water Heater	Commercial	New	Lodging	All	Water Heating	12.5	56.8%	per premise	3,777	\$25,234	per unit	671	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Lodging	All	Water Heating	12.5	56.8%	per premise	3,777	\$25,234	per unit	671	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Misc.	All	Water Heating	12.5	60.0%	per premise	22	\$8,299	per unit	14	\$5,147
Heat Pump Water Heater	Commercial	New	Misc.	All	Water Heating	12.5	56.8%	per premise	21	\$7,233	per unit	13	\$4,486

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Heat Pump Water Heater	Commercial	Turnover	Misc.	All	Water Heating	12.5	56.8%	per premise	21	\$7,233	per unit	13	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Office	All	Water Heating	12.5	60.0%	per premise	83	\$18,153	per unit	24	\$5,147
Heat Pump Water Heater	Commercial	New	Office	All	Water Heating	12.5	56.8%	per premise	79	\$15,822	per unit	22	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Office	All	Water Heating	12.5	56.8%	per premise	79	\$15,822	per unit	22	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Restaurant	All	Water Heating	12.5	60.0%	per premise	819	\$5,147	per unit	819	\$5,147
Heat Pump Water Heater	Commercial	New	Restaurant	All	Water Heating	12.5	56.8%	per premise	775	\$4,486	per unit	775	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Restaurant	All	Water Heating	12.5	56.8%	per premise	775	\$4,486	per unit	775	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Retail	All	Water Heating	12.5	60.0%	per premise	51	\$14,818	per unit	18	\$5,147
Heat Pump Water Heater	Commercial	New	Retail	All	Water Heating	12.5	56.8%	per premise	48	\$12,915	per unit	17	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Retail	All	Water Heating	12.5	56.8%	per premise	48	\$12,915	per unit	17	\$4,486
Heat Pump Water Heater	Commercial	Early Retirement	Warehouse	All	Water Heating	12.5	60.0%	per premise	39	\$21,799	per unit	9	\$5,147
Heat Pump Water Heater	Commercial	New	Warehouse	All	Water Heating	12.5	56.8%	per premise	37	\$18,999	per unit	9	\$4,486
Heat Pump Water Heater	Commercial	Turnover	Warehouse	All	Water Heating	12.5	56.8%	per premise	37	\$18,999	per unit	9	\$4,486
High Efficiency Commercial Gas Clothes Washer	Commercial	Existing	Education	All	Water Heating	7.0	27.8%	per premise	857	\$1,496	per unit	857	\$1,496
High Efficiency Commercial Gas Clothes Washer	Commercial	New	Education	All	Water Heating	7.0	27.8%	per premise	857	\$200	per unit	857	\$200

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Commercial Gas Clothes Washer	Commercial	Existing	Healthcare	All	Water Heating	7.0	27.8%	per premise	519	\$1,496	per unit	519	\$1,496
High Efficiency Commercial Gas Clothes Washer	Commercial	New	Healthcare	All	Water Heating	7.0	27.8%	per premise	519	\$200	per unit	519	\$200
High Efficiency Commercial Gas Clothes Washer	Commercial	Existing	Lodging	All	Water Heating	7.0	27.8%	per premise	1,850	\$1,496	per unit	1,850	\$1,496
High Efficiency Commercial Gas Clothes Washer	Commercial	New	Lodging	All	Water Heating	7.0	27.8%	per premise	1,850	\$200	per unit	1,850	\$200
High Efficiency Commercial Gas Clothes Washer	Commercial	Existing	Misc.	All	Water Heating	7.0	27.8%	per premise	10	\$1,496	per unit	10	\$1,496
High Efficiency Commercial Gas Clothes Washer	Commercial	New	Misc.	All	Water Heating	7.0	27.8%	per premise	10	\$200	per unit	10	\$200
High Efficiency Commercial Gas Clothes Washer	Commercial	Existing	Restaurant	All	Water Heating	7.0	27.8%	per premise	379	\$1,496	per unit	379	\$1,496
High Efficiency Commercial Gas Clothes Washer	Commercial	New	Restaurant	All	Water Heating	7.0	27.8%	per premise	379	\$200	per unit	379	\$200
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Education	All	Water Heating	12.7	23.2%	per premise	714	\$19,541	per unit	109	\$2,998
High Efficiency Tank Condensing Water Heater	Commercial	New	Education	All	Water Heating	12.7	23.2%	per premise	714	\$7,674	per unit	109	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Education	All	Water Heating	12.7	23.2%	per premise	714	\$7,674	per unit	109	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Grocery	All	Water Heating	12.7	23.2%	per premise	83	\$10,250	per unit	24	\$2,998

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Tank Condensing Water Heater	Commercial	New	Grocery	All	Water Heating	12.7	23.2%	per premise	83	\$4,025	per unit	24	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Grocery	All	Water Heating	12.7	23.2%	per premise	83	\$4,025	per unit	24	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Healthcare	All	Water Heating	12.7	23.2%	per premise	432	\$13,552	per unit	96	\$2,998
High Efficiency Tank Condensing Water Heater	Commercial	New	Healthcare	All	Water Heating	12.7	23.2%	per premise	432	\$5,322	per unit	96	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Healthcare	All	Water Heating	12.7	23.2%	per premise	432	\$5,322	per unit	96	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Lodging	All	Water Heating	12.7	23.2%	per premise	1,541	\$16,864	per unit	274	\$2,998
High Efficiency Tank Condensing Water Heater	Commercial	New	Lodging	All	Water Heating	12.7	23.2%	per premise	1,541	\$6,622	per unit	274	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Lodging	All	Water Heating	12.7	23.2%	per premise	1,541	\$6,622	per unit	274	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Misc.	All	Water Heating	12.7	23.2%	per premise	9	\$4,834	per unit	5	\$2,998
High Efficiency Tank Condensing Water Heater	Commercial	New	Misc.	All	Water Heating	12.7	23.2%	per premise	9	\$1,898	per unit	5	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Misc.	All	Water Heating	12.7	23.2%	per premise	9	\$1,898	per unit	5	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Office	All	Water Heating	12.7	23.2%	per premise	32	\$10,573	per unit	9	\$2,998

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Tank Condensing Water Heater	Commercial	New	Office	All	Water Heating	12.7	23.2%	per premise	32	\$4,152	per unit	9	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Office	All	Water Heating	12.7	23.2%	per premise	32	\$4,152	per unit	9	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Restaurant	All	Water Heating	12.7	23.2%	per premise	316	\$2,998	per unit	316	\$2,998
High Efficiency Tank Condensing Water Heater	Commercial	New	Restaurant	All	Water Heating	12.7	23.2%	per premise	316	\$1,177	per unit	316	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Restaurant	All	Water Heating	12.7	23.2%	per premise	316	\$1,177	per unit	316	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Retail	All	Water Heating	12.7	23.2%	per premise	20	\$8,631	per unit	7	\$2,998
High Efficiency Tank Condensing Water Heater	Commercial	New	Retail	All	Water Heating	12.7	23.2%	per premise	20	\$3,389	per unit	7	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Retail	All	Water Heating	12.7	23.2%	per premise	20	\$3,389	per unit	7	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Early Retirement	Warehouse	All	Water Heating	12.7	23.2%	per premise	15	\$12,697	per unit	4	\$2,998
High Efficiency Tank Condensing Water Heater	Commercial	New	Warehouse	All	Water Heating	12.7	23.2%	per premise	15	\$4,986	per unit	4	\$1,177
High Efficiency Tank Condensing Water Heater	Commercial	Turnover	Warehouse	All	Water Heating	12.7	23.2%	per premise	15	\$4,986	per unit	4	\$1,177
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Education	All	Water Heating	20.0	22.4%	per premise	321	\$4,579	per unit	93	\$1,334

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Tankless Water Heater	Commercial	New	Education	All	Water Heating	20.0	22.4%	per premise	321	\$4,579	per unit	49	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Education	All	Water Heating	20.0	27.8%	per premise	527	\$8,693	per unit	43	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Grocery	All	Water Heating	20.0	22.4%	per premise	37	\$2,402	per unit	21	\$1,334
High Efficiency Tankless Water Heater	Commercial	New	Grocery	All	Water Heating	20.0	22.4%	per premise	37	\$2,402	per unit	11	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Grocery	All	Water Heating	20.0	27.8%	per premise	62	\$4,560	per unit	9	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Healthcare	All	Water Heating	20.0	22.4%	per premise	194	\$3,176	per unit	82	\$1,334
High Efficiency Tankless Water Heater	Commercial	New	Healthcare	All	Water Heating	20.0	22.4%	per premise	194	\$3,176	per unit	43	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Healthcare	All	Water Heating	20.0	27.8%	per premise	319	\$6,028	per unit	37	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Lodging	All	Water Heating	20.0	22.4%	per premise	692	\$3,952	per unit	234	\$1,334
High Efficiency Tankless Water Heater	Commercial	New	Lodging	All	Water Heating	20.0	22.4%	per premise	692	\$3,952	per unit	123	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Lodging	All	Water Heating	20.0	27.8%	per premise	1,137	\$7,502	per unit	106	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Misc.	All	Water Heating	20.0	22.4%	per premise	4	\$1,133	per unit	5	\$1,334

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Tankless Water Heater	Commercial	New	Misc.	All	Water Heating	20.0	22.4%	per premise	4	\$1,133	per unit	2	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Misc.	All	Water Heating	20.0	27.8%	per premise	6	\$2,150	per unit	2	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Office	All	Water Heating	20.0	22.4%	per premise	14	\$2,478	per unit	8	\$1,334
High Efficiency Tankless Water Heater	Commercial	New	Office	All	Water Heating	20.0	22.4%	per premise	14	\$2,478	per unit	4	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Office	All	Water Heating	20.0	27.8%	per premise	24	\$4,704	per unit	4	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Restaurant	All	Water Heating	20.0	22.4%	per premise	142	\$703	per unit	270	\$1,334
High Efficiency Tankless Water Heater	Commercial	New	Restaurant	All	Water Heating	20.0	22.4%	per premise	142	\$703	per unit	142	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Restaurant	All	Water Heating	20.0	27.8%	per premise	233	\$1,334	per unit	123	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Retail	All	Water Heating	20.0	22.4%	per premise	9	\$2,023	per unit	6	\$1,334
High Efficiency Tankless Water Heater	Commercial	New	Retail	All	Water Heating	20.0	22.4%	per premise	9	\$2,023	per unit	3	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Retail	All	Water Heating	20.0	27.8%	per premise	14	\$3,839	per unit	3	\$703
High Efficiency Tankless Water Heater	Commercial	Early Retirement	Warehouse	All	Water Heating	20.0	22.4%	per premise	7	\$2,975	per unit	3	\$1,334

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Tankless Water Heater	Commercial	New	Warehouse	All	Water Heating	20.0	22.4%	per premise	7	\$2,975	per unit	2	\$703
High Efficiency Tankless Water Heater	Commercial	Turnover	Warehouse	All	Water Heating	20.0	27.8%	per premise	11	\$5,648	per unit	1	\$703
High Efficiency Water Heater	Commercial	Early Retirement	Education	All	Water Heating	12.5	22.9%	per premise	704	\$6,447	per unit	108	\$989
High Efficiency Water Heater	Commercial	New	Education	All	Water Heating	12.5	17.1%	per premise	528	\$2,138	per unit	81	\$328
High Efficiency Water Heater	Commercial	Turnover	Education	All	Water Heating	12.5	17.1%	per premise	528	\$2,138	per unit	81	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Grocery	All	Water Heating	12.5	22.9%	per premise	82	\$3,382	per unit	24	\$989
High Efficiency Water Heater	Commercial	New	Grocery	All	Water Heating	12.5	17.1%	per premise	62	\$1,122	per unit	18	\$328
High Efficiency Water Heater	Commercial	Turnover	Grocery	All	Water Heating	12.5	17.1%	per premise	62	\$1,122	per unit	18	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Healthcare	All	Water Heating	12.5	22.9%	per premise	426	\$4,471	per unit	94	\$989
High Efficiency Water Heater	Commercial	New	Healthcare	All	Water Heating	12.5	17.1%	per premise	320	\$1,483	per unit	71	\$328
High Efficiency Water Heater	Commercial	Turnover	Healthcare	All	Water Heating	12.5	17.1%	per premise	320	\$1,483	per unit	71	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Lodging	All	Water Heating	12.5	22.9%	per premise	1,521	\$5,564	per unit	270	\$989
High Efficiency Water Heater	Commercial	New	Lodging	All	Water Heating	12.5	17.1%	per premise	1,140	\$1,845	per unit	203	\$328
High Efficiency Water Heater	Commercial	Turnover	Lodging	All	Water Heating	12.5	17.1%	per premise	1,140	\$1,845	per unit	203	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Misc.	All	Water Heating	12.5	22.9%	per premise	9	\$1,595	per unit	5	\$989

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
High Efficiency Water Heater	Commercial	New	Misc.	All	Water Heating	12.5	17.1%	per premise	6	\$529	per unit	4	\$328
High Efficiency Water Heater	Commercial	Turnover	Misc.	All	Water Heating	12.5	17.1%	per premise	6	\$529	per unit	4	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Office	All	Water Heating	12.5	22.9%	per premise	32	\$3,488	per unit	9	\$989
High Efficiency Water Heater	Commercial	New	Office	All	Water Heating	12.5	17.1%	per premise	24	\$1,157	per unit	7	\$328
High Efficiency Water Heater	Commercial	Turnover	Office	All	Water Heating	12.5	17.1%	per premise	24	\$1,157	per unit	7	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Restaurant	All	Water Heating	12.5	22.9%	per premise	312	\$989	per unit	312	\$989
High Efficiency Water Heater	Commercial	New	Restaurant	All	Water Heating	12.5	17.1%	per premise	234	\$328	per unit	234	\$328
High Efficiency Water Heater	Commercial	Turnover	Restaurant	All	Water Heating	12.5	17.1%	per premise	234	\$328	per unit	234	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Retail	All	Water Heating	12.5	22.9%	per premise	19	\$2,848	per unit	7	\$989
High Efficiency Water Heater	Commercial	New	Retail	All	Water Heating	12.5	17.1%	per premise	14	\$944	per unit	5	\$328
High Efficiency Water Heater	Commercial	Turnover	Retail	All	Water Heating	12.5	17.1%	per premise	14	\$944	per unit	5	\$328
High Efficiency Water Heater	Commercial	Early Retirement	Warehouse	All	Water Heating	12.5	22.9%	per premise	15	\$4,189	per unit	4	\$989
High Efficiency Water Heater	Commercial	New	Warehouse	All	Water Heating	12.5	17.1%	per premise	11	\$1,389	per unit	3	\$328
High Efficiency Water Heater	Commercial	Turnover	Warehouse	All	Water Heating	12.5	17.1%	per premise	11	\$1,389	per unit	3	\$328
Hot Water Pipe Insulation	Commercial	Existing	Education	All	Water Heating	11.0	2.0%	per premise	118	\$107	per sf facility	0	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Hot Water Pipe Insulation	Commercial	Existing	Grocery	All	Water Heating	11.0	2.0%	per premise	80	\$56	per sf facility	0	\$0
Hot Water Pipe Insulation	Commercial	Existing	Healthcare	All	Water Heating	11.0	2.0%	per premise	69	\$74	per sf facility	0	\$0
Hot Water Pipe Insulation	Commercial	Existing	Lodging	All	Water Heating	11.0	2.0%	per premise	69	\$92	per sf facility	0	\$0
Hot Water Pipe Insulation	Commercial	Existing	Misc.	All	Water Heating	11.0	2.0%	per premise	26	\$26	per sf facility	0	\$0
Hot Water Pipe Insulation	Commercial	Existing	Office	All	Water Heating	11.0	2.0%	per premise	47	\$58	per sf facility	0	\$0
Hot Water Pipe Insulation	Commercial	Existing	Restaurant	All	Water Heating	11.0	2.0%	per premise	27	\$15	per sf facility	0	\$0
Hot Water Pipe Insulation	Commercial	Existing	Retail	All	Water Heating	11.0	2.0%	per premise	48	\$47	per sf facility	0	\$0
Hot Water Pipe Insulation	Commercial	Existing	Warehouse	All	Water Heating	11.0	2.0%	per premise	39	\$69	per sf facility	0	\$0
Hot Water Temperature Setback	Commercial	Existing	Education	All	Water Heating	5.0	14.3%	per premise	440	\$40	per water heater	440	\$40
Hot Water Temperature Setback	Commercial	New	Education	All	Water Heating	5.0	14.3%	per premise	440	\$40	per water heater	440	\$40

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Hot Water Temperature Setback	Commercial	Existing	Grocery	All	Water Heating	5.0	14.3%	per premise	51	\$40	per water heater	51	\$40
Hot Water Temperature Setback	Commercial	New	Grocery	All	Water Heating	5.0	14.3%	per premise	51	\$40	per water heater	51	\$40
Hot Water Temperature Setback	Commercial	Existing	Healthcare	All	Water Heating	5.0	14.3%	per premise	266	\$40	per water heater	266	\$40
Hot Water Temperature Setback	Commercial	New	Healthcare	All	Water Heating	5.0	14.3%	per premise	266	\$40	per water heater	266	\$40
Hot Water Temperature Setback	Commercial	Existing	Lodging	All	Water Heating	5.0	14.3%	per premise	950	\$40	per water heater	950	\$40
Hot Water Temperature Setback	Commercial	New	Lodging	All	Water Heating	5.0	14.3%	per premise	950	\$40	per water heater	950	\$40
Hot Water Temperature Setback	Commercial	Existing	Misc.	All	Water Heating	5.0	14.3%	per premise	5	\$40	per water heater	5	\$40
Hot Water Temperature Setback	Commercial	New	Misc.	All	Water Heating	5.0	14.3%	per premise	5	\$40	per water heater	5	\$40

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Hot Water Temperature Setback	Commercial	Existing	Office	All	Water Heating	5.0	14.3%	per premise	20	\$40	per water heater	20	\$40
Hot Water Temperature Setback	Commercial	New	Office	All	Water Heating	5.0	14.3%	per premise	20	\$40	per water heater	20	\$40
Hot Water Temperature Setback	Commercial	Existing	Retail	All	Water Heating	5.0	14.3%	per premise	12	\$40	per water heater	12	\$40
Hot Water Temperature Setback	Commercial	New	Retail	All	Water Heating	5.0	14.3%	per premise	12	\$40	per water heater	12	\$40
Hot Water Temperature Setback	Commercial	Existing	Warehouse	All	Water Heating	5.0	14.3%	per premise	9	\$40	per water heater	9	\$40
Hot Water Temperature Setback	Commercial	New	Warehouse	All	Water Heating	5.0	14.3%	per premise	9	\$40	per water heater	9	\$40
Low Flow Showerhead	Commercial	Existing	Education	All	Water Heating	10.0	33.3%	per premise	1,027	\$800	per unit	128	\$100
Low Flow Showerhead	Commercial	New	Education	All	Water Heating	10.0	19.8%	per premise	608	\$260	per unit	76	\$33
Low Flow Showerhead	Commercial	Existing	Grocery	All	Water Heating	10.0	33.3%	per premise	120	\$100	per unit	120	\$100

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Low Flow Showerhead	Commercial	New	Grocery	All	Water Heating	10.0	19.8%	per premise	71	\$33	per unit	71	\$33
Low Flow Showerhead	Commercial	Existing	Healthcare	All	Water Heating	10.0	33.3%	per premise	622	\$1,000	per unit	62	\$100
Low Flow Showerhead	Commercial	New	Healthcare	All	Water Heating	10.0	19.8%	per premise	368	\$325	per unit	37	\$33
Low Flow Showerhead	Commercial	Existing	Lodging	All	Water Heating	10.0	33.3%	per premise	2,217	\$2,500	per unit	89	\$100
Low Flow Showerhead	Commercial	New	Lodging	All	Water Heating	10.0	19.8%	per premise	1,314	\$813	per unit	53	\$33
Low Flow Showerhead	Commercial	Existing	Misc.	All	Water Heating	10.0	33.3%	per premise	12	\$100	per unit	12	\$100
Low Flow Showerhead	Commercial	New	Misc.	All	Water Heating	10.0	19.8%	per premise	7	\$33	per unit	7	\$33
Low Flow Showerhead	Commercial	Existing	Office	All	Water Heating	10.0	33.3%	per premise	46	\$100	per unit	46	\$100
Low Flow Showerhead	Commercial	New	Office	All	Water Heating	10.0	19.8%	per premise	27	\$33	per unit	27	\$33
Low Flow Showerhead	Commercial	Existing	Restaurant	All	Water Heating	10.0	33.3%	per premise	455	\$100	per unit	455	\$100
Low Flow Showerhead	Commercial	New	Restaurant	All	Water Heating	10.0	19.8%	per premise	269	\$33	per unit	269	\$33
Low Flow Showerhead	Commercial	Existing	Retail	All	Water Heating	10.0	33.3%	per premise	28	\$100	per unit	28	\$100

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Low Flow Showerhead	Commercial	New	Retail	All	Water Heating	10.0	19.8%	per premise	17	\$33	per unit	17	\$33
Low Flow Showerhead	Commercial	Existing	Warehouse	All	Water Heating	10.0	33.3%	per premise	22	\$100	per unit	22	\$100
Low Flow Showerhead	Commercial	New	Warehouse	All	Water Heating	10.0	19.8%	per premise	13	\$33	per unit	13	\$33
Low-flow Pre-Rinse Spray Valve	Commercial	Existing	Education	All	Water Heating	5.0	44.2%	per premise	1,362	\$203	per unit	681	\$102
Low-flow Pre-Rinse Spray Valve	Commercial	New	Education	All	Water Heating	5.0	33.8%	per premise	1,040	\$77	per unit	520	\$38
Low-flow Pre-Rinse Spray Valve	Commercial	Existing	Grocery	All	Water Heating	5.0	44.2%	per premise	159	\$203	per unit	80	\$102
Low-flow Pre-Rinse Spray Valve	Commercial	New	Grocery	All	Water Heating	5.0	33.8%	per premise	121	\$77	per unit	61	\$38
Low-flow Pre-Rinse Spray Valve	Commercial	Existing	Healthcare	All	Water Heating	5.0	44.2%	per premise	825	\$203	per unit	412	\$102
Low-flow Pre-Rinse Spray Valve	Commercial	New	Healthcare	All	Water Heating	5.0	33.8%	per premise	630	\$77	per unit	315	\$38
Low-flow Pre-Rinse Spray Valve	Commercial	Existing	Restaurant	All	Water Heating	5.0	44.2%	per premise	603	\$203	per unit	302	\$102
Low-flow Pre-Rinse Spray Valve	Commercial	New	Restaurant	All	Water Heating	5.0	33.8%	per premise	460	\$77	per unit	230	\$38
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Education	All	Water Heating	15.0	41.9%	per premise	1,290	\$12,241	per unit	645	\$6,121

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Education	All	Water Heating	15.0	41.9%	per premise	1,290	\$4,042	per unit	645	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Grocery	All	Water Heating	15.0	41.9%	per premise	151	\$12,241	per unit	75	\$6,121
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Grocery	All	Water Heating	15.0	41.9%	per premise	151	\$4,042	per unit	75	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Healthcare	All	Water Heating	15.0	41.9%	per premise	781	\$12,241	per unit	390	\$6,121
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Healthcare	All	Water Heating	15.0	41.9%	per premise	781	\$4,042	per unit	390	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Lodging	All	Water Heating	15.0	41.9%	per premise	2,785	\$12,241	per unit	1,393	\$6,121
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Lodging	All	Water Heating	15.0	41.9%	per premise	2,785	\$4,042	per unit	1,393	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Misc.	All	Water Heating	15.0	41.9%	per premise	16	\$6,121	per unit	16	\$6,121
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Misc.	All	Water Heating	15.0	41.9%	per premise	16	\$2,021	per unit	16	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Office	All	Water Heating	15.0	41.9%	per premise	58	\$6,121	per unit	58	\$6,121
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Office	All	Water Heating	15.0	41.9%	per premise	58	\$2,021	per unit	58	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Restaurant	All	Water Heating	15.0	41.9%	per premise	571	\$12,241	per unit	286	\$6,121

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Restaurant	All	Water Heating	15.0	41.9%	per premise	571	\$4,042	per unit	286	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Retail	All	Water Heating	15.0	41.9%	per premise	35	\$6,121	per unit	35	\$6,121
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Retail	All	Water Heating	15.0	41.9%	per premise	35	\$2,021	per unit	35	\$2,021
Low-temp Door-Type Energy Star Dishwasher	Commercial	Existing	Warehouse	All	Water Heating	15.0	41.9%	per premise	27	\$6,121	per unit	27	\$6,121
Low-temp Door-Type Energy Star Dishwasher	Commercial	New	Warehouse	All	Water Heating	15.0	41.9%	per premise	27	\$2,021	per unit	27	\$2,021
Motion Faucet Controls	Commercial	Existing	Education	All	Water Heating	5.0	20.0%	per premise	616	\$9,335	per unit	21	\$311
Motion Faucet Controls	Commercial	New	Education	All	Water Heating	5.0	20.0%	per premise	616	\$572	per unit	21	\$19
Motion Faucet Controls	Commercial	Existing	Grocery	All	Water Heating	5.0	20.0%	per premise	72	\$1,245	per unit	18	\$311
Motion Faucet Controls	Commercial	New	Grocery	All	Water Heating	5.0	20.0%	per premise	72	\$76	per unit	18	\$19
Motion Faucet Controls	Commercial	Existing	Healthcare	All	Water Heating	5.0	20.0%	per premise	373	\$3,112	per unit	37	\$311
Motion Faucet Controls	Commercial	New	Healthcare	All	Water Heating	5.0	20.0%	per premise	373	\$191	per unit	37	\$19
Motion Faucet Controls	Commercial	Existing	Lodging	All	Water Heating	5.0	20.0%	per premise	1,330	\$1,245	per unit	333	\$311

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Motion Faucet Controls	Commercial	New	Lodging	All	Water Heating	5.0	20.0%	per premise	1,330	\$76	per unit	333	\$19
Motion Faucet Controls	Commercial	Existing	Misc.	All	Water Heating	5.0	20.0%	per premise	7	\$622	per unit	4	\$311
Motion Faucet Controls	Commercial	New	Misc.	All	Water Heating	5.0	20.0%	per premise	7	\$38	per unit	4	\$19
Motion Faucet Controls	Commercial	Existing	Office	All	Water Heating	5.0	20.0%	per premise	28	\$3,112	per unit	3	\$311
Motion Faucet Controls	Commercial	New	Office	All	Water Heating	5.0	20.0%	per premise	28	\$191	per unit	3	\$19
Motion Faucet Controls	Commercial	Existing	Restaurant	All	Water Heating	5.0	20.0%	per premise	273	\$622	per unit	136	\$311
Motion Faucet Controls	Commercial	New	Restaurant	All	Water Heating	5.0	20.0%	per premise	273	\$38	per unit	136	\$19
Motion Faucet Controls	Commercial	Existing	Retail	All	Water Heating	5.0	20.0%	per premise	17	\$622	per unit	8	\$311
Motion Faucet Controls	Commercial	New	Retail	All	Water Heating	5.0	20.0%	per premise	17	\$38	per unit	8	\$19
Motion Faucet Controls	Commercial	Existing	Warehouse	All	Water Heating	5.0	20.0%	per premise	13	\$622	per unit	7	\$311
Motion Faucet Controls	Commercial	New	Warehouse	All	Water Heating	5.0	20.0%	per premise	13	\$38	per unit	7	\$19
Multi-tank Conveyor Energy Star Dishwasher	Commercial	Existing	Education	All	Water Heating	20.0	48.1%	per premise	1,481	\$32,345	per unit	741	\$16,172

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Multi-tank Conveyor Energy Star Dishwasher	Commercial	New	Education	All	Water Heating	20.0	48.1%	per premise	1,481	\$1,940	per unit	741	\$970
Multi-tank Conveyor Energy Star Dishwasher	Commercial	Existing	Grocery	All	Water Heating	20.0	48.1%	per premise	173	\$32,345	per unit	86	\$16,172
Multi-tank Conveyor Energy Star Dishwasher	Commercial	New	Grocery	All	Water Heating	20.0	48.1%	per premise	173	\$1,940	per unit	86	\$970
Multi-tank Conveyor Energy Star Dishwasher	Commercial	Existing	Healthcare	All	Water Heating	20.0	48.1%	per premise	897	\$32,345	per unit	448	\$16,172
Multi-tank Conveyor Energy Star Dishwasher	Commercial	New	Healthcare	All	Water Heating	20.0	48.1%	per premise	897	\$1,940	per unit	448	\$970
Multi-tank Conveyor Energy Star Dishwasher	Commercial	Existing	Lodging	All	Water Heating	20.0	48.1%	per premise	3,198	\$32,345	per unit	1,599	\$16,172
Multi-tank Conveyor Energy Star Dishwasher	Commercial	New	Lodging	All	Water Heating	20.0	48.1%	per premise	3,198	\$1,940	per unit	1,599	\$970
Multi-tank Conveyor Energy Star Dishwasher	Commercial	Existing	Restaurant	All	Water Heating	20.0	48.1%	per premise	656	\$32,345	per unit	328	\$16,172
Multi-tank Conveyor Energy Star Dishwasher	Commercial	New	Restaurant	All	Water Heating	20.0	48.1%	per premise	656	\$1,940	per unit	328	\$970
Ozone injection laundry systems	Commercial	Existing	Education	All	Water Heating	10.0	23.6%	per premise	727	\$8,283	per premise	727	\$8,283
Ozone injection laundry systems	Commercial	New	Education	All	Water Heating	10.0	23.6%	per premise	727	\$8,283	per premise	727	\$8,283
Ozone injection laundry systems	Commercial	Existing	Healthcare	All	Water Heating	10.0	38.9%	per premise	725	\$8,283	per premise	725	\$8,283

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Ozone injection laundry systems	Commercial	New	Healthcare	All	Water Heating	10.0	38.9%	per premise	725	\$8,283	per premise	725	\$8,283
Ozone injection laundry systems	Commercial	Existing	Lodging	All	Water Heating	10.0	15.8%	per premise	1,049	\$8,283	per premise	1,049	\$8,283
Ozone injection laundry systems	Commercial	New	Lodging	All	Water Heating	10.0	15.8%	per premise	1,049	\$8,283	per premise	1,049	\$8,283
Ozone injection laundry systems	Commercial	Existing	Misc.	All	Water Heating	10.0	21.6%	per premise	8	\$8,283	per premise	8	\$8,283
Ozone injection laundry systems	Commercial	New	Misc.	All	Water Heating	10.0	21.6%	per premise	8	\$8,283	per premise	8	\$8,283
Ozone injection laundry systems	Commercial	Existing	Restaurant	All	Water Heating	10.0	21.6%	per premise	294	\$8,283	per premise	294	\$8,283
Ozone injection laundry systems	Commercial	New	Restaurant	All	Water Heating	10.0	21.6%	per premise	294	\$8,283	per premise	294	\$8,283
Recirculation Controls	Commercial	Existing	Education	All	Water Heating	15.0	6.0%	per premise	185	\$900	per unit	62	\$300
Recirculation Controls	Commercial	New	Education	All	Water Heating	15.0	6.0%	per premise	185	\$250	per unit	62	\$83
Recirculation Controls	Commercial	Existing	Healthcare	All	Water Heating	15.0	6.0%	per premise	112	\$848	per unit	40	\$300
Recirculation Controls	Commercial	New	Healthcare	All	Water Heating	15.0	6.0%	per premise	112	\$235	per unit	40	\$83

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Recirculation Controls	Commercial	Existing	Lodging	All	Water Heating	15.0	6.0%	per premise	399	\$1,055	per unit	114	\$300
Recirculation Controls	Commercial	New	Lodging	All	Water Heating	15.0	6.0%	per premise	399	\$293	per unit	114	\$83
Recirculation Controls	Commercial	Existing	Misc.	All	Water Heating	15.0	6.0%	per premise	2	\$302	per unit	2	\$300
Recirculation Controls	Commercial	New	Misc.	All	Water Heating	15.0	6.0%	per premise	2	\$84	per unit	2	\$83
Refrigeration system superheat recovery DHW	Commercial	Existing	Grocery	All	Water Heating	15.0	20.0%	per premise	72	\$7,500	per premise	72	\$7,500
Refrigeration system superheat recovery DHW	Commercial	New	Grocery	All	Water Heating	15.0	20.0%	per premise	72	\$7,500	per premise	72	\$7,500
Refrigeration system superheat recovery DHW	Commercial	Existing	Restaurant	All	Water Heating	15.0	20.0%	per premise	273	\$7,500	per premise	273	\$7,500
Refrigeration system superheat recovery DHW	Commercial	New	Restaurant	All	Water Heating	15.0	20.0%	per premise	273	\$7,500	per premise	273	\$7,500
Refrigeration system superheat recovery DHW	Commercial	Existing	Warehouse	All	Water Heating	15.0	20.0%	per premise	13	\$7,500	per premise	13	\$7,500
Refrigeration system superheat recovery DHW	Commercial	New	Warehouse	All	Water Heating	15.0	20.0%	per premise	13	\$7,500	per premise	13	\$7,500
Solar Hot Water Heater	Commercial	Early Retirement	Education	All	Water Heating	15.0	52.4%	per premise	1,614	\$21,311	per unit	1,614	\$21,311
Solar Hot Water Heater	Commercial	New	Education	All	Water Heating	15.0	52.4%	per premise	1,614	\$21,311	per unit	1,614	\$21,311

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Solar Hot Water Heater	Commercial	Turnover	Education	All	Water Heating	15.0	52.4%	per premise	1,614	\$21,311	per unit	1,614	\$21,311
Solar Hot Water Heater	Commercial	Early Retirement	Grocery	All	Water Heating	15.0	52.4%	per premise	188	\$21,311	per unit	188	\$21,311
Solar Hot Water Heater	Commercial	New	Grocery	All	Water Heating	15.0	52.4%	per premise	188	\$21,311	per unit	188	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Grocery	All	Water Heating	15.0	52.4%	per premise	188	\$21,311	per unit	188	\$21,311
Solar Hot Water Heater	Commercial	Early Retirement	Healthcare	All	Water Heating	15.0	52.4%	per premise	977	\$21,311	per unit	977	\$21,311
Solar Hot Water Heater	Commercial	New	Healthcare	All	Water Heating	15.0	52.4%	per premise	977	\$21,311	per unit	977	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Healthcare	All	Water Heating	15.0	52.4%	per premise	977	\$21,311	per unit	977	\$21,311
Solar Hot Water Heater	Commercial	Early Retirement	Lodging	All	Water Heating	15.0	52.4%	per premise	3,484	\$21,311	per unit	3,484	\$21,311
Solar Hot Water Heater	Commercial	New	Lodging	All	Water Heating	15.0	52.4%	per premise	3,484	\$21,311	per unit	3,484	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Lodging	All	Water Heating	15.0	52.4%	per premise	3,484	\$21,311	per unit	3,484	\$21,311
Solar Hot Water Heater	Commercial	Early Retirement	Misc.	All	Water Heating	15.0	52.4%	per premise	20	\$21,311	per unit	20	\$21,311
Solar Hot Water Heater	Commercial	New	Misc.	All	Water Heating	15.0	52.4%	per premise	20	\$21,311	per unit	20	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Misc.	All	Water Heating	15.0	52.4%	per premise	20	\$21,311	per unit	20	\$21,311
Solar Hot Water Heater	Commercial	Early Retirement	Office	All	Water Heating	15.0	52.4%	per premise	73	\$21,311	per unit	73	\$21,311
Solar Hot Water Heater	Commercial	New	Office	All	Water Heating	15.0	52.4%	per premise	73	\$21,311	per unit	73	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Office	All	Water Heating	15.0	52.4%	per premise	73	\$21,311	per unit	73	\$21,311

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm)	Incremental Cost per Measure (\$)
Solar Hot Water Heater	Commercial	Early Retirement	Restaurant	All	Water Heating	15.0	52.4%	per premise	715	\$21,311	per unit	715	\$21,311
Solar Hot Water Heater	Commercial	New	Restaurant	All	Water Heating	15.0	52.4%	per premise	715	\$21,311	per unit	715	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Restaurant	All	Water Heating	15.0	52.4%	per premise	715	\$21,311	per unit	715	\$21,311
Solar Hot Water Heater	Commercial	Early Retirement	Retail	All	Water Heating	15.0	52.4%	per premise	44	\$21,311	per unit	44	\$21,311
Solar Hot Water Heater	Commercial	New	Retail	All	Water Heating	15.0	52.4%	per premise	44	\$21,311	per unit	44	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Retail	All	Water Heating	15.0	52.4%	per premise	44	\$21,311	per unit	44	\$21,311
Solar Hot Water Heater	Commercial	Early Retirement	Warehouse	All	Water Heating	15.0	52.4%	per premise	34	\$21,311	per unit	34	\$21,311
Solar Hot Water Heater	Commercial	New	Warehouse	All	Water Heating	15.0	52.4%	per premise	34	\$21,311	per unit	34	\$21,311
Solar Hot Water Heater	Commercial	Turnover	Warehouse	All	Water Heating	15.0	52.4%	per premise	34	\$21,311	per unit	34	\$21,311

B.3 Industrial Sector Measures

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Boiler Power Burner	Industrial	Existing	FoodMfg	All	Process Heating	3.5	1.1%	per premise	21	\$272	per unit	23	\$300
Boiler Power Burner	Industrial	Existing	PaperMfg	All	Process Heating	3.5	1.1%	per premise	15	\$194	per unit	23	\$300
Boiler Power Burner	Industrial	Existing	StoneClayGlass	All	Process Heating	3.5	1.1%	per premise	8	\$110	per unit	23	\$300
Boiler Power Burner	Industrial	Existing	MetalsFab	All	Process Heating	3.5	1.1%	per premise	8	\$100	per unit	23	\$300
Boiler Power Burner	Industrial	Existing	Other	All	Process Heating	3.5	1.1%	per premise	3	\$37	per unit	23	\$300
Boiler Power Burner	Industrial	Existing	LumberWood	All	Process Heating	3.5	1.1%	per premise	9	\$118	per unit	23	\$300
Boiler Repair/Maintenance	Industrial	Existing	FoodMfg	All	Space Heating	2.0	2.0%	per premise	40	\$1,278	per unit	40	\$1,278
Boiler Repair/Maintenance	Industrial	Existing	PaperMfg	All	Space Heating	2.0	2.0%	per premise	40	\$1,278	per unit	40	\$1,278
Boiler Repair/Maintenance	Industrial	Existing	MetalsFab	All	Space Heating	2.0	2.0%	per premise	40	\$1,278	per unit	40	\$1,278
Boiler Repair/Maintenance	Industrial	Existing	LumberWood	All	Space Heating	2.0	2.0%	per premise	40	\$1,278	per unit	40	\$1,278
Boiler Repair/Maintenance	Industrial	Existing	StoneClayGlass	All	Space Heating	2.0	2.0%	per premise	40	\$1,278	per unit	40	\$1,278
Boiler Repair/Maintenance	Industrial	Existing	Other	All	Space Heating	2.0	2.0%	per premise	40	\$1,278	per unit	40	\$1,278
Boiler Stack Economizer	Industrial	Existing	FoodMfg	All	Space Heating	20.0	6.3%	per premise	123	\$7,564	per unit	123	\$7,564
Boiler Stack Economizer	Industrial	Existing	PaperMfg	All	Space Heating	20.0	6.3%	per premise	123	\$7,564	per unit	123	\$7,564
Boiler Stack Economizer	Industrial	Existing	MetalsFab	All	Space Heating	20.0	6.3%	per premise	123	\$7,564	per unit	123	\$7,564

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Boiler Stack Economizer	Industrial	Existing	LumberWood	All	Space Heating	20.0	6.3%	per premise	123	\$7,564	per unit	123	\$7,564
Boiler Stack Economizer	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	6.3%	per premise	123	\$7,564	per unit	123	\$7,564
Boiler Stack Economizer	Industrial	Existing	Other	All	Space Heating	20.0	6.3%	per premise	123	\$7,564	per unit	123	\$7,564
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Industrial	Existing	FoodMfg	All	Space Heating	6.0	1.2%	per premise	23	\$720	per unit	8	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Industrial	Existing	PaperMfg	All	Space Heating	6.0	1.2%	per premise	23	\$720	per unit	8	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Industrial	Existing	MetalsFab	All	Space Heating	6.0	1.2%	per premise	23	\$720	per unit	8	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Industrial	Existing	LumberWood	All	Space Heating	6.0	1.2%	per premise	23	\$720	per unit	8	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Industrial	Existing	StoneClayGlass	All	Space Heating	6.0	1.2%	per premise	23	\$720	per unit	8	\$250
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Industrial	Existing	Other	All	Space Heating	6.0	1.2%	per premise	23	\$720	per unit	8	\$250
Boiler vent damper - min. 1000 kBtu input	Industrial	Existing	FoodMfg	All	Space Heating	12.0	1.2%	per premise	24	\$1,000	per unit	24	\$1,000
Boiler vent damper - min. 1000 kBtu input	Industrial	Existing	PaperMfg	All	Space Heating	12.0	1.2%	per premise	24	\$1,000	per unit	24	\$1,000

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Boiler vent damper - min. 1000 kBtu input	Industrial	Existing	MetalsFab	All	Space Heating	12.0	1.2%	per premise	24	\$1,000	per unit	24	\$1,000
Boiler vent damper - min. 1000 kBtu input	Industrial	Existing	LumberWood	All	Space Heating	12.0	1.2%	per premise	24	\$1,000	per unit	24	\$1,000
Boiler vent damper - min. 1000 kBtu input	Industrial	Existing	StoneClayGlass	All	Space Heating	12.0	1.2%	per premise	24	\$1,000	per unit	24	\$1,000
Boiler vent damper - min. 1000 kBtu input	Industrial	Existing	Other	All	Space Heating	12.0	1.2%	per premise	24	\$1,000	per unit	24	\$1,000
Demand Controlled Ventilation	Industrial	Existing	FoodMfg	All	Space Heating	12.0	19.0%	per premise	374	\$1,922	per unit	219	\$1,125
Demand Controlled Ventilation	Industrial	Existing	PaperMfg	All	Space Heating	12.0	19.0%	per premise	374	\$1,922	per unit	219	\$1,125
Demand Controlled Ventilation	Industrial	Existing	MetalsFab	All	Space Heating	12.0	19.0%	per premise	374	\$1,922	per unit	219	\$1,125
Demand Controlled Ventilation	Industrial	Existing	LumberWood	All	Space Heating	12.0	19.0%	per premise	374	\$1,922	per unit	219	\$1,125
Demand Controlled Ventilation	Industrial	Existing	StoneClayGlass	All	Space Heating	12.0	19.0%	per premise	374	\$1,922	per unit	219	\$1,125
Demand Controlled Ventilation	Industrial	Existing	Other	All	Space Heating	12.0	19.0%	per premise	374	\$1,922	per unit	219	\$1,125
Duct Sealing and Insulation	Industrial	Existing	FoodMfg	All	Space Heating	19.0	10.5%	per premise	208	\$14,273	per sf facility	0	\$1
Duct Sealing and Insulation	Industrial	Existing	PaperMfg	All	Space Heating	19.0	10.5%	per premise	208	\$14,273	per sf facility	0	\$1
Duct Sealing and Insulation	Industrial	Existing	MetalsFab	All	Space Heating	19.0	10.5%	per premise	208	\$14,273	per sf facility	0	\$1
Duct Sealing and Insulation	Industrial	Existing	LumberWood	All	Space Heating	19.0	10.5%	per premise	208	\$14,273	per sf facility	0	\$1
Duct Sealing and Insulation	Industrial	Existing	StoneClayGlass	All	Space Heating	19.0	10.5%	per premise	208	\$14,273	per sf facility	0	\$1

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Duct Sealing and Insulation	Industrial	Existing	Other	All	Space Heating	19.0	10.5%	per premise	208	\$14,273	per sf facility	0	\$1
HVAC Controls	Industrial	Existing	FoodMfg	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC Controls	Industrial	Existing	PaperMfg	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC Controls	Industrial	Existing	MetalsFab	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC Controls	Industrial	Existing	LumberWood	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC Controls	Industrial	Existing	StoneClayGlass	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC Controls	Industrial	Existing	Other	All	Space Heating	11.0	8.8%	per premise	174	\$9,587	per building	174	\$9,587
HVAC System Commissioning	Industrial	Existing	FoodMfg	All	Space Heating	7.0	5.5%	per premise	108	\$1,314	per building	108	\$1,314
HVAC System Commissioning	Industrial	Existing	PaperMfg	All	Space Heating	7.0	5.5%	per premise	108	\$1,314	per building	108	\$1,314
HVAC System Commissioning	Industrial	Existing	MetalsFab	All	Space Heating	7.0	5.5%	per premise	108	\$1,314	per building	108	\$1,314
HVAC System Commissioning	Industrial	Existing	LumberWood	All	Space Heating	7.0	5.5%	per premise	108	\$1,314	per building	108	\$1,314
HVAC System Commissioning	Industrial	Existing	StoneClayGlass	All	Space Heating	7.0	5.5%	per premise	108	\$1,314	per building	108	\$1,314
HVAC System Commissioning	Industrial	Existing	Other	All	Space Heating	7.0	5.5%	per premise	108	\$1,314	per building	108	\$1,314
Improved Process Heating Controls	Industrial	Existing	FoodMfg	All	Process Heating	15.0	30.4%	per premise	545	\$262	per therm saved	1	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Improved Process Heating Controls	Industrial	Existing	PaperMfg	All	Process Heating	15.0	30.4%	per premise	388	\$187	per therm saved	1	\$0
Improved Process Heating Controls	Industrial	Existing	StoneClayGlass	All	Process Heating	15.0	30.4%	per premise	220	\$106	per therm saved	1	\$0
Improved Process Heating Controls	Industrial	Existing	MetalsFab	All	Process Heating	15.0	30.4%	per premise	200	\$97	per therm saved	1	\$0
Improved Process Heating Controls	Industrial	Existing	Other	All	Process Heating	15.0	30.4%	per premise	73	\$35	per therm saved	1	\$0
Improved Process Heating Controls	Industrial	Existing	LumberWood	All	Process Heating	15.0	30.4%	per premise	236	\$114	per therm saved	1	\$0
Optimized Furnace Operations/Improved O&M	Industrial	Existing	FoodMfg	All	Process Heating	17.0	6.0%	per premise	107	\$45	per therm saved	1	\$0
Optimized Furnace Operations/Improved O&M	Industrial	Existing	PaperMfg	All	Process Heating	17.0	6.0%	per premise	76	\$32	per therm saved	1	\$0
Optimized Furnace Operations/Improved O&M	Industrial	Existing	StoneClayGlass	All	Process Heating	17.0	6.0%	per premise	43	\$18	per therm saved	1	\$0
Optimized Furnace Operations/Improved O&M	Industrial	Existing	MetalsFab	All	Process Heating	17.0	6.0%	per premise	39	\$17	per therm saved	1	\$0
Optimized Furnace Operations/Improved O&M	Industrial	Existing	Other	All	Process Heating	17.0	6.0%	per premise	14	\$6	per therm saved	1	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Optimized Furnace Operations/Improved O&M	Industrial	Existing	LumberWood	All	Process Heating	17.0	6.0%	per premise	46	\$20	per therm saved	1	\$0
Refrigeration system superheat recovery	Industrial	Existing	FoodMfg	All	Water Heating	15.0	8.0%	per premise	5	\$2,996	per unit	5	\$2,996
Refrigeration system superheat recovery	Industrial	Existing	Other	All	Water Heating	15.0	8.0%	per premise	5	\$2,996	per unit	5	\$2,996
Roof insulation (retrofit only) - Tier 1: Min R-30	Industrial	Existing	FoodMfg	All	Space Heating	27.5	5.8%	per premise	114	\$3,103	per sf installation	0	\$0
Roof insulation (retrofit only) - Tier 1: Min R-30	Industrial	Existing	PaperMfg	All	Space Heating	27.5	5.8%	per premise	114	\$3,103	per sf installation	0	\$0
Roof insulation (retrofit only) - Tier 1: Min R-30	Industrial	Existing	MetalsFab	All	Space Heating	27.5	5.8%	per premise	114	\$3,103	per sf installation	0	\$0
Roof insulation (retrofit only) - Tier 1: Min R-30	Industrial	Existing	LumberWood	All	Space Heating	27.5	5.8%	per premise	114	\$3,103	per sf installation	0	\$0
Roof insulation (retrofit only) - Tier 1: Min R-30	Industrial	Existing	StoneClayGlass	All	Space Heating	27.5	5.8%	per premise	114	\$3,103	per sf installation	0	\$0
Roof insulation (retrofit only) - Tier 1: Min R-30	Industrial	Existing	Other	All	Space Heating	27.5	5.8%	per premise	114	\$3,103	per sf installation	0	\$0
Roof insulation (retrofit only) - Tier 2: Min R-45	Industrial	Existing	FoodMfg	All	Space Heating	27.5	6.9%	per premise	136	\$5,554	per sf installation	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Industrial	Existing	PaperMfg	All	Space Heating	27.5	6.9%	per premise	136	\$5,554	per sf installation	0	\$1

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Roof insulation (retrofit only) - Tier 2: Min R-45	Industrial	Existing	MetalsFab	All	Space Heating	27.5	6.9%	per premise	136	\$5,554	per sf installation	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Industrial	Existing	LumberWood	All	Space Heating	27.5	6.9%	per premise	136	\$5,554	per sf installation	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Industrial	Existing	StoneClayGlass	All	Space Heating	27.5	6.9%	per premise	136	\$5,554	per sf installation	0	\$1
Roof insulation (retrofit only) - Tier 2: Min R-45	Industrial	Existing	Other	All	Space Heating	27.5	6.9%	per premise	136	\$5,554	per sf installation	0	\$1
Space Heating O&M	Industrial	Existing	FoodMfg	All	Space Heating	2.0	8.0%	per premise	158	\$506	per therm saved	1	\$3
Space Heating O&M	Industrial	Existing	PaperMfg	All	Space Heating	2.0	8.0%	per premise	158	\$506	per therm saved	1	\$3
Space Heating O&M	Industrial	Existing	MetalsFab	All	Space Heating	2.0	8.0%	per premise	158	\$506	per therm saved	1	\$3
Space Heating O&M	Industrial	Existing	LumberWood	All	Space Heating	2.0	8.0%	per premise	158	\$506	per therm saved	1	\$3
Space Heating O&M	Industrial	Existing	StoneClayGlass	All	Space Heating	2.0	8.0%	per premise	158	\$506	per therm saved	1	\$3
Space Heating O&M	Industrial	Existing	Other	All	Space Heating	2.0	8.0%	per premise	158	\$506	per therm saved	1	\$3

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Steam System Efficiency Improvements	Industrial	Existing	FoodMfg	All	Space Heating	15.0	10.2%	per premise	201	\$10,540	per unit	201	\$10,540
Steam System Efficiency Improvements	Industrial	Existing	PaperMfg	All	Space Heating	15.0	10.2%	per premise	201	\$10,540	per unit	201	\$10,540
Steam System Efficiency Improvements	Industrial	Existing	MetalsFab	All	Space Heating	15.0	10.2%	per premise	201	\$10,540	per unit	201	\$10,540
Steam System Efficiency Improvements	Industrial	Existing	LumberWood	All	Space Heating	15.0	10.2%	per premise	201	\$10,540	per unit	201	\$10,540
Steam System Efficiency Improvements	Industrial	Existing	StoneClayGlass	All	Space Heating	15.0	10.2%	per premise	201	\$10,540	per unit	201	\$10,540
Steam System Efficiency Improvements	Industrial	Existing	Other	All	Space Heating	15.0	10.2%	per premise	201	\$10,540	per unit	201	\$10,540
Wall insulation (retrofit only) - Tier 1: Min R-11	Industrial	Existing	FoodMfg	All	Space Heating	27.5	15.9%	per premise	314	\$5,697	per sf installation	0	\$2
Wall insulation (retrofit only) - Tier 1: Min R-11	Industrial	Existing	PaperMfg	All	Space Heating	27.5	15.9%	per premise	314	\$5,697	per sf installation	0	\$2
Wall insulation (retrofit only) - Tier 1: Min R-11	Industrial	Existing	MetalsFab	All	Space Heating	27.5	15.9%	per premise	314	\$5,697	per sf installation	0	\$2
Wall insulation (retrofit only) - Tier 1: Min R-11	Industrial	Existing	LumberWood	All	Space Heating	27.5	15.9%	per premise	314	\$5,697	per sf installation	0	\$2
Wall insulation (retrofit only) - Tier 1: Min R-11	Industrial	Existing	StoneClayGlass	All	Space Heating	27.5	15.9%	per premise	314	\$5,697	per sf installation	0	\$2

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Wall insulation (retrofit only) - Tier 1: Min R-11	Industrial	Existing	Other	All	Space Heating	27.5	15.9%	per premise	314	\$5,697	per sf installation	0	\$2
Wall insulation (retrofit only) - Tier 2: Min R-19	Industrial	Existing	FoodMfg	All	Space Heating	27.5	19.7%	per premise	389	\$6,532	per sf installation	0	\$3
Wall insulation (retrofit only) - Tier 2: Min R-19	Industrial	Existing	PaperMfg	All	Space Heating	27.5	19.7%	per premise	389	\$6,532	per sf installation	0	\$3
Wall insulation (retrofit only) - Tier 2: Min R-19	Industrial	Existing	MetalsFab	All	Space Heating	27.5	19.7%	per premise	389	\$6,532	per sf installation	0	\$3
Wall insulation (retrofit only) - Tier 2: Min R-19	Industrial	Existing	LumberWood	All	Space Heating	27.5	19.7%	per premise	389	\$6,532	per sf installation	0	\$3
Wall insulation (retrofit only) - Tier 2: Min R-19	Industrial	Existing	StoneClayGlass	All	Space Heating	27.5	19.7%	per premise	389	\$6,532	per sf installation	0	\$3
Wall insulation (retrofit only) - Tier 2: Min R-19	Industrial	Existing	Other	All	Space Heating	27.5	19.7%	per premise	389	\$6,532	per sf installation	0	\$3
Waste Water Heat Exchanger	Industrial	Existing	FoodMfg	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per unit	20	\$18,000
Waste Water Heat Exchanger	Industrial	Existing	PaperMfg	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per unit	20	\$18,000
Waste Water Heat Exchanger	Industrial	Existing	MetalsFab	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per unit	20	\$18,000
Waste Water Heat Exchanger	Industrial	Existing	LumberWood	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per unit	20	\$18,000
Waste Water Heat Exchanger	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per unit	20	\$18,000

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Waste Water Heat Exchanger	Industrial	Existing	Other	All	Space Heating	20.0	1.0%	per premise	20	\$18,000	per unit	20	\$18,000
Windows - Add Argon to Vinyl Lowe	Industrial	Existing	FoodMfg	All	Space Heating	20.0	5.0%	per premise	99	\$1,148	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Industrial	Existing	PaperMfg	All	Space Heating	20.0	5.0%	per premise	99	\$1,148	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Industrial	Existing	MetalsFab	All	Space Heating	20.0	5.0%	per premise	99	\$1,148	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Industrial	Existing	LumberWood	All	Space Heating	20.0	5.0%	per premise	99	\$1,148	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	5.0%	per premise	99	\$1,148	per sf facility	0	\$0
Windows - Add Argon to Vinyl Lowe	Industrial	Existing	Other	All	Space Heating	20.0	5.0%	per premise	99	\$1,148	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Industrial	Existing	FoodMfg	All	Space Heating	20.0	12.8%	per premise	252	\$7,570	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Industrial	Existing	PaperMfg	All	Space Heating	20.0	12.8%	per premise	252	\$7,570	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Industrial	Existing	MetalsFab	All	Space Heating	20.0	12.8%	per premise	252	\$7,570	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Industrial	Existing	LumberWood	All	Space Heating	20.0	12.8%	per premise	252	\$7,570	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	12.8%	per premise	252	\$7,570	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 36	Industrial	Existing	Other	All	Space Heating	20.0	12.8%	per premise	252	\$7,570	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Industrial	Existing	FoodMfg	All	Space Heating	20.0	8.3%	per premise	164	\$3,028	per sf facility	0	\$0

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Windows - Non-Tinted AL Code to Class 40	Industrial	Existing	PaperMfg	All	Space Heating	20.0	8.3%	per premise	164	\$3,028	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Industrial	Existing	MetalsFab	All	Space Heating	20.0	8.3%	per premise	164	\$3,028	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Industrial	Existing	LumberWood	All	Space Heating	20.0	8.3%	per premise	164	\$3,028	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	8.3%	per premise	164	\$3,028	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 40	Industrial	Existing	Other	All	Space Heating	20.0	8.3%	per premise	164	\$3,028	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Industrial	Existing	FoodMfg	All	Space Heating	20.0	3.1%	per premise	60	\$2,014	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Industrial	Existing	PaperMfg	All	Space Heating	20.0	3.1%	per premise	60	\$2,014	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Industrial	Existing	MetalsFab	All	Space Heating	20.0	3.1%	per premise	60	\$2,014	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Industrial	Existing	LumberWood	All	Space Heating	20.0	3.1%	per premise	60	\$2,014	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	3.1%	per premise	60	\$2,014	per sf facility	0	\$0
Windows - Non-Tinted AL Code to Class 45	Industrial	Existing	Other	All	Space Heating	20.0	3.1%	per premise	60	\$2,014	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Industrial	Existing	FoodMfg	All	Space Heating	20.0	11.0%	per premise	217	\$7,578	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Industrial	Existing	PaperMfg	All	Space Heating	20.0	11.0%	per premise	217	\$7,570	per sf facility	0	\$0

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Windows - Tinted AL Code to Class 36	Industrial	Existing	MetalsFab	All	Space Heating	20.0	11.0%	per premise	217	\$7,570	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Industrial	Existing	LumberWood	All	Space Heating	20.0	11.0%	per premise	217	\$7,570	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	11.0%	per premise	217	\$7,570	per sf facility	0	\$0
Windows - Tinted AL Code to Class 36	Industrial	Existing	Other	All	Space Heating	20.0	11.0%	per premise	217	\$7,570	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Industrial	Existing	FoodMfg	All	Space Heating	20.0	0.6%	per premise	12	\$2,014	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Industrial	Existing	PaperMfg	All	Space Heating	20.0	0.6%	per premise	12	\$2,014	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Industrial	Existing	MetalsFab	All	Space Heating	20.0	0.6%	per premise	12	\$2,014	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Industrial	Existing	LumberWood	All	Space Heating	20.0	0.6%	per premise	12	\$2,014	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Industrial	Existing	StoneClayGlass	All	Space Heating	20.0	0.6%	per premise	12	\$2,014	per sf facility	0	\$0
Windows - Tinted AL Code to Class 45	Industrial	Existing	Other	All	Space Heating	20.0	0.6%	per premise	12	\$2,014	per sf facility	0	\$0
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	PaperMfg	All	Water Heating	20.0	16.7%	per premise	11	\$1,426	per unit	11	\$1,426
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	FoodMfg	All	Space Heating	20.0	16.7%	per premise	329	\$43,119	per unit	329	\$43,119
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	LumberWood	All	Space Heating	20.0	16.7%	per premise	329	\$43,119	per unit	329	\$43,119

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	MetalsFab	All	Space Heating	20.0	16.7%	per premise	329	\$43,119	per unit	329	\$43,119
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	PaperMfg	All	Space Heating	20.0	16.7%	per premise	329	\$43,119	per unit	329	\$43,119
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	FoodMfg	All	Water Heating	20.0	16.7%	per premise	11	\$1,426	per unit	11	\$1,426
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	Other	All	Space Heating	20.0	16.7%	per premise	329	\$43,119	per unit	329	\$43,119
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	MetalsFab	All	Water Heating	20.0	16.7%	per premise	11	\$1,426	per unit	11	\$1,426
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	StoneClayGlass	All	Space Heating	20.0	16.7%	per premise	329	\$43,119	per unit	329	\$43,119
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	LumberWood	All	Water Heating	20.0	16.7%	per premise	11	\$1,426	per unit	11	\$1,426
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	Other	All	Water Heating	20.0	16.7%	per premise	11	\$1,426	per unit	11	\$1,426
Combination Boiler and Hot Water Heater	Industrial	Early Retirement	StoneClayGlass	All	Water Heating	20.0	16.7%	per premise	11	\$1,426	per unit	11	\$1,426
Combination Boiler and Hot Water Heater	Industrial	Turnover	PaperMfg	All	Water Heating	20.0	11.4%	per premise	7	\$789	per unit	7	\$789
Combination Boiler and Hot Water Heater	Industrial	Turnover	FoodMfg	All	Space Heating	20.0	11.4%	per premise	226	\$23,869	per unit	226	\$23,869

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Combination Boiler and Hot Water Heater	Industrial	Turnover	LumberWood	All	Space Heating	20.0	11.4%	per premise	226	\$23,869	per unit	226	\$23,869
Combination Boiler and Hot Water Heater	Industrial	Turnover	MetalsFab	All	Space Heating	20.0	11.4%	per premise	226	\$23,869	per unit	226	\$23,869
Combination Boiler and Hot Water Heater	Industrial	Turnover	PaperMfg	All	Space Heating	20.0	11.4%	per premise	226	\$23,869	per unit	226	\$23,869
Combination Boiler and Hot Water Heater	Industrial	Turnover	FoodMfg	All	Water Heating	20.0	11.4%	per premise	7	\$789	per unit	7	\$789
Combination Boiler and Hot Water Heater	Industrial	Turnover	Other	All	Space Heating	20.0	11.4%	per premise	226	\$23,869	per unit	226	\$23,869
Combination Boiler and Hot Water Heater	Industrial	Turnover	MetalsFab	All	Water Heating	20.0	11.4%	per premise	7	\$789	per unit	7	\$789
Combination Boiler and Hot Water Heater	Industrial	Turnover	StoneClayGlass	All	Space Heating	20.0	11.4%	per premise	226	\$23,869	per unit	226	\$23,869
Combination Boiler and Hot Water Heater	Industrial	Turnover	LumberWood	All	Water Heating	20.0	11.4%	per premise	7	\$789	per unit	7	\$789
Combination Boiler and Hot Water Heater	Industrial	Turnover	Other	All	Water Heating	20.0	11.4%	per premise	7	\$789	per unit	7	\$789
Combination Boiler and Hot Water Heater	Industrial	Turnover	StoneClayGlass	All	Water Heating	20.0	11.4%	per premise	7	\$789	per unit	7	\$789
Direct Fired Radiant Heater	Industrial	Early Retirement	FoodMfg	All	Space Heating	17.0	23.5%	per premise	464	\$2,532	per unit	582	\$3,178
Direct Fired Radiant Heater	Industrial	Early Retirement	PaperMfg	All	Space Heating	17.0	23.5%	per premise	464	\$2,532	per unit	582	\$3,178

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Direct Fired Radiant Heater	Industrial	Early Retirement	MetalsFab	All	Space Heating	17.0	23.5%	per premise	464	\$2,532	per unit	582	\$3,178
Direct Fired Radiant Heater	Industrial	Early Retirement	LumberWood	All	Space Heating	17.0	23.5%	per premise	464	\$2,532	per unit	582	\$3,178
Direct Fired Radiant Heater	Industrial	Early Retirement	StoneClayGlass	All	Space Heating	17.0	23.5%	per premise	464	\$2,532	per unit	582	\$3,178
Direct Fired Radiant Heater	Industrial	Early Retirement	Other	All	Space Heating	17.0	23.5%	per premise	464	\$2,532	per unit	582	\$3,178
Direct Fired Radiant Heater	Industrial	Turnover	FoodMfg	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	1,224	\$2,142
Direct Fired Radiant Heater	Industrial	Turnover	PaperMfg	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	1,224	\$2,142
Direct Fired Radiant Heater	Industrial	Turnover	MetalsFab	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	1,224	\$2,142
Direct Fired Radiant Heater	Industrial	Turnover	LumberWood	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	1,224	\$2,142
Direct Fired Radiant Heater	Industrial	Turnover	StoneClayGlass	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	1,224	\$2,142
Direct Fired Radiant Heater	Industrial	Turnover	Other	All	Space Heating	17.0	23.5%	per premise	464	\$812	per unit	1,224	\$2,142
High Efficiency Condensing Boiler	Industrial	Early Retirement	FoodMfg	All	Process Heating	20.0	16.7%	per premise	298	\$38,866	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	FoodMfg	All	Process Heating	20.0	16.7%	per premise	298	\$38,866	per unit	329	\$42,860

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
High Efficiency Condensing Boiler	Industrial	Early Retirement	PaperMfg	All	Process Heating	20.0	16.7%	per premise	212	\$27,659	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	PaperMfg	All	Process Heating	20.0	16.7%	per premise	212	\$27,659	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	StoneClayGlass	All	Process Heating	20.0	16.7%	per premise	121	\$15,733	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	StoneClayGlass	All	Process Heating	20.0	16.7%	per premise	121	\$15,733	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	FoodMfg	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	FoodMfg	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	MetalsFab	All	Process Heating	20.0	16.7%	per premise	110	\$14,298	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	MetalsFab	All	Process Heating	20.0	16.7%	per premise	110	\$14,298	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	Other	All	Process Heating	20.0	16.7%	per premise	40	\$5,229	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	Other	All	Process Heating	20.0	16.7%	per premise	40	\$5,229	per unit	329	\$42,860

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
High Efficiency Condensing Boiler	Industrial	Early Retirement	LumberWood	All	Process Heating	20.0	16.7%	per premise	129	\$16,832	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	LumberWood	All	Process Heating	20.0	16.7%	per premise	129	\$16,832	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	PaperMfg	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	PaperMfg	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	MetalsFab	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	MetalsFab	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	LumberWood	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	LumberWood	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	StoneClayGlass	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	StoneClayGlass	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
High Efficiency Condensing Boiler	Industrial	Early Retirement	Other	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Early Retirement	Other	All	Space Heating	20.0	16.7%	per premise	329	\$42,860	per unit	329	\$42,860
High Efficiency Condensing Boiler	Industrial	Turnover	FoodMfg	All	Process Heating	20.0	11.4%	per premise	205	\$21,266	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	FoodMfg	All	Process Heating	20.0	11.4%	per premise	205	\$21,266	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	PaperMfg	All	Process Heating	20.0	11.4%	per premise	146	\$15,134	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	PaperMfg	All	Process Heating	20.0	11.4%	per premise	146	\$15,134	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	StoneClayGlass	All	Process Heating	20.0	11.4%	per premise	83	\$8,609	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	StoneClayGlass	All	Process Heating	20.0	11.4%	per premise	83	\$8,609	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	FoodMfg	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	FoodMfg	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	MetalsFab	All	Process Heating	20.0	11.4%	per premise	75	\$7,823	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	MetalsFab	All	Process Heating	20.0	11.4%	per premise	75	\$7,823	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	Other	All	Process Heating	20.0	11.4%	per premise	28	\$2,861	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	Other	All	Process Heating	20.0	11.4%	per premise	28	\$2,861	per unit	226	\$23,452

Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Per Premise Values			Per Unit Values		
								Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
High Efficiency Condensing Boiler	Industrial	Turnover	LumberWood	All	Process Heating	20.0	11.4%	per premise	89	\$9,210	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	LumberWood	All	Process Heating	20.0	11.4%	per premise	89	\$9,210	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	PaperMfg	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	PaperMfg	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	MetalsFab	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	MetalsFab	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	LumberWood	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	LumberWood	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	StoneClayGlass	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	StoneClayGlass	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	Other	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Boiler	Industrial	Turnover	Other	All	Space Heating	20.0	11.4%	per premise	226	\$23,452	per unit	226	\$23,452
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Early Retirement	FoodMfg	All	Space Heating	18.0	23.2%	per premise	457	\$13,372	per unit	112	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Early Retirement	PaperMfg	All	Space Heating	18.0	23.2%	per premise	457	\$13,372	per unit	112	\$3,289

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Early Retirement	MetalsFab	All	Space Heating	18.0	23.2%	per premise	457	\$13,372	per unit	112	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Early Retirement	LumberWood	All	Space Heating	18.0	23.2%	per premise	457	\$13,372	per unit	112	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Early Retirement	StoneClayGlass	All	Space Heating	18.0	23.2%	per premise	457	\$13,372	per unit	112	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Early Retirement	Other	All	Space Heating	18.0	23.2%	per premise	457	\$13,372	per unit	112	\$3,289
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Turnover	FoodMfg	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Turnover	PaperMfg	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Turnover	MetalsFab	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Turnover	LumberWood	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Turnover	StoneClayGlass	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Condensing Unit Heater 92% AFUE	Industrial	Turnover	Other	All	Space Heating	18.0	13.0%	per premise	257	\$8,095	per unit	63	\$1,991
High Efficiency Non-Condensing Unit Heater	Industrial	Early Retirement	FoodMfg	All	Space Heating	18.0	17.8%	per premise	351	\$12,762	per unit	86	\$3,139

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
High Efficiency Non-Condensing Unit Heater	Industrial	Early Retirement	PaperMfg	All	Space Heating	18.0	17.8%	per premise	351	\$12,762	per unit	86	\$3,139
High Efficiency Non-Condensing Unit Heater	Industrial	Early Retirement	MetalsFab	All	Space Heating	18.0	17.8%	per premise	351	\$12,762	per unit	86	\$3,139
High Efficiency Non-Condensing Unit Heater	Industrial	Early Retirement	LumberWood	All	Space Heating	18.0	17.8%	per premise	351	\$12,762	per unit	86	\$3,139
High Efficiency Non-Condensing Unit Heater	Industrial	Early Retirement	StoneClayGlass	All	Space Heating	18.0	17.8%	per premise	351	\$12,762	per unit	86	\$3,139
High Efficiency Non-Condensing Unit Heater	Industrial	Early Retirement	Other	All	Space Heating	18.0	17.8%	per premise	351	\$12,762	per unit	86	\$3,139
High Efficiency Non-Condensing Unit Heater	Industrial	Turnover	FoodMfg	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841
High Efficiency Non-Condensing Unit Heater	Industrial	Turnover	PaperMfg	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841
High Efficiency Non-Condensing Unit Heater	Industrial	Turnover	MetalsFab	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841
High Efficiency Non-Condensing Unit Heater	Industrial	Turnover	LumberWood	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841
High Efficiency Non-Condensing Unit Heater	Industrial	Turnover	StoneClayGlass	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841
High Efficiency Non-Condensing Unit Heater	Industrial	Turnover	Other	All	Space Heating	18.0	7.0%	per premise	138	\$7,485	per unit	34	\$1,841

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
Process Heating: High Efficiency Furnace	Industrial	Early Retirement	FoodMfg	All	Process Heating	17.0	15.4%	per premise	275	\$9,721	per unit	72	\$2,532
Process Heating: High Efficiency Furnace	Industrial	Early Retirement	PaperMfg	All	Process Heating	17.0	15.4%	per premise	196	\$6,920	per unit	72	\$2,532
Process Heating: High Efficiency Furnace	Industrial	Early Retirement	StoneClayGlass	All	Process Heating	17.0	15.4%	per premise	111	\$3,936	per unit	72	\$2,532
High Efficiency Condensing Furnace	Industrial	Early Retirement	FoodMfg	All	Space Heating	17.0	15.4%	per premise	304	\$10,723	per unit	72	\$2,532
Process Heating: High Efficiency Furnace	Industrial	Early Retirement	MetalsFab	All	Process Heating	17.0	15.4%	per premise	101	\$3,577	per unit	72	\$2,532
Process Heating: High Efficiency Furnace	Industrial	Early Retirement	Other	All	Process Heating	17.0	15.4%	per premise	37	\$1,308	per unit	72	\$2,532
Process Heating: High Efficiency Furnace	Industrial	Early Retirement	LumberWood	All	Process Heating	17.0	15.4%	per premise	119	\$4,211	per unit	72	\$2,532
High Efficiency Condensing Furnace	Industrial	Early Retirement	PaperMfg	All	Space Heating	17.0	15.4%	per premise	304	\$10,723	per unit	72	\$2,532
High Efficiency Condensing Furnace	Industrial	Early Retirement	MetalsFab	All	Space Heating	17.0	15.4%	per premise	304	\$10,723	per unit	72	\$2,532
High Efficiency Condensing Furnace	Industrial	Early Retirement	LumberWood	All	Space Heating	17.0	15.4%	per premise	304	\$10,723	per unit	72	\$2,532

								Per Premise Values			Per Unit Values		
Measure Name	Sector	Vintage	Segment	Climate Zone	End Use	EUL (yrs)	Energy Savings (%)	Unit	Energy Savings (therms)	Incremental Cost (\$)	Unit	Savings EUI (Thm/Unit)	Incremental Cost per Measure (\$/Unit)
High Efficiency Condensing Furnace	Industrial	Early Retirement	StoneClayGlass	All	Space Heating	17.0	15.4%	per premise	304	\$10,723	per unit	72	\$2,532
High Efficiency Condensing Furnace	Industrial	Early Retirement	Other	All	Space Heating	17.0	15.4%	per premise	304	\$10,723	per unit	72	\$2,532
Process Heating: High Efficiency Furnace	Industrial	Turnover	FoodMfg	All	Process Heating	17.0	14.3%	per premise	256	\$3,119	per unit	67	\$812
Process Heating: High Efficiency Furnace	Industrial	Turnover	PaperMfg	All	Process Heating	17.0	14.3%	per premise	182	\$2,219	per unit	67	\$812
Process Heating: High Efficiency Furnace	Industrial	Turnover	StoneClayGlass	All	Process Heating	17.0	14.3%	per premise	103	\$1,262	per unit	67	\$812
High Efficiency Condensing Furnace	Industrial	Turnover	FoodMfg	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812
Process Heating: High Efficiency Furnace	Industrial	Turnover	MetalsFab	All	Process Heating	17.0	14.3%	per premise	94	\$1,147	per unit	67	\$812
Process Heating: High Efficiency Furnace	Industrial	Turnover	Other	All	Process Heating	17.0	14.3%	per premise	34	\$419	per unit	67	\$812
Process Heating: High Efficiency Furnace	Industrial	Turnover	LumberWood	All	Process Heating	17.0	14.3%	per premise	111	\$1,350	per unit	67	\$812
High Efficiency Condensing Furnace	Industrial	Turnover	PaperMfg	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812
High Efficiency Condensing Furnace	Industrial	Turnover	MetalsFab	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812
High Efficiency Condensing Furnace	Industrial	Turnover	LumberWood	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812
High Efficiency Condensing Furnace	Industrial	Turnover	StoneClayGlass	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812
High Efficiency Condensing Furnace	Industrial	Turnover	Other	All	Space Heating	17.0	14.3%	per premise	282	\$3,438	per unit	67	\$812

Appendix C Detailed Findings by Scenario

Detailed natural gas energy efficiency cumulative savings for each of the 22 scenarios run for each sector (66 scenarios total) are presented below. Within each scenario table, natural gas savings are presented by segment, by end use and by year. Values presented in each year represent the cumulative savings to each given year. Each of the scenarios addressed in this study are summarized in the table below.

Potential Category	Scenario	Scenario # Res/Com/Ind	Avoided Costs	Incentivized %	Discount Rate	
					Residential	Comm./ Industrial
Base Case – Technical/Economic/Achievable Potential Scenarios under TRC						
Technical	Technical – Base	1 / 23 / 45	Current	n/a	3.40%	8.55%
Economic	Economic – Base	2 / 24 / 46	Current	n/a	3.40%	8.55%
Achievable Potential	Achievable – Base	3 / 25 / 47	Current	30%	3.40%	8.55%
	Achievable – Moderate	4 / 26 / 48	Current	50%	3.40%	8.55%
	Achievable – High	5 / 27 / 49	Current	75%	3.40%	8.55%
Base Case – Technical/Economic/Achievable Scenarios under UCT						
Technical	Technical – Base	6 / 28 / 50	Current	n/a	8.55%	8.55%
Economic	Economic – Base	7 / 29 / 51	Current	n/a	8.55%	8.55%
Achievable Potential	Achievable – Base	8 / 30 / 52	Current	30%	8.55%	8.55%
	Achievable – Moderate	9 / 31 / 53	Current	50%	8.55%	8.55%
	Achievable – High	10 / 32 / 54	Current	75%	8.55%	8.55%
Alternate Base Achievable Scenarios under TRC						
Achievable Potential	Achievable – Base	11 / 33 / 55	+25%	30%	3.40%	8.55%
	Achievable – Base	12 / 34 / 56	+50%	30%	3.40%	8.55%
	Achievable – Base	13 / 35 / 57	+100%	30%	3.40%	8.55%
	Achievable – Base	14 / 36 / 58	-25%	30%	3.40%	8.55%
	Achievable – Base	15 / 37 / 59	-50%	30%	3.40%	8.55%
	Achievable – Base	21 / 43 / 65	Current	30%	4.17%	4.17%
Alternate Base Achievable Scenarios under UCT						
Achievable Potential	Achievable – Base	16 / 38 / 60	+25%	30%	8.55%	8.55%
	Achievable – Base	17 / 39 / 61	+50%	30%	8.55%	8.55%
	Achievable – Base	18 / 40 / 62	+100%	30%	8.55%	8.55%
	Achievable – Base	19 / 41 / 63	-25%	30%	8.55%	8.55%
	Achievable – Base	20 / 42 / 64	-50%	30%	8.55%	8.55%
	Achievable – Base	22 / 44 / 66	Current	30%	4.17%	4.17%

C.1 Residential Sector Scenario Findings

C-1: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #1)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	464.0	966.0	1,480.2	2,006.1	2,528.9	3,062.1	3,596.0	4,141.3	4,697.2	5,263.5	5,842.5	6,434.9	6,983.3	7,527.6	8,084.0	8,595.4	9,117.7	9,595.7	10,015.8	10,457.2	10,810.3
Clothes Drying	0.9	1.9	2.9	4.0	5.0	6.1	7.2	8.4	9.5	10.7	11.9	13.1	14.4	14.7	15.0	15.3	15.7	16.0	16.5	16.9	17.4
Room Heating	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.1
Space Heating	245.3	508.8	778.4	1,054.0	1,335.0	1,621.5	1,903.2	2,190.7	2,483.8	2,782.3	3,087.3	3,399.4	3,717.7	4,032.1	4,352.7	4,622.7	4,898.5	5,180.0	5,467.8	5,766.4	6,002.2
Water Heating	217.7	455.2	698.8	948.0	1,188.6	1,434.2	1,685.3	1,941.9	2,203.5	2,470.1	2,742.8	3,021.9	3,250.5	3,480.2	3,715.6	3,956.6	4,202.7	4,398.8	4,530.6	4,672.9	4,789.7
Mfg_CZ2	139.9	291.3	446.3	604.9	762.5	923.2	1,084.2	1,248.5	1,416.0	1,586.7	1,761.2	1,939.8	2,105.2	2,269.5	2,437.4	2,592.3	2,750.5	2,895.4	3,022.8	3,156.6	3,262.9
Clothes Drying	0.3	0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.9	3.3	3.6	4.0	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.3
Room Heating	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Space Heating	73.2	152.0	232.5	314.9	398.8	484.5	568.6	654.4	742.0	831.1	922.2	1,015.4	1,110.5	1,204.5	1,300.3	1,381.5	1,464.3	1,548.9	1,635.4	1,725.1	1,795.7
Water Heating	66.4	138.7	212.9	288.8	362.1	436.8	513.3	591.4	671.1	752.2	835.2	920.2	1,009.1	1,090.4	1,172.3	1,246.0	1,321.2	1,341.4	1,382.1	1,426.1	1,461.5
Mfg_CZ3	167.8	349.0	534.5	724.2	913.0	1,105.6	1,298.5	1,495.6	1,696.4	1,901.0	2,110.1	2,324.1	2,523.4	2,721.0	2,922.9	3,106.9	3,294.9	3,468.5	3,623.2	3,785.4	3,913.7
Clothes Drying	0.3	0.7	1.0	1.4	1.7	2.1	2.5	2.9	3.3	3.7	4.1	4.6	5.0	5.1	5.2	5.3	5.4	5.6	5.7	5.9	6.0
Room Heating	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4
Space Heating	90.8	188.2	287.7	389.4	493.2	598.9	703.1	809.5	917.9	1,028.3	1,141.1	1,256.5	1,374.2	1,490.2	1,608.5	1,706.9	1,807.5	1,910.1	2,015.1	2,123.9	2,211.2
Water Heating	76.7	160.1	245.8	333.4	418.0	504.5	592.8	683.1	775.1	868.9	964.8	1,062.9	1,144.0	1,225.5	1,309.0	1,394.5	1,481.7	1,552.5	1,602.1	1,655.3	1,696.2
Multi_CZ1	16,153.3	34,022.1	52,334.4	71,071.3	89,426.4	108,164.1	126,797.4	145,846.0	165,285.3	185,106.0	205,387.7	226,162.4	244,173.4	261,950.0	280,169.1	296,914.8	314,060.9	330,931.5	347,400.7	364,742.2	380,698.4
Clothes Drying	62.9	132.5	204.2	277.5	352.3	428.6	506.6	586.1	667.2	749.8	834.2	920.5	1,008.6	1,028.6	1,050.3	1,073.6	1,098.6	1,125.1	1,153.4	1,185.1	1,219.1
Room Heating	4.9	10.7	16.6	22.7	28.9	35.2	41.7	48.3	55.1	61.9	69.0	76.2	83.5	91.0	98.7	106.5	114.4	122.5	130.7	139.3	148.1
Space Heating	9,671.4	20,485.2	31,576.1	42,926.5	54,509.4	66,326.8	77,876.6	89,680.7	101,725.2	114,004.0	126,564.7	139,427.2	152,560.6	165,622.6	178,956.0	190,653.7	202,597.3	214,793.0	227,279.4	240,324.8	252,425.4
Water Heating	6,414.1	13,393.7	20,537.5	27,844.7	34,535.7	41,373.5	48,372.6	55,530.8	62,837.8	70,290.3	77,919.8	85,738.5	90,520.7	95,207.8	100,064.0	105,081.0	110,250.6	114,891.0	118,837.2	123,093.1	126,905.8
Multi_CZ2	15,961.4	33,410.9	51,295.9	69,591.4	87,518.9	105,815.3	124,067.1	142,719.4	161,746.0	181,139.0	200,977.2	221,291.0	239,037.0	256,566.1	274,520.8	291,141.7	308,146.9	324,895.7	341,260.2	358,414.8	374,195.8
Clothes Drying	60.3	127.1	195.9	266.3	338.1	411.3	486.1	562.5	640.3	719.5	800.5	883.4	967.8	987.0	1,007.9	1,030.3	1,054.2	1,079.6	1,106.8	1,137.2	1,169.8
Room Heating	4.7	10.3	16.0	21.8	27.7	33.8	40.0	46.4	52.8	59.4	66.2	73.1	80.2	87.3	94.7	102.2	109.8	117.5	125.4	133.7	142.1
Space Heating	9,178.4	19,456.5	29,999.0	40,788.4	51,799.3	63,033.3	74,062.3	85,333.4	96,833.4	108,556.6	120,548.3	132,827.1	145,363.7	157,843.2	170,581.2	181,827.0	193,307.0	205,027.1	217,024.7	229,558.0	241,178.1
Water Heating	6,717.9	13,817.0	21,085.0	28,514.9	35,353.9	42,337.0	49,478.8	56,777.2	64,219.4	71,803.4	79,562.2	87,507.4	92,625.3	97,648.5	102,837.0	108,182.3	113,676.0	118,671.5	123,003.2	127,586.0	131,705.8
Multi_CZ3	13,937.8	29,201.5	44,841.1	60,840.2	76,496.9	92,476.7	108,405.4	124,685.1	141,293.2	158,222.5	175,541.8	193,277.8	208,693.7	223,855.9	239,391.1	253,427.8	267,801.5	281,962.6	295,803.6	310,345.5	323,518.5
Clothes Drying	54.5	114.9	177.1	240.7	305.6	371.7	439.3	508.4	578.7	650.3	723.5	798.4	874.8	892.1	910.9	931.2	952.8	975.8	1,000.4	1,027.8	1,057.3
Room Heating	4.1	8.8	13.7	18.7	23.8	29.0	34.3	39.8	45.3	51.0	56.8	62.7	68.8	74.9	81.2	87.6	94.1	100.8	107.6	114.6	121.9
Space Heating	8,476.6	17,936.5	27,637.3	37,564.7	47,695.1	58,030.2	68,183.6	78,559.0	89,144.1	99,933.6	110,969.3	122,268.5	133,803.9	145,243.4	156,919.8	166,968.3	177,231.5	187,714.5	198,450.5	209,670.9	220,079.8
Water Heating	5,402.6	11,141.3	17,013.1	23,016.2	28,472.4	34,045.7	39,748.2	45,577.9	51,525.0	57,587.6	63,792.1	70,148.2	73,946.3	77,645.5	81,479.2	85,440.7	89,523.0	93,171.5	96,245.2	99,532.2	102,259.4
Single_CZ1	98,309.0	204,933.6	314,154.3	425,864.5	537,170.0	650,708.0	764,711.6	881,139.6	999,826.3	1,120,726.4	1,243,847.6	1,369,850.4	1,487,491.8	1,600,948.5	1,716,978.1	1,827,715.5	1,940,773.6	2,044,736.8	2,136,804.9	2,233,469.8	2,315,619.8
Clothes Drying	301.1	634.5	977.6	1,328.8	1,687.0	2,052.4	2,425.7	2,806.7	3,195.1	3,590.5	3,994.7	4,408.0	4,829.6	4,925.3	5,029.3	5,141.2	5,260.5	5,387.5	5,523.1	5,674.6	5,837.5
Other	15.8	31.8	48.3	65.2	82.4	99.9	117.7	135.9	154.4	173.2	192.4	212.0	231.9	252.2	272.8	293.7	315.0	336.6	358.5	381.7	403.4
Room Heating	12.5	27.0	42.0	57.4	73.1	89.1	105.4	122.1	139.2	156.6	174.4	192.6	211.2	230.2	249.5	269.2	289.2	309.6	330.5	352.2	374.5
Space Heating	53,710.7	111,647.2	170,899.7	231,496.9	293,293.6	356,295.1	418,631.3	482,275.8	547,136.9	613,190.3	680,223.3	748,812.0	818,779.7	884,755.6	952,119.2	1,013,063.2	1,075,257.4	1,138,730.9	1,203,602.8	1,270,908.2	1,329,065.7
Water Heating	44,268.9	92,593.1	142,186.6	192,916.2	242,033.9	292,171.6	343,431.5	395,799.1	449,200.7	503,615.8	559,262.8	616,225.8	663,439.3	710,785.2	759,307.3	808,948.2	859,651.4	899,972.2	926,990.1	956,154.1	979,938.7
Single_CZ2	186,405.3	388,574.3	595,677.0	807,500.2	1,018,496.8	1,233,726.6	1,449,793.4	1,670,457.0	1,895,403.1	2,124,546.1	2,357,890.5	2,596,698.6	2,819,812.4	3,035,292.4	3,255,650.6	3,466,448.8	3,681,647.3	3,879,574.6	4,054,911.5	4,238,959.4	4,394,089.5
Clothes Drying	577.3	1,216.6	1,874.7	2,548.0	3,234.9	3,935.6	4,651.4	5,382.1	6,126.7	6,885.1	7,660.0	8,452.6	9,261.1	9,444.6	9,644.0	9,858.5	10,087.3	10,330.8	10,590.9	10,881.4	11,193.6
Other	30.2	61.0	92.7	125.0	158.0	191.6	225.8	260.7	296.1	332.2	368.9	406.5	444.7	483.5	523.1	563.2	604.0	645.4	687.4	730.1	773.5
Room Heating	22.7	49.2	76.5	104.4	132.9	162.1	191.8	222.3	253.3	285.0	317.4	350.5	384.4	418.8	454.0	489.9	526.3	563.5	601.4	641.0	681.6
Space Heating	100,749.4	209,547.6	320,825.2	434,630.7	550,691.4	669,017.6	786,015.8	905,474.0	1,027,221.3	1,151,211.1	1,277,025.3	1,405,764.4	1,537,090.5	1,661,152.7	1,787,824.8	1,902,779.2					

C-2: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #2)

Segment/End Use]	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	154.1	323.6	497.2	674.8	842.1	1,013.1	1,188.0	1,366.9	1,549.4	1,735.5	1,926.0	2,121.1	2,264.0	2,400.6	2,541.4	2,686.2	2,834.7	2,987.1	3,136.3	3,293.5	3,410.4
Room Heating	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.1
Space Heating	78.9	170.5	264.5	360.8	459.2	559.6	662.2	767.1	874.2	983.3	1,095.0	1,209.2	1,325.9	1,434.8	1,546.1	1,659.7	1,775.5	1,893.5	2,014.3	2,140.8	2,224.9
Water Heating	75.2	153.1	232.5	313.8	382.8	453.3	525.5	599.4	674.8	751.7	830.6	911.4	937.4	965.1	994.6	1,025.7	1,058.4	1,092.7	1,121.0	1,151.7	1,184.5
Mfg_CZ2	46.5	97.5	149.8	203.2	253.5	304.9	357.5	411.3	466.2	522.1	579.4	638.0	680.7	721.7	763.9	807.2	851.7	897.4	942.0	989.1	1,023.7
Room Heating	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Space Heating	23.6	50.9	78.9	107.6	136.9	166.8	197.4	228.6	260.5	293.0	326.3	360.3	395.0	427.5	460.7	494.6	529.1	564.3	600.3	638.0	662.7
Water Heating	22.9	46.6	70.8	95.6	116.6	138.1	160.1	182.6	205.5	229.0	253.0	277.6	285.5	294.0	302.9	312.4	322.4	332.8	341.4	350.8	360.8
Mfg_CZ3	54.6	114.7	176.2	239.1	298.5	359.2	421.3	484.8	549.6	615.7	683.3	752.6	803.7	852.3	902.4	953.9	1,006.8	1,061.0	1,114.3	1,170.4	1,212.6
Room Heating	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4
Space Heating	28.6	61.8	95.9	130.8	166.5	202.8	240.0	278.1	316.8	356.4	396.8	438.2	480.5	519.7	559.7	600.6	642.3	684.8	728.3	773.8	804.7
Water Heating	25.9	52.8	80.2	108.2	132.0	156.3	181.2	206.6	232.6	259.1	286.3	314.1	323.0	332.4	342.5	353.1	364.2	375.9	385.7	396.3	407.5
Multi_CZ1	6,701.9	14,562.7	22,609.5	30,852.2	38,505.8	46,338.5	54,367.2	62,589.8	70,999.7	79,590.3	88,394.6	97,428.4	103,572.9	109,581.9	115,799.6	122,216.6	128,823.8	135,626.4	142,569.0	150,030.3	156,928.2
Room Heating	4.9	10.7	16.6	22.7	28.9	35.2	41.7	48.3	55.1	61.9	69.0	76.2	83.5	91.0	98.7	106.5	114.4	122.5	130.7	139.3	148.1
Space Heating	2,619.2	6,143.3	9,763.6	13,480.6	17,286.1	21,182.1	25,176.8	29,269.3	33,460.3	37,744.9	42,136.2	46,642.4	51,255.7	55,641.3	60,134.1	64,729.6	69,424.0	74,220.4	79,159.1	84,451.8	89,057.1
Water Heating	4,077.8	8,408.7	12,829.3	17,348.9	21,909.9	25,121.1	29,148.7	33,272.2	37,484.3	41,783.4	46,189.5	50,709.8	52,233.7	53,849.5	55,566.9	57,380.6	59,285.4	61,283.5	63,279.2	65,439.2	67,723.0
Multi_CZ2	7,020.9	15,027.6	23,226.3	31,620.1	39,451.7	47,460.6	55,663.8	64,059.1	72,637.8	81,394.2	90,363.1	99,559.7	105,977.1	112,283.8	118,796.5	125,503.3	132,401.1	139,488.6	146,707.1	154,389.7	161,528.5
Room Heating	4.7	10.3	16.0	21.8	27.7	33.8	40.0	46.4	52.8	59.4	66.2	73.1	80.2	87.3	94.7	102.2	109.8	117.5	125.4	133.7	142.1
Space Heating	2,505.7	5,881.3	9,349.2	12,909.7	16,555.1	20,287.3	24,114.1	28,034.6	32,049.7	36,154.5	40,361.5	44,678.7	49,098.7	53,313.5	57,631.1	62,047.2	66,558.2	71,167.0	75,912.4	80,997.8	85,420.5
Water Heating	4,510.4	9,136.0	13,861.2	18,688.6	22,868.9	27,139.5	31,509.7	35,978.1	40,535.2	45,180.4	49,935.5	54,807.8	56,798.2	58,883.0	61,070.7	63,355.9	65,733.0	68,204.1	70,669.3	73,258.2	75,965.9
Multi_CZ3	5,657.8	12,175.1	18,844.4	25,673.7	31,980.5	38,433.0	45,045.2	51,815.4	58,736.9	65,805.1	73,047.6	80,477.1	85,378.2	90,116.1	95,023.6	100,092.7	105,316.0	110,697.5	116,186.7	122,073.8	127,455.6
Room Heating	4.1	8.8	13.7	18.7	23.8	29.0	34.3	39.8	45.3	51.0	56.8	62.7	68.8	74.9	81.2	87.6	94.1	100.8	107.6	114.6	121.9
Space Heating	2,288.6	5,345.8	8,485.9	11,709.6	15,009.6	18,387.8	21,851.1	25,398.7	29,031.2	32,744.4	36,549.5	40,454.0	44,450.7	48,213.7	52,069.0	56,012.9	60,042.1	64,159.0	68,398.0	72,938.9	76,886.5
Water Heating	3,365.1	6,820.5	10,344.8	13,945.4	16,947.0	20,016.2	23,159.8	26,376.9	29,660.4	33,009.7	36,441.3	39,960.4	40,858.7	41,827.5	42,873.4	43,992.2	45,179.8	46,437.7	47,681.1	49,020.2	50,447.2
Single_CZ1	42,633.3	89,366.5	137,184.2	186,102.7	233,335.9	281,559.5	330,871.7	381,258.6	432,653.2	485,032.0	538,604.4	593,453.5	638,534.1	679,339.9	721,289.4	764,326.1	808,395.7	853,523.1	898,257.5	945,173.1	982,756.1
Other	15.8	31.8	48.3	65.2	82.4	99.9	117.7	135.9	154.4	173.2	192.4	212.0	231.9	252.2	272.8	293.7	315.0	336.6	358.5	380.7	403.4
Room Heating	12.5	27.0	42.0	57.4	73.1	89.1	105.4	122.1	139.2	156.6	174.4	192.6	211.2	230.2	249.5	269.2	289.2	309.6	330.5	352.2	374.5
Space Heating	27,946.7	59,484.0	91,794.0	124,866.2	158,622.4	193,069.0	228,273.4	264,226.5	300,890.5	338,245.8	376,429.9	415,501.8	455,375.4	490,661.4	526,748.0	563,597.2	601,172.7	639,492.7	678,686.5	719,607.3	750,796.6
Water Heating	14,658.4	29,823.6	45,299.8	61,113.9	74,558.0	88,301.5	102,375.1	116,774.1	131,469.1	146,456.4	161,807.7	177,547.2	182,715.6	188,196.2	194,019.1	200,166.0	206,618.8	213,384.1	218,882.1	224,832.9	231,181.5
Single_CZ2	73,510.4	153,903.9	236,129.5	320,244.3	400,929.0	483,312.6	567,564.1	653,659.3	741,481.6	830,991.2	922,548.8	1,016,297.0	1,091,081.5	1,157,819.9	1,226,519.8	1,297,083.8	1,369,418.6	1,443,566.5	1,516,713.4	1,593,568.4	1,659,277.1
Other	30.2	61.0	92.7	125.0	158.0	191.6	225.8	260.7	296.1	332.2	368.9	406.5	444.7	483.5	523.1	563.2	604.0	645.4	687.4	730.1	773.5
Room Heating	22.7	49.2	76.5	104.4	132.9	162.1	191.8	222.3	253.3	285.0	317.4	350.5	384.4	418.8	454.0	489.9	526.3	563.5	601.4	641.0	681.6
Space Heating	45,349.2	96,605.3	149,095.5	202,825.7	257,669.0	313,636.1	370,836.7	429,255.7	488,833.1	549,535.9	611,587.5	675,083.7	739,885.5	796,041.1	853,500.5	912,201.6	972,085.6	1,033,182.0	1,095,706.4	1,161,068.2	1,214,518.9
Water Heating	28,108.2	57,188.4	86,864.8	117,189.1	142,969.1	169,322.9	196,309.8	223,920.7	252,099.1	280,838.1	310,275.0	340,456.3	350,367.0	360,876.4	372,042.2	383,829.1	396,202.7	409,175.6	419,718.2	431,129.3	443,303.1
Single_CZ3	57,137.1	119,693.2	183,693.9	249,166.4	312,521.8	377,200.9	443,335.4	510,906.5	579,823.7	650,056.2	721,884.3	795,419.2	856,450.9	911,174.8	967,427.1	1,025,132.2	1,084,217.6	1,144,716.3	1,204,870.3	1,267,924.0	1,319,058.0
Other	20.3	40.9	62.2	83.9	106.0	128.5	151.4	174.8	198.6	222.7	247.4	272.6	298.2	324.3	350.8	377.7	405.0	432.8	461.0	489.6	518.7
Room Heating	15.2	33.0	51.3	70.0	89.1	108.7	128.6	149.0	169.9	191.1	212.8	235.1	257.8	280.9	304.5	328.5	353.0	377.9	403.3	429.8	457.0
Space Heating	38,345.5	81,466.2	125,633.4	170,839.6	216,977.8	264,056.3	312,167.2	361,297.8	411,395.5	462,433.9	514,601.7	567,979.0	622,447.9	670,208.8	719,059.8	768,948.7	819,825.9	871,716.0	924,789.3	980,183.5	1,023,149.0
Water Heating	18,756.1	38,153.2	57,947.0	78,172.9	95,348.9	112,907.5	130,888.2	149,284.9	168,059.8	187,208.4	206,822.4	226,932.6	233,447.1	240,360.8	247,712.1	255,477.4	263,633.8	272,189.6	279,216.7	286,821.1	294,933.3
Grand Total	192,916.5	405,264.9	622,511.0	844,776.5	1,058,118.9	1,275,982.2	1,498,814.1	1,726,551.6	1,958,898.1	2,195,742.3	2,438,031.5	2,686,146.5	2,884,743.2	3,064,291.0	3,249,063.7	3,438,804.0	3,633,266.2</				

C-3: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #3)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	43.0	87.7	134.6	184.2	231.4	282.2	337.3	397.2	462.1	531.9	606.7	686.5	747.9	809.8	875.1	943.5	1,014.6	1,088.6	1,165.0	1,245.6	1,326.9
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
Space Heating	14.8	30.8	48.3	67.7	89.2	113.5	140.9	171.9	206.7	245.1	287.4	333.2	382.2	430.6	481.5	534.4	589.2	646.1	704.9	766.7	828.3
Water Heating	28.3	56.9	86.3	116.6	142.1	168.7	196.4	225.3	255.4	286.7	319.2	353.1	365.6	379.0	393.5	408.9	425.1	442.2	459.8	478.5	498.2
Mfg_CZ2	13.0	26.5	40.6	55.6	69.8	85.1	101.7	119.7	139.2	160.1	182.6	206.6	225.0	243.5	263.0	283.5	304.8	327.0	349.8	373.9	398.2
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	4.4	9.1	14.3	20.1	26.5	33.7	41.8	51.0	61.4	72.8	85.4	99.0	113.6	128.0	143.1	158.9	175.2	192.2	209.7	228.1	246.4
Water Heating	8.6	17.3	26.3	35.5	43.3	51.4	59.8	68.6	77.8	87.3	97.2	107.6	111.3	115.4	119.9	124.5	129.5	134.7	140.1	145.8	151.7
Mfg_CZ3	15.4	31.3	48.1	65.8	82.6	100.8	120.5	141.8	164.9	189.7	216.4	244.7	266.7	288.7	312.0	336.3	361.6	387.9	415.1	443.7	472.7
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	5.6	11.6	18.2	25.4	33.4	42.4	52.5	63.9	76.6	90.6	106.0	122.6	140.4	157.8	176.1	195.2	214.9	235.4	256.5	278.8	301.0
Water Heating	9.8	19.7	29.9	40.4	49.2	58.4	68.0	78.0	88.3	99.1	110.4	122.1	126.3	130.9	135.8	141.1	146.6	152.5	158.5	164.9	171.6
Multi_CZ1	1,980.0	4,055.4	6,233.4	8,540.0	10,680.9	12,996.9	15,518.8	18,267.4	21,252.8	24,475.8	27,942.6	31,645.6	34,301.5	37,028.5	39,926.3	42,974.5	46,155.6	49,486.4	52,959.0	56,696.5	60,552.8
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8
Space Heating	411.7	894.4	1,437.2	2,058.3	2,776.7	3,614.1	4,593.2	5,731.2	7,038.7	8,516.5	10,163.7	11,972.3	13,924.3	15,889.2	17,966.3	20,140.4	22,398.7	24,754.4	27,206.3	29,844.6	32,542.5
Water Heating	1,568.1	3,160.6	4,795.4	6,480.3	7,902.2	9,379.8	10,921.3	12,530.5	14,206.5	15,949.6	17,766.7	19,658.3	20,359.2	21,118.0	21,935.3	22,805.8	23,724.8	24,695.9	25,712.6	26,807.5	27,961.5
Multi_CZ2	1,915.4	3,923.9	6,039.4	8,289.3	10,394.2	12,684.1	15,191.8	17,939.4	20,937.1	24,185.8	27,691.0	31,443.3	34,208.0	37,060.1	40,087.9	43,269.6	46,586.1	50,055.3	53,662.3	57,507.3	61,467.7
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8
Space Heating	390.2	848.5	1,364.6	1,955.8	2,640.4	3,439.4	4,374.5	5,462.2	6,712.7	8,127.0	9,704.0	11,436.0	13,305.9	15,192.7	17,187.3	19,275.1	21,443.7	23,705.9	26,060.5	28,594.1	31,184.8
Water Heating	1,525.1	3,074.9	4,674.0	6,332.2	7,751.8	9,241.9	10,813.3	12,471.7	14,217.1	16,049.5	17,975.3	19,992.9	20,884.9	21,846.9	22,876.9	23,967.3	25,111.6	26,314.7	27,563.3	28,870.6	30,236.1
Multi_CZ3	1,732.5	3,538.3	5,426.6	7,417.8	9,254.1	11,228.0	13,363.5	15,676.3	18,173.3	20,855.3	23,727.8	26,785.5	28,917.3	31,084.0	33,385.2	35,805.1	38,330.0	40,972.8	43,726.4	46,682.4	49,728.8
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1
Space Heating	374.1	808.8	1,295.2	1,849.1	2,486.2	3,225.4	4,085.9	5,082.3	6,223.7	7,510.7	8,942.5	10,512.5	12,205.1	13,895.6	15,682.1	17,551.8	19,493.6	21,518.9	23,626.4	25,893.0	28,210.4
Water Heating	1,358.3	2,729.1	4,130.7	5,567.6	6,766.2	8,000.2	9,274.1	10,589.2	11,943.4	13,336.6	14,775.3	16,260.7	16,697.4	17,170.9	17,682.7	18,230.0	18,810.0	19,424.3	20,067.0	20,752.8	21,478.2
Single_CZ1	12,603.8	25,779.5	39,670.8	54,459.4	69,193.0	85,115.5	102,410.1	121,181.1	141,447.4	163,179.6	186,389.7	211,004.4	232,441.8	253,173.3	274,885.2	297,455.6	320,781.5	344,949.6	369,818.0	395,908.6	422,044.4
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3
Space Heating	7,108.6	14,718.2	22,896.2	31,796.2	41,554.3	52,306.9	64,209.0	77,352.7	91,760.9	107,404.1	124,269.7	142,284.0	161,294.5	179,400.9	198,289.2	217,856.3	238,016.1	258,842.8	280,286.2	302,739.5	325,049.7
Water Heating	5,494.2	11,058.9	16,770.1	22,656.0	27,627.7	32,792.5	38,178.7	43,798.1	49,646.5	55,724.2	62,055.6	68,641.5	71,052.4	73,660.5	76,466.0	79,450.4	82,596.9	85,917.8	89,321.6	92,937.1	96,740.4
Single_CZ2	22,624.4	45,992.1	70,344.8	95,917.0	120,765.7	147,204.1	175,500.6	205,820.9	238,219.7	272,699.6	309,337.4	348,068.6	380,209.0	410,735.6	442,776.1	476,150.1	510,702.7	546,571.5	583,506.5	622,330.6	661,846.1
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4
Space Heating	12,087.1	24,781.4	38,178.8	52,459.4	67,767.5	84,292.8	102,249.0	121,779.0	142,945.0	165,749.4	190,222.0	216,297.2	243,784.7	269,278.3	295,905.2	323,521.2	352,003.4	381,466.0	411,834.5	443,684.9	475,865.6
Water Heating	10,535.5	21,206.1	32,157.6	43,444.0	52,977.6	62,881.4	73,209.8	83,985.2	95,199.9	106,854.2	118,995.1	131,623.7	136,246.8	141,247.9	146,627.7	152,350.4	158,384.1	164,752.0	171,279.1	178,212.0	185,504.9
Single_CZ3	17,147.9	35,045.5	53,886.8	73,909.7	93,889.1	115,426.8	138,762.4	164,031.3	191,256.8	220,401.1	251,483.4	284,410.6	313,286.1	341,000.4	370,006.4	400,145.0	431,281.4	463,528.7	496,709.8	531,509.2	566,401.3
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5
Space Heating	10,085.0	20,830.3	32,332.1	44,792.6	58,387.2	73,294.3	89,717.8	107,778.2	127,504.4	148,858.2	171,827.4	196,317.7	222,127.6	246,525.4	271,963.3	298,305.5	325,438.6	353,466.2	382,305.7	412,499.2	442,545.5
Water Heating	7,061.6	14,212.2	21,549.1	29,107.9	35,488.0	42,112.4	49,016.5	56,215.0	63,702.2	71,478.5	79,575.3	87,993.9	91,039.4	94,334.6	97,880.1	101,652.7	105,631.4	109,831.3	114,140.6	118,719.2	123,536.9
Grand Total	58,075.3	118,480.2	181,825.0	248,838.8	314,560.8	385,123.4	461,306.6	543,575.3	632,053.1	726,679.0	827,577.8	934,495.8	1,024,603.2	1,111,423.8	1,202,517.4	1,297,363.4	1,395,518.2	1,497,367.8	1,602,312.0	1,712,697.7	1,824,238.9

C-4: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #4)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	55.3	113.8	175.9	242.4	306.8	376.9	453.4	536.5	626.3	722.4	824.8	933.1	1,018.3	1,103.6	1,193.1	1,286.3	1,382.7	1,482.2	1,584.6	1,692.9	1,800.5
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5
Space Heating	19.8	42.1	66.9	94.8	126.5	162.3	203.0	248.7	299.5	355.1	415.4	480.0	548.4	615.7	686.0	758.8	833.8	910.9	990.5	1,074.5	1,156.7
Water Heating	35.5	71.7	109.0	147.5	180.3	214.5	250.3	287.7	326.7	367.2	409.2	453.0	469.7	487.6	506.8	527.2	548.5	570.9	593.7	617.9	643.3
Mfg_CZ2	16.7	34.3	53.1	73.1	92.5	113.6	136.6	161.6	188.5	217.4	248.2	280.7	306.2	331.7	358.5	386.4	415.3	445.1	475.7	508.1	540.3
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Space Heating	5.9	12.5	19.9	28.2	37.5	48.2	60.3	73.9	89.0	105.5	123.5	142.7	163.1	183.1	204.1	225.8	248.1	271.1	294.8	319.8	344.2
Water Heating	12.3	21.8	33.2	44.9	54.9	65.3	76.2	87.6	99.5	111.8	124.6	138.0	143.1	148.5	154.4	160.6	167.1	173.9	180.8	188.2	195.9
Mfg_CZ3	19.8	40.6	62.8	86.5	109.5	134.5	161.7	191.3	223.2	257.3	293.7	332.1	362.5	392.9	424.7	457.8	492.0	527.4	563.7	602.2	640.5
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Space Heating	7.4	15.8	25.0	35.4	47.0	60.2	75.1	91.8	110.2	130.4	152.2	175.6	200.3	224.6	249.8	276.0	302.9	330.6	359.2	389.4	419.0
Water Heating	12.3	24.8	37.7	51.1	62.4	74.2	86.6	99.5	112.9	126.9	141.4	156.4	162.1	168.2	174.8	181.7	189.0	196.6	204.4	212.7	221.4
Multi_CZ1	2,535.5	5,252.5	8,137.4	11,229.6	14,164.6	17,368.5	20,875.3	24,700.3	28,842.7	33,289.8	38,039.8	43,077.4	46,791.5	50,579.5	54,573.2	58,749.3	63,088.2	67,582.2	72,265.5	77,321.1	82,502.9
Room Heating	0.3	0.9	1.7	2.7	4.0	5.7	7.8	10.3	13.3	16.7	20.5	24.7	29.2	33.9	38.9	44.1	49.4	54.9	60.6	66.6	72.8
Space Heating	565.6	1,269.6	2,081.1	3,028.4	4,137.8	5,436.7	6,949.4	8,688.6	10,656.9	12,844.0	15,241.2	17,833.8	20,597.0	23,363.6	26,263.8	29,280.6	32,400.1	35,615.3	38,963.3	42,577.0	46,241.1
Water Heating	1,969.6	3,982.0	6,054.6	8,198.6	10,022.8	11,926.2	13,918.2	16,001.4	18,172.5	20,429.1	22,778.0	25,218.9	26,165.3	27,182.0	28,270.6	29,424.6	30,638.7	31,911.9	33,241.6	34,677.5	36,189.1
Multi_CZ2	2,468.8	5,113.8	7,936.1	10,977.2	13,891.4	17,091.5	20,613.2	24,472.7	28,668.0	33,185.4	38,021.4	43,158.3	47,044.9	51,025.1	55,216.4	59,593.5	64,135.6	68,833.4	73,715.6	78,934.0	84,275.0
Room Heating	0.3	0.9	1.6	2.6	3.8	5.5	7.5	9.9	12.8	16.1	19.7	23.7	28.0	32.6	37.3	42.3	47.4	52.7	58.2	63.9	69.8
Space Heating	536.7	1,206.5	1,979.4	2,882.7	3,941.8	5,182.9	6,629.5	8,293.7	10,178.1	12,272.8	14,569.4	17,053.7	19,702.0	22,359.4	25,145.2	28,042.9	31,039.3	34,127.7	37,343.4	40,814.6	44,333.8
Water Heating	1,931.8	3,906.4	5,955.1	8,092.0	9,945.8	11,903.2	13,976.3	16,169.1	18,477.1	20,896.5	23,432.3	26,080.8	27,314.9	28,633.2	30,033.9	31,508.3	33,048.8	34,653.0	36,314.0	38,055.6	39,871.3
Multi_CZ3	2,216.2	4,570.7	7,058.9	9,711.3	12,207.8	14,914.7	17,858.2	21,049.6	24,487.7	28,162.6	32,074.3	36,211.5	39,179.7	42,179.4	45,341.2	48,647.0	52,081.7	55,639.3	59,344.1	63,332.7	67,414.2
Room Heating	0.3	0.7	1.4	2.2	3.3	4.7	6.4	8.5	11.0	13.8	16.9	20.3	24.0	27.9	32.0	36.3	40.7	45.2	49.9	54.8	59.9
Space Heating	511.1	1,140.5	1,862.0	2,699.9	3,676.7	4,815.6	6,137.3	7,652.7	9,363.8	11,261.8	13,339.3	15,584.0	17,974.5	20,351.0	22,841.9	25,432.6	28,113.3	30,872.0	33,746.2	36,846.9	39,990.3
Water Heating	1,704.8	3,429.5	5,195.5	7,009.2	8,527.9	10,094.5	11,714.4	13,388.4	15,112.9	16,887.0	18,718.1	20,607.2	21,181.1	21,800.4	22,467.3	23,178.1	23,929.7	24,722.1	25,548.1	26,431.0	27,364.0
Single_CZ1	16,303.6	33,680.9	52,226.4	72,172.8	92,312.6	114,181.8	137,936.2	163,602.8	191,098.5	220,299.1	251,173.2	283,614.1	311,883.4	339,053.6	367,320.1	396,560.0	426,670.5	457,614.9	489,392.7	522,801.5	555,639.9
Other	1.1	2.6	4.8	7.6	11.2	15.9	21.7	28.7	36.9	46.2	56.6	67.9	80.1	92.9	106.3	120.2	134.6	149.3	164.4	179.9	195.7
Room Heating	0.9	2.3	4.2	6.7	10.1	14.4	19.7	26.1	33.7	42.3	51.9	62.5	73.8	85.8	98.4	111.5	125.0	138.9	153.3	168.4	184.0
Space Heating	9,390.6	19,734.0	31,035.2	43,487.0	57,242.1	72,450.3	89,234.7	107,614.4	127,520.2	148,836.5	171,507.8	195,430.4	220,420.7	244,071.4	268,575.6	293,832.4	319,758.4	346,320.7	373,660.6	402,345.0	430,219.2
Water Heating	6,911.0	13,942.0	21,182.3	28,671.4	35,049.1	41,701.3	48,660.1	55,933.6	63,507.8	71,374.0	79,556.9	88,053.4	91,308.8	94,803.5	98,539.8	102,495.9	106,652.5	111,006.0	115,414.4	120,108.1	125,041.0
Single_CZ2	28,880.0	59,138.7	90,968.6	124,715.2	157,974.8	193,637.6	231,993.3	273,156.0	317,078.2	363,647.6	412,883.9	464,660.7	508,067.4	549,253.1	592,254.1	636,866.2	682,916.8	730,339.3	779,092.9	830,474.1	882,275.8
Other	2.1	5.1	9.1	14.5	21.6	30.5	41.7	55.1	70.8	88.6	108.5	130.2	153.5	178.1	203.9	230.6	258.1	286.3	315.3	344.9	375.3
Room Heating	1.6	4.1	7.6	12.3	18.4	26.2	35.8	47.6	61.3	77.0	94.5	113.7	134.3	156.1	179.0	202.8	227.4	252.7	278.9	306.4	334.8
Space Heating	15,624.1	32,395.0	50,333.6	69,709.4	90,726.2	113,616.5	138,607.4	165,797.6	195,166.5	226,618.4	260,126.2	295,569.6	332,690.0	367,128.0	402,915.8	439,891.4	477,919.3	516,940.4	557,185.3	599,508.8	641,792.8
Water Heating	13,252.1	26,734.5	40,618.3	54,979.0	67,208.6	79,964.4	93,308.4	107,255.7	121,779.6	136,863.6	152,554.7	168,847.1	175,089.6	181,790.8	188,955.4	196,541.5	204,512.0	212,859.9	221,313.4	230,313.9	239,772.9
Single_CZ3	22,143.0	45,691.3	70,774.3	97,696.8	124,906.0	154,379.1	186,321.0	220,767.0	257,607.9	296,682.8	337,955.7	381,290.0	419,301.1	455,571.9	493,290.4	532,295.3	572,452.2	613,713.7	656,093.3	700,631.6	744,480.7
Other	1.4	3.4	6.1	9.7	14.5	20.5	27.9	36.9	47.5	59.4	72.8	87.3	103.0	119.4	136.7	154.6	173.0	192.0	211.4	231.3	251.7
Room Heating	1.1	2.8	5.1	8.2	12.3	17.5	24.0	31.9	41.1	51.6	63.4	76.2	90.1	104.7	120.1	136.0	152.5	169.5	187.0	205.5	224.5
Space Heating	13,260.5	27,774.1	43,555.6	60,859.8	79,883.2	100,821.9	123,839.7	148,962.0	176,097.6	205,096.2	235,890.3	268,346.6	302,222.4	334,053.3	367,023.8	401,000.2	435,872.7	471,598.4	508,363.6	546,923.6	584,489.0
Water Heating	8,880.0	17,911.0	27,207.5	36,819.1	44,996.0	53,519.2	62,429.3	71,736.1	81,421.8	91,475.5	101,929.3	112,779.9	116,885.6	121,294.5	126,009.9	131,004.5	136,253.9	141,753.8	147,331.2	153,271.2	159,515.5
Grand Total	74,638.8	153,636.7	237,393.4	326,904.9	415,965.9	512,198.1	616,348.7	728,637.7	848,821.1	976,464.2	1,111,514.8	1,253,558.1	1,373,954.8	1,489,490.8	1,609,971.7	1,734,841.8	1,863,635.0	1,996,177.4	2,132,528.1	2,276,298.1	2,419,569.8

C-5: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #5)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	73.3	150.5	232.1	319.0	402.5	492.6	590.1	695.3	808.1	928.0	1,055.3	1,189.4	1,291.8	1,393.8	1,500.7	1,612.0	1,727.2	1,846.1	1,968.7	2,098.1	2,226.5
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Space Heating	26.1	55.2	87.4	123.3	163.4	208.5	259.0	315.3	377.2	444.5	517.1	594.7	676.5	756.4	839.6	925.8	1,014.6	1,105.8	1,200.3	1,299.7	1,396.5
Water Heating	47.2	95.3	144.7	195.7	239.0	284.1	331.0	380.0	430.8	483.4	538.0	594.5	615.1	637.1	660.8	685.8	712.1	739.8	767.9	797.9	829.4
Mfg_CZ2	22.1	45.4	70.0	96.2	121.3	148.4	177.8	209.4	243.3	279.4	317.6	357.9	388.5	419.1	451.1	484.4	518.9	554.5	591.3	630.0	668.4
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Space Heating	7.7	16.4	25.9	36.6	48.5	61.9	76.9	93.7	112.1	132.1	153.7	176.8	201.1	224.9	249.7	275.4	301.9	329.1	357.2	386.8	415.6
Water Heating	14.4	29.0	44.1	59.6	72.8	86.5	100.8	115.7	131.2	147.2	163.9	181.1	187.3	194.1	201.2	208.9	216.9	225.3	233.9	243.0	252.6
Mfg_CZ3	26.2	53.7	82.8	113.8	143.6	175.8	210.6	248.0	288.1	330.8	376.0	423.6	460.3	496.6	534.6	574.2	615.2	657.5	701.1	747.2	792.9
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Space Heating	9.8	20.7	32.7	46.0	60.9	77.5	96.0	116.6	139.1	163.6	190.0	218.1	247.8	276.6	306.6	337.6	369.6	402.4	436.4	472.2	507.1
Water Heating	16.4	33.0	50.1	67.8	82.7	98.3	114.5	131.4	149.0	167.1	185.9	205.4	212.4	219.9	228.5	236.5	245.5	255.0	264.6	274.8	285.6
Multi_CZ1	3,363.6	6,950.0	10,741.6	14,783.6	18,582.8	22,696.3	27,160.9	31,990.9	37,182.9	42,722.1	48,609.5	54,829.9	59,245.5	63,725.7	68,448.6	73,387.8	78,521.2	83,840.4	89,399.7	95,386.2	101,507.9
Room Heating	0.4	1.1	2.0	3.3	4.8	6.8	9.3	12.3	15.7	19.6	24.0	28.8	33.9	39.3	45.0	50.9	57.0	63.3	69.8	76.6	83.7
Space Heating	742.8	1,654.8	2,695.0	3,895.1	5,283.1	6,888.0	8,735.1	10,836.7	13,194.2	15,795.6	18,632.1	21,688.4	24,937.2	28,163.1	31,541.7	35,054.3	38,685.3	42,427.1	46,335.2	50,542.4	54,791.8
Water Heating	2,620.4	5,294.1	8,044.6	10,885.3	13,294.8	15,801.5	18,416.5	21,141.9	23,973.0	26,906.9	29,953.3	33,112.7	34,274.4	35,523.4	36,861.9	38,282.6	39,779.0	41,350.1	42,994.8	44,767.2	46,632.4
Multi_CZ2	3,271.7	6,759.2	10,463.0	14,430.2	18,192.0	22,287.1	26,754.0	31,608.0	36,844.2	42,446.6	48,414.3	54,729.2	59,334.7	64,029.1	68,971.7	74,134.4	79,493.4	85,038.9	90,820.1	96,986.4	103,283.0
Room Heating	0.4	1.1	2.0	3.1	4.6	6.6	8.9	11.8	15.1	18.8	23.0	27.6	32.5	37.7	43.2	48.8	54.7	60.7	67.0	73.5	80.3
Space Heating	704.7	1,572.0	2,562.5	3,706.4	5,030.8	6,563.6	8,329.1	10,339.2	12,595.1	15,085.5	17,801.8	20,729.1	23,841.5	26,939.7	30,184.6	33,558.1	37,045.4	40,639.0	44,392.3	48,433.0	52,513.9
Water Heating	2,566.6	5,186.1	7,898.6	10,720.7	13,156.5	15,717.0	18,416.0	21,257.1	24,234.0	27,342.2	30,589.4	33,972.5	35,460.7	37,051.6	38,743.9	40,527.4	42,393.4	44,339.2	46,360.8	48,479.8	50,688.9
Multi_CZ3	2,940.5	6,051.0	9,325.4	12,798.8	16,039.4	19,526.6	23,288.8	27,337.1	31,667.5	36,268.7	41,143.2	46,280.1	49,828.0	53,392.4	57,148.9	61,077.2	65,159.8	69,390.6	73,808.5	78,553.0	83,397.3
Room Heating	0.4	0.9	1.7	2.7	4.0	5.6	7.7	10.1	12.9	16.2	19.8	23.7	27.9	32.4	37.0	41.9	46.9	52.1	57.4	63.1	68.9
Space Heating	671.8	1,488.1	2,414.4	3,477.9	4,702.5	6,112.5	7,729.9	9,564.8	11,618.5	13,880.5	16,343.6	18,994.7	21,810.4	24,584.3	27,489.0	30,508.4	33,629.3	36,845.3	40,203.5	43,816.6	47,465.5
Water Heating	2,268.3	4,562.0	6,909.3	9,318.2	11,332.9	13,408.4	15,551.3	17,762.1	20,036.1	22,372.0	24,779.9	27,261.7	27,989.7	28,775.8	29,623.0	30,526.9	31,483.6	32,493.2	33,547.6	34,673.3	35,863.0
Single_CZ1	21,590.8	44,484.2	68,774.3	94,726.2	120,673.5	148,592.8	178,637.1	210,812.1	245,004.4	281,072.2	319,002.4	358,691.7	392,554.9	424,745.6	458,196.8	492,776.0	528,371.1	564,946.7	602,546.2	641,990.6	680,630.0
Other	1.4	3.3	5.9	9.3	13.6	19.2	26.0	34.1	43.6	54.3	66.2	79.1	93.0	107.6	123.0	138.8	155.2	172.0	189.3	207.0	225.1
Room Heating	1.1	2.8	5.2	8.2	12.2	17.3	23.5	31.0	39.8	49.7	60.7	72.8	85.7	99.4	113.7	128.7	144.1	160.0	176.5	193.8	211.6
Space Heating	12,399.0	25,950.1	40,629.8	56,655.1	74,171.3	93,320.1	114,216.6	136,859.5	161,155.1	186,971.9	214,262.0	242,923.0	272,757.4	300,620.5	329,440.1	359,109.4	389,540.0	420,700.1	452,799.5	486,393.8	518,886.5
Water Heating	9,189.2	18,528.0	28,133.6	38,053.6	46,476.3	55,236.2	64,371.0	73,887.5	83,766.0	93,996.4	104,613.5	115,618.8	123,918.0	128,520.0	133,399.0	138,531.7	143,914.6	149,381.0	155,195.9	161,306.9	
Single_CZ2	38,329.1	78,348.8	120,302.9	164,588.0	207,938.9	254,117.6	303,439.0	356,008.7	411,747.5	470,524.9	532,397.0	597,240.7	650,598.3	700,743.2	753,055.2	807,302.7	863,287.8	920,939.4	980,311.9	1,042,727.4	1,105,526.9
Other	2.7	6.3	11.2	17.7	26.2	36.8	49.8	65.4	83.6	104.1	126.9	151.7	178.3	206.4	235.8	266.2	297.6	329.8	363.1	397.0	431.7
Room Heating	2.0	5.1	9.4	15.0	22.3	31.5	42.8	56.5	72.3	90.4	110.4	132.4	156.0	180.9	207.0	234.2	262.2	291.1	321.1	352.6	385.0
Space Heating	20,703.6	42,809.0	66,334.7	91,585.4	118,769.6	148,130.9	179,911.5	214,203.5	250,965.7	290,087.3	331,557.7	375,255.1	420,888.5	467,736.5	506,168.3	551,002.5	597,085.9	644,354.4	693,181.6	744,381.2	795,395.5
Water Heating	17,620.8	35,528.4	53,947.6	72,969.9	89,120.8	105,918.5	123,434.9	141,683.3	160,625.9	180,243.2	200,602.0	221,701.5	229,375.5	237,619.5	246,444.1	255,799.8	265,642.1	275,964.1	286,446.1	297,596.6	309,314.6
Single_CZ3	29,331.3	60,368.3	93,243.0	128,303.2	163,404.7	201,091.7	241,566.0	284,835.4	330,750.8	379,128.3	429,957.3	483,106.2	528,814.2	571,936.2	616,726.7	663,011.5	710,643.7	759,577.8	809,887.2	862,642.8	914,417.9
Other	1.8	4.2	7.5	11.9	17.5	24.7	33.4	43.9	56.0	69.8	85.1	101.7	119.6	138.4	158.1	178.5	199.6	221.2	243.5	266.2	289.5
Room Heating	1.3	3.4	6.3	10.1	14.9	21.1	28.7	37.9	48.5	60.6	74.1	88.8	104.6	121.3	138.8	157.0	175.9	195.2	215.4	236.5	258.2
Space Heating	17,520.3	36,556.6	57,090.4	79,408.6	103,697.7	130,143.5	158,899.9	189,961.1	223,218.2	258,485.3	295,711.6	334,765.7	375,385.6	413,040.7	451,977.8	492,055.5	533,156.7	575,239.8	618,581.4	663,924.1	707,907.9
Water Heating	11,807.9	23,804.0	36,138.8	48,872.6	59,674.4	70,902.4	82,603.9	94,787.6	107,428.0	120,512.6	134,086.5	148,149.9	153,204.4	158,635.8	164,452.0	170,620.4	177,111.6	183,921.5	190,847.0	198,215.9	205,962.3
Grand Total	98,948.6	203,211.1	313,235.4	430,159.2	545,498.6	669,129.0	801,824.2	943,745.0	1,094,536.9	1,253,700.9	1,421,272.5	1,596,848.6	1,742,516.2	1,880,881.6	2,025,034.3	2,174,360.1	2,328,338.4	2,486,791.9	2,650,034.8	2,821,761.6	2,992,450.7

C-6: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #6)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	464.0	966.0	1,480.2	2,006.1	2,528.9	3,062.1	3,596.0	4,141.3	4,697.2	5,263.5	5,842.5	6,434.9	6,983.3	7,527.6	8,084.0	8,595.4	9,117.7	9,595.7	10,015.8	10,457.2	10,810.3
Clothes Drying	0.9	1.9	2.9	4.0	5.0	6.1	7.2	8.4	9.5	10.7	11.9	13.1	14.4	14.7	15.0	15.3	15.7	16.0	16.5	16.9	17.4
Room Heating	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.1
Space Heating	245.3	508.8	778.4	1,054.0	1,335.0	1,621.5	1,903.2	2,190.7	2,483.8	2,782.3	3,087.3	3,399.4	3,717.7	4,032.1	4,352.7	4,622.7	4,898.5	5,180.0	5,467.8	5,766.4	6,002.2
Water Heating	217.7	455.2	698.8	948.0	1,188.6	1,434.2	1,685.3	1,941.9	2,203.5	2,470.1	2,742.8	3,021.9	3,250.5	3,480.2	3,715.6	3,956.6	4,202.7	4,398.8	4,530.6	4,672.9	4,789.7
Mfg_CZ2	139.9	291.3	446.3	604.9	762.5	923.2	1,084.2	1,248.5	1,416.0	1,586.7	1,761.2	1,939.8	2,105.2	2,269.5	2,437.4	2,592.3	2,750.5	2,895.4	3,022.8	3,156.6	3,262.9
Clothes Drying	0.3	0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.9	3.3	3.6	4.0	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.3
Room Heating	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Space Heating	73.2	152.0	232.5	314.9	398.8	484.5	568.6	654.4	742.0	831.1	922.2	1,015.4	1,110.5	1,204.5	1,300.3	1,381.5	1,464.3	1,548.9	1,635.4	1,725.1	1,795.7
Water Heating	66.4	138.7	212.9	288.8	362.1	436.8	513.3	591.4	671.1	752.2	835.2	920.2	990.1	1,060.4	1,132.3	1,206.0	1,281.2	1,341.4	1,382.1	1,426.1	1,461.5
Mfg_CZ3	167.8	349.0	534.5	724.2	913.0	1,105.6	1,298.5	1,495.6	1,696.4	1,901.0	2,110.1	2,324.1	2,523.4	2,721.0	2,922.9	3,106.9	3,294.9	3,468.5	3,623.2	3,785.4	3,913.7
Clothes Drying	0.3	0.7	1.0	1.4	1.7	2.1	2.5	2.9	3.3	3.7	4.1	4.6	5.0	5.1	5.2	5.3	5.4	5.6	5.7	5.9	6.0
Room Heating	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4
Space Heating	90.8	188.2	287.7	389.4	493.2	598.9	703.1	809.5	917.9	1,028.3	1,141.1	1,256.5	1,374.2	1,490.2	1,608.5	1,706.9	1,807.5	1,910.1	2,015.1	2,123.9	2,211.2
Water Heating	76.7	160.1	245.8	333.4	418.0	504.5	592.8	683.1	775.1	868.9	964.8	1,062.9	1,144.0	1,225.5	1,309.0	1,394.5	1,481.7	1,552.5	1,602.1	1,655.3	1,696.2
Multi_CZ1	16,153.3	34,022.1	52,334.4	71,071.3	89,426.4	108,164.1	126,797.4	145,846.0	165,285.3	185,106.0	205,387.7	226,162.4	244,173.4	261,950.0	280,169.1	296,914.8	314,060.9	330,931.5	347,400.7	364,742.2	380,698.4
Clothes Drying	62.9	132.5	204.2	277.5	352.3	428.6	506.6	586.1	667.2	749.8	834.2	920.5	1,008.6	1,028.6	1,050.3	1,073.6	1,098.6	1,125.1	1,153.4	1,185.1	1,219.1
Room Heating	4.9	10.7	16.6	22.7	28.9	35.2	41.7	48.3	55.1	61.9	69.0	76.2	83.5	91.0	98.7	106.5	114.4	122.5	130.7	139.3	148.1
Space Heating	9,671.4	20,485.2	31,576.1	42,926.5	54,509.4	66,326.8	77,876.6	89,680.7	101,725.2	114,004.0	126,564.7	139,427.2	152,560.6	165,622.6	178,956.0	190,653.7	202,597.3	214,793.0	227,279.4	240,324.8	252,425.4
Water Heating	6,414.1	13,393.7	20,537.5	27,844.7	34,535.7	41,373.5	48,372.6	55,530.8	62,837.8	70,290.3	77,919.8	85,738.5	90,520.7	95,207.8	100,064.0	105,081.0	110,250.6	114,891.0	118,837.2	123,093.1	126,905.8
Multi_CZ2	15,961.4	33,410.9	51,295.9	69,591.4	87,518.9	105,815.3	124,067.1	142,719.4	161,746.0	181,139.0	200,977.2	221,291.0	239,037.0	256,566.1	274,520.8	291,141.7	308,146.9	324,895.7	341,260.8	358,414.8	374,195.8
Clothes Drying	60.3	127.1	195.9	266.3	338.1	411.3	486.1	562.5	640.3	719.5	800.5	883.4	967.8	987.0	1,030.3	1,054.2	1,079.6	1,106.8	1,137.2	1,169.8	
Room Heating	4.7	10.3	16.0	21.8	27.7	33.8	40.0	46.4	52.8	59.4	66.2	73.1	80.2	87.3	94.7	102.2	109.8	117.5	125.4	133.7	142.1
Space Heating	9,178.4	19,456.5	29,999.0	40,788.4	51,799.3	63,033.3	74,062.3	85,333.4	96,833.4	108,556.6	120,548.3	132,827.1	145,363.7	157,843.2	170,581.2	181,827.0	193,307.0	205,027.1	217,024.7	229,558.0	241,178.1
Water Heating	6,717.9	13,817.0	21,085.0	28,514.9	35,353.9	42,337.0	49,478.8	56,777.2	64,219.4	71,803.4	79,562.2	87,507.4	92,625.3	97,648.5	102,837.0	108,182.3	113,676.0	118,671.5	123,003.2	127,586.0	131,705.8
Multi_CZ3	13,937.8	29,201.5	44,841.1	60,840.2	76,496.8	92,476.7	108,405.4	124,685.1	141,293.2	158,222.5	175,541.8	193,277.8	208,693.7	223,855.9	239,391.1	253,427.8	267,801.5	281,962.6	295,803.6	310,345.5	323,518.5
Clothes Drying	54.5	114.9	177.1	240.7	305.6	371.7	439.3	508.4	578.7	650.3	723.5	798.4	874.8	892.1	910.9	931.2	952.8	975.8	1,000.4	1,027.8	1,057.3
Room Heating	4.1	8.8	13.7	18.7	23.8	29.0	34.3	39.8	45.3	51.0	56.8	62.7	68.8	74.9	81.2	87.6	94.1	100.8	107.6	114.6	121.9
Space Heating	8,476.6	17,936.5	27,637.3	37,564.7	47,695.1	58,030.2	68,183.6	78,559.0	89,144.1	99,933.6	110,969.3	122,268.5	133,803.9	145,243.4	156,919.8	166,968.3	177,231.5	187,714.8	198,450.5	209,670.9	220,079.8
Water Heating	5,402.6	11,141.3	17,013.1	23,016.2	28,472.4	34,045.7	39,748.2	45,577.9	51,525.0	57,587.6	63,792.1	70,148.2	73,946.3	77,645.5	81,479.2	85,440.7	89,523.0	93,171.5	96,245.2	99,532.2	102,259.4
Single_CZ1	98,309.0	204,933.6	314,154.3	425,864.5	537,170.0	650,708.0	764,711.6	881,139.6	999,826.3	1,120,726.4	1,243,847.6	1,369,850.4	1,487,491.8	1,600,948.5	1,716,978.1	1,827,715.5	1,940,773.6	2,044,736.8	2,136,804.9	2,233,469.8	2,315,619.8
Clothes Drying	301.1	634.5	977.6	1,328.8	1,687.0	2,052.4	2,425.7	2,806.7	3,195.1	3,590.5	3,994.7	4,408.0	4,829.6	4,925.3	5,029.3	5,141.2	5,260.5	5,387.5	5,523.1	5,674.6	5,837.5
Other	15.8	31.8	48.3	65.2	82.4	99.9	117.7	135.9	154.4	173.2	192.4	212.0	231.9	252.2	272.8	293.7	315.0	336.6	358.5	380.7	403.4
Room Heating	12.5	27.0	42.0	57.4	73.1	89.1	105.4	122.1	139.2	156.6	174.4	192.6	211.2	230.2	249.5	269.2	289.2	309.6	330.5	352.2	374.5
Space Heating	53,710.7	111,647.2	170,899.7	231,496.9	293,293.6	356,295.1	418,631.3	482,275.8	547,136.9	613,190.3	680,223.3	748,812.0	818,779.7	884,755.6	952,119.2	1,013,063.2	1,075,257.4	1,138,730.9	1,203,602.8	1,270,908.2	1,329,065.7
Water Heating	44,268.9	92,593.1	142,186.6	192,916.2	242,033.9	292,171.6	343,431.5	395,799.1	449,200.7	503,615.8	559,262.8	616,225.8	663,439.3	710,785.2	759,307.3	808,948.2	859,651.4	899,972.2	926,990.1	956,154.1	979,938.7
Single_CZ2	186,405.3	388,574.3	595,677.0	807,500.2	1,018,496.8	1,233,726.6	1,449,793.4	1,670,457.0	1,895,403.1	2,124,546.1	2,357,890.5	2,596,698.6	2,819,812.4	3,035,292.4	3,255,650.6	3,466,448.8	3,681,647.3	3,879,574.6	4,054,911.5	4,238,959.4	4,394,089.5
Clothes Drying	577.3	1,216.6	1,874.7	2,548.0	3,234.9	3,935.6	4,651.4	5,382.1	6,126.7	6,885.1	7,660.0	8,452.6	9,261.1	9,444.6	9,644.0	9,858.5	10,087.3	10,330.8	10,590.9	10,881.4	11,193.6
Other	30.2	61.0	92.7	125.0	158.0	191.6	225.8	260.5	296.1	332.2	368.9	405.6	444.7	483.5	523.1	563.2	604.0	645.4	687.4	730.1	773.5
Room Heating	22.7	49.2	76.5	104.4	132.9	162.1	191.8	222.3	253.3	285.0	317.4	350.5	384.4	418.8	454.0	489.9	526.3	563.5	601.4	641.0	681.6
Space Heating	100,749.4	209,547.6	320,825.2	434,630.7	550,691.4	669,017.6	786,015.8	905,474.0	1,027,221.3	1,151,211.1	1,277,025.3	1,405,764.4	1,537,090.5	1,661,152.7	1,787,824.8	1,902,779.2	2,020,085.4				

C-7: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #7)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	318.6	659.1	1,007.2	1,363.2	1,712.4	2,068.6	2,422.0	2,783.1	3,151.2	3,526.2	3,909.6	4,302.1	4,645.9	4,987.2	5,336.6	5,637.2	5,945.1	6,260.4	6,564.8	6,882.5	7,139.6
Room Heating	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.1
Space Heating	229.5	476.9	729.8	988.5	1,252.3	1,521.3	1,785.4	2,055.1	2,330.0	2,610.0	2,896.2	3,189.0	3,487.8	3,782.2	4,082.5	4,332.0	4,586.9	4,847.2	5,113.5	5,390.0	5,603.4
Water Heating	89.1	182.2	277.3	374.5	459.9	547.1	636.3	727.6	820.7	915.7	1,012.9	1,112.6	1,157.5	1,204.4	1,253.4	1,304.4	1,357.4	1,412.3	1,450.4	1,491.5	1,535.2
Mfg_CZ2	95.6	197.8	302.3	409.1	513.9	620.8	726.7	835.0	945.4	1,057.9	1,172.9	1,290.7	1,393.5	1,495.7	1,600.4	1,690.9	1,783.5	1,878.5	1,970.0	2,065.6	2,142.8
Room Heating	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Space Heating	68.4	142.2	217.8	295.0	373.8	454.0	532.8	613.3	695.3	778.9	864.3	951.6	1,040.8	1,128.7	1,218.4	1,293.3	1,369.9	1,448.0	1,528.0	1,611.0	1,674.9
Water Heating	27.1	55.5	84.5	114.1	140.1	166.6	193.8	221.6	250.0	278.9	308.5	338.9	352.5	366.8	381.7	397.3	413.4	430.1	441.7	454.3	467.6
Mfg_CZ3	115.9	239.4	365.7	494.8	621.7	751.2	879.8	1,011.1	1,145.0	1,281.4	1,420.9	1,563.6	1,689.5	1,814.3	1,942.1	2,050.5	2,161.6	2,275.4	2,385.7	2,500.7	2,595.0
Room Heating	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4
Space Heating	85.2	176.6	270.1	365.8	463.3	562.7	660.5	760.5	862.3	966.0	1,072.0	1,180.4	1,291.0	1,399.8	1,510.8	1,601.8	1,694.8	1,789.8	1,886.9	1,987.8	2,066.9
Water Heating	30.7	62.8	95.5	129.0	158.4	188.4	219.1	250.5	282.6	315.3	348.7	383.0	398.3	414.3	431.1	448.5	466.6	485.3	498.4	512.6	527.7
Multi_CZ1	11,822.1	25,018.2	38,524.9	52,347.4	65,687.6	79,313.3	92,748.1	106,492.5	120,529.5	134,851.5	149,516.6	164,548.9	176,776.5	188,985.5	201,525.1	212,486.9	223,748.1	235,316.0	246,987.1	259,343.2	270,827.6
Room Heating	4.9	10.7	16.6	22.7	28.9	35.2	41.7	48.3	55.1	61.9	69.0	76.2	83.5	91.0	98.7	106.5	114.4	122.5	130.7	139.3	148.1
Space Heating	7,584.2	16,256.9	25,144.7	34,244.5	43,534.7	53,017.6	62,207.4	71,605.9	81,203.7	90,994.9	101,016.9	111,286.1	121,779.4	132,157.5	142,759.2	151,682.1	160,808.2	170,142.8	179,726.6	189,817.3	198,904.8
Water Heating	4,232.9	8,750.6	13,363.5	18,080.2	22,124.0	26,260.5	30,499.0	34,838.3	39,270.8	43,794.7	48,430.7	53,186.6	54,913.6	56,737.0	58,667.1	60,698.4	62,825.5	65,050.7	67,129.8	69,386.6	71,774.7
Multi_CZ2	11,819.1	24,834.0	38,158.3	51,790.5	64,961.0	78,408.8	91,731.2	105,354.4	119,260.3	133,442.1	147,957.9	162,831.0	175,000.2	187,168.7	199,657.5	210,714.6	222,061.3	233,704.6	245,441.8	257,801.6	269,318.2
Room Heating	4.7	10.3	16.0	21.8	27.7	33.8	40.0	46.4	52.8	59.4	66.2	73.1	80.2	87.3	94.7	102.2	109.8	117.5	125.4	133.7	142.1
Space Heating	7,153.0	15,354.0	23,759.3	32,365.4	41,152.2	50,121.5	58,860.8	67,798.1	76,924.6	86,234.5	95,763.1	105,526.2	115,501.8	125,377.8	135,465.9	144,019.9	152,766.8	161,711.5	170,893.5	180,560.6	189,258.1
Water Heating	4,661.4	9,469.7	14,383.0	19,403.3	23,781.1	28,253.5	32,830.3	37,510.0	42,282.9	47,148.2	52,128.5	57,231.7	59,418.2	61,703.5	64,096.9	66,592.6	69,184.8	71,875.6	74,422.9	77,107.3	79,917.9
Multi_CZ3	10,236.4	21,521.8	33,069.9	44,885.1	56,273.1	67,901.9	79,406.8	91,172.8	103,184.4	115,435.5	127,976.5	140,827.7	151,223.5	161,561.2	172,177.1	181,206.2	190,486.8	200,025.1	209,644.1	219,808.6	229,206.7
Room Heating	4.1	8.8	13.7	18.7	23.8	29.0	34.3	39.8	45.3	51.0	56.8	62.7	68.8	74.9	81.2	87.6	94.1	100.8	107.6	114.6	121.9
Space Heating	6,732.8	14,395.0	22,246.1	30,283.7	38,488.8	46,863.1	55,034.7	63,389.8	71,919.8	80,619.6	89,522.3	98,642.5	107,959.4	117,143.6	126,524.3	134,240.9	142,136.0	150,214.1	158,509.5	167,242.6	175,114.4
Water Heating	3,499.5	7,118.0	10,810.1	14,582.7	17,760.6	21,009.8	24,337.7	27,743.2	31,219.3	34,765.0	38,397.5	42,122.5	43,195.4	44,342.7	45,571.5	46,877.6	48,256.7	49,710.2	51,027.0	52,451.4	53,970.3
Single_CZ1	66,740.2	138,382.1	211,627.0	286,527.0	360,239.5	435,433.1	510,325.7	586,826.7	664,820.2	744,277.1	825,048.8	907,733.8	981,053.4	1,050,666.9	1,121,990.3	1,187,200.9	1,253,945.9	1,322,260.8	1,388,373.2	1,457,397.7	1,517,655.2
Other	15.8	31.8	48.3	65.2	82.4	99.9	117.7	135.9	154.4	173.2	192.4	212.0	231.9	252.2	272.8	293.7	315.0	336.6	358.5	380.7	403.4
Room Heating	12.5	27.0	42.0	57.4	73.1	89.1	105.4	122.1	139.2	156.6	174.4	192.6	211.2	230.2	249.5	269.2	289.2	309.6	330.5	352.2	374.5
Space Heating	49,170.1	102,419.7	156,873.9	212,568.4	269,369.9	327,283.9	384,490.6	442,905.0	502,445.2	563,087.3	624,596.7	687,542.0	751,771.8	811,913.7	873,338.0	928,251.8	984,321.5	1,041,574.3	1,100,130.3	1,160,988.4	1,212,573.2
Water Heating	17,541.8	35,903.6	54,662.8	73,836.0	90,714.2	107,960.2	125,611.9	143,663.6	162,081.3	180,859.9	200,085.3	219,787.2	228,838.5	238,273.4	248,130.0	258,386.2	269,020.1	280,040.2	287,554.0	295,676.4	304,304.0
Single_CZ2	125,627.0	260,605.0	398,610.4	539,736.9	678,539.8	820,136.0	961,100.9	1,105,099.6	1,251,914.4	1,401,490.3	1,553,530.9	1,709,180.1	1,846,817.4	1,977,741.6	2,111,881.6	2,234,894.8	2,360,803.0	2,489,673.3	2,614,273.1	2,744,394.9	2,857,541.9
Other	30.2	61.0	92.7	125.0	158.0	191.6	225.8	260.7	296.1	332.2	368.9	406.5	444.7	483.5	523.1	563.2	604.0	645.4	687.4	730.1	773.5
Room Heating	22.7	49.2	76.5	104.4	132.9	162.1	191.8	222.3	253.3	285.0	317.4	350.5	384.4	418.8	454.0	489.9	526.3	563.5	601.4	641.0	681.6
Space Heating	91,936.6	191,647.7	293,622.4	397,922.9	504,299.5	612,762.8	719,815.6	829,133.9	940,565.2	1,054,064.5	1,169,170.3	1,286,969.2	1,407,178.2	1,519,937.0	1,635,101.8	1,738,372.2	1,843,812.0	1,951,472.0	2,061,584.1	2,176,048.4	2,272,567.4
Water Heating	33,637.4	68,847.1	104,818.8	141,584.6	173,949.3	207,019.5	240,867.7	275,482.8	310,799.7	346,808.7	383,674.3	421,453.9	438,810.2	456,902.2	475,802.8	495,469.5	515,860.7	536,992.3	551,400.3	566,975.5	583,519.4
Single_CZ3	90,616.3	187,656.1	286,852.9	388,286.4	488,288.6	590,291.1	692,018.3	795,918.1	901,831.2	1,009,719.5	1,119,414.0	1,231,693.3	1,332,039.0	1,426,876.1	1,524,014.7	1,612,155.2	1,702,366.6	1,794,696.1	1,884,445.9	1,978,074.4	2,060,564.0
Other	20.3	40.9	62.2	83.9	106.0	128.5	151.4	174.8	198.6	222.7	247.4	272.6	298.2	324.3	350.8	377.7	405.0	432.8	461.0	489.6	518.7
Room Heating	15.2	33.0	51.3	70.0	89.1	108.7	128.6	149.0	169.9	191.1	212.8	235.1	257.8	280.9	304.5	328.5	353.0	377.9	403.3	429.8	457.0
Space Heating	68,161.4	141,704.9	216,897.8	293,797.7	372,220.4	452,172.7	531,331.0	612,150.1	694,514.6	778,392.6	863,505.5	950,593.4	1,039,446.8	1,122,300.6	1,206,916.7	1,282,023.7	1,358,718.3	1,437,037.4	1,517,134.7	1,600,334.0	1,671,749.0
Water Heating	22,419.3	45,877.3	69,841.6	94,334.8	115,873.1	137,881.2	160,407.3	183,444.1	206,948.2	230,913.1	255,448.3	280,592.3	292,036.3	303,970.4	316,442.8	329,425.3	342,890.2	356,848.1	366,446.9	376,820.9	387,839.3
Grand Total	317,391.1	659,113.5	1,008,518.6	1,365,840.4	1																

C-8: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #8)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Mfg_CZ1	101.6	206.9	317.0	433.3	550.8	676.1	806.0	945.5	1,094.6	1,253.1	1,421.1	1,598.2	1,760.6	1,926.4	2,098.7	2,252.8	2,412.0	2,576.6	2,745.0	2,920.9	3,096.8	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4
Space Heating	71.2	145.3	223.2	305.8	393.8	487.8	584.5	688.6	800.3	919.3	1,045.7	1,179.1	1,318.6	1,460.0	1,606.4	1,733.2	1,863.9	1,998.8	2,137.5	2,282.0	2,425.3	
Water Heating	30.4	61.5	93.8	127.5	157.0	188.3	221.5	256.8	294.2	333.7	375.3	419.0	441.8	466.2	492.2	519.4	547.8	577.6	607.3	638.5	671.1	
Mfg_CZ2	30.3	61.7	94.6	129.3	164.4	201.9	240.8	282.5	327.2	374.8	425.2	478.4	527.1	576.9	628.6	675.1	723.1	772.8	823.6	876.7	929.8	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	21.0	43.0	66.0	90.5	116.6	144.5	173.3	204.3	237.6	273.1	310.8	350.7	392.5	434.8	478.6	516.8	556.2	596.8	638.6	682.1	725.2	
Water Heating	9.3	18.7	28.6	38.8	47.8	57.3	67.5	78.2	89.6	101.6	114.3	127.6	134.6	142.0	149.9	158.2	166.9	175.9	185.0	194.5	204.4	
Mfg_CZ3	37.5	76.3	116.9	159.6	202.8	248.7	296.3	347.2	401.6	459.2	520.2	584.3	643.5	703.7	766.3	821.5	878.5	937.5	997.8	1,060.8	1,123.9	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	27.0	55.0	84.4	115.5	148.5	183.6	219.8	258.5	300.0	344.0	390.7	439.8	491.2	543.1	596.8	642.8	690.1	738.9	789.2	841.5	893.4	
Water Heating	10.5	21.3	32.4	44.1	54.3	65.1	76.5	88.7	101.6	115.1	129.5	144.5	152.2	160.5	169.4	178.7	188.3	198.5	208.6	219.3	230.4	
Multi_CZ1	3,440.1	7,055.4	10,878.0	14,959.7	19,027.0	23,442.2	28,046.5	33,084.0	38,561.6	44,470.9	50,814.2	57,569.6	64,424.2	69,475.8	75,815.2	81,610.9	87,628.2	93,893.2	100,373.4	107,233.6	114,245.5	
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8	
Space Heating	1,862.8	3,870.1	6,036.5	8,404.0	11,010.6	13,897.6	16,896.4	20,246.3	23,954.6	28,013.2	32,418.1	37,148.3	42,161.0	47,304.1	52,668.5	57,429.3	62,357.6	67,474.8	72,767.5	78,352.2	84,023.1	
Water Heating	1,577.1	3,184.8	4,840.7	6,554.3	8,014.4	9,541.6	11,145.9	12,832.0	14,599.5	16,448.0	18,383.9	20,406.4	21,245.1	22,150.5	23,122.0	24,153.2	25,238.5	26,382.3	27,565.7	28,837.0	30,173.6	
Multi_CZ2	3,265.3	6,700.1	10,341.9	14,242.3	18,142.5	22,392.9	26,867.1	31,779.0	37,135.9	42,929.8	49,162.1	55,809.8	61,609.6	67,617.2	73,912.0	79,727.3	85,762.0	92,042.7	98,531.0	105,367.6	112,350.0	
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8	
Space Heating	1,731.4	3,601.5	5,623.6	7,837.8	10,280.8	12,992.6	15,833.8	19,011.5	22,533.0	26,390.6	30,579.9	35,080.8	39,852.2	44,752.8	49,864.9	54,430.6	59,156.2	64,062.4	69,136.4	74,490.4	79,925.8	
Water Heating	1,533.8	3,098.2	4,717.5	6,403.3	7,859.7	9,397.5	11,029.3	12,761.9	14,595.6	16,529.8	18,570.4	20,714.6	21,740.1	22,844.0	24,023.4	25,269.6	26,575.0	27,945.7	29,356.1	30,834.7	32,377.5	
Multi_CZ3	3,055.1	6,252.3	9,623.7	13,211.9	16,777.1	20,630.4	24,651.8	29,030.3	33,770.2	38,864.1	44,314.8	50,104.7	55,096.8	60,234.3	65,609.0	70,413.9	75,401.9	80,593.9	85,961.8	91,633.2	97,425.0	
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1	
Space Heating	1,689.2	3,502.6	5,454.5	7,581.1	9,914.7	12,491.0	15,184.0	18,180.5	21,486.6	25,095.3	29,003.6	33,193.6	37,628.2	42,163.8	46,891.4	51,007.9	55,269.8	59,695.7	64,273.7	69,103.4	74,008.5	
Water Heating	1,365.8	2,749.3	4,168.5	5,629.7	6,860.7	8,136.9	9,464.3	10,845.1	12,277.4	13,760.8	15,301.2	16,898.8	17,453.7	18,053.0	18,697.3	19,382.7	20,105.6	20,868.5	21,655.1	22,493.3	23,376.3	
Single_CZ1	21,714.3	44,164.0	67,618.7	92,314.0	117,311.2	143,890.7	171,467.4	200,984.5	232,446.3	265,812.9	301,102.7	338,257.3	372,619.8	406,631.1	441,968.1	475,209.3	509,488.1	544,910.8	581,127.5	618,943.2	657,079.8	
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0	
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3	
Space Heating	15,788.8	32,168.7	49,323.5	67,438.2	86,639.1	107,074.7	128,108.2	150,656.9	174,726.7	200,284.2	227,330.5	255,821.6	285,567.2	314,646.5	344,748.1	372,485.2	401,020.5	430,437.7	460,674.4	492,190.0	523,757.5	
Water Heating	5,924.4	11,992.9	18,290.8	24,868.6	30,661.1	36,800.0	43,336.8	50,297.2	57,679.6	65,477.4	73,707.8	82,356.7	86,957.8	91,872.7	97,089.9	102,575.2	108,299.1	114,284.2	120,243.0	126,521.4	133,068.0	
Single_CZ2	40,633.5	82,671.3	126,617.2	172,920.6	219,784.1	269,663.1	321,432.7	376,902.2	436,081.9	498,894.8	565,371.6	635,398.1	700,047.7	764,147.3	830,766.0	893,616.6	958,436.4	1,025,428.7	1,093,923.4	1,165,456.9	1,237,572.0	
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2	
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4	
Space Heating	29,271.3	59,669.8	91,535.3	125,220.1	160,969.2	199,067.2	238,290.2	280,397.8	325,403.4	373,242.4	423,912.5	477,327.0	533,124.0	587,767.1	644,347.7	696,644.5	750,451.8	805,929.1	862,957.9	922,411.6	981,931.3	
Water Heating	11,360.5	22,997.0	35,073.5	47,686.9	58,794.3	70,566.0	83,100.7	96,447.6	110,603.7	125,556.4	141,338.8	157,923.5	166,746.3	176,170.9	186,175.2	196,693.6	207,669.3	219,146.1	230,572.6	242,611.6	255,165.1	
Single_CZ3	29,953.2	60,865.0	93,109.3	126,996.6	161,317.5	197,715.2	235,443.3	275,713.7	318,528.7	363,836.8	411,671.9	461,961.7	508,711.6	554,774.5	602,591.3	647,229.9	693,246.1	740,777.9	789,391.5	840,121.7	891,319.7	
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4	
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5	
Space Heating	22,344.9	45,468.7	69,634.2	95,086.0	121,983.4	150,519.4	179,882.5	211,252.3	244,633.0	279,981.3	317,308.3	356,559.4	397,482.0	437,319.0	478,525.8	516,213.7	554,975.5	594,920.9	635,967.9	678,725.2	721,608.9	
Water Heating	7,607.1	15,393.3	23,469.4	31,901.5	39,320.3	47,175.7	55,532.7	64,423.4	73,845.5	83,791.1	94,282.8	105,303.2	111,110.7	117,315.1	123,902.4	130,829.5	138,059.2	145,620.0	153,160.1	161,105.6	169,391.9	
Grand Total	102,230.9	208,053.0	318,717.3	435,367.3	553,277.5	678,861.2	809,251.9	949,069.0	1,098,348.0	1,256,896.3	1,424,803.7	1,601,762.2	1,764,440.8	1,926,087.3	2,094,155.2	2,251,557.4	2,413,976.3	2,581,934.0	2,753,875.0	2,933,614.6	3,115,142.6	

C-9: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #9)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	90.4	187.0	290.5	402.4	516.4	640.7	776.0	922.6	1,079.7	1,246.5	1,422.9	1,608.2	1,772.6	1,939.2	2,112.0	2,260.3	2,413.5	2,571.4	2,732.2	2,901.5	3,066.2
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5
Space Heating	53.7	112.2	176.1	246.2	323.3	408.2	501.6	603.4	713.3	830.5	954.8	1,085.7	1,222.1	1,359.0	1,500.3	1,615.7	1,734.6	1,856.9	1,983.1	2,115.7	2,242.1
Water Heating	36.7	74.7	114.4	156.2	193.1	232.4	274.4	319.1	366.3	415.9	468.0	522.4	550.3	580.0	611.4	644.3	678.5	714.1	748.7	785.3	823.6
Mfg_CZ2	18.4	38.7	60.9	85.4	110.4	138.4	169.6	203.9	241.4	281.6	324.5	370.0	408.8	448.2	489.3	531.8	575.6	620.7	666.5	714.7	761.3
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	7.2	15.9	26.0	37.8	51.6	67.6	86.0	106.7	129.8	154.9	182.0	210.8	241.1	271.5	303.0	335.5	368.8	403.1	438.3	475.4	510.3
Water Heating	11.2	22.8	34.8	47.6	58.8	70.8	83.6	97.2	111.6	126.7	142.5	159.1	167.6	176.7	186.2	196.2	206.7	217.5	228.0	239.2	250.8
Mfg_CZ3	33.1	68.3	106.1	146.7	188.1	233.1	282.1	334.9	391.4	451.4	514.7	581.2	640.5	700.4	762.4	814.8	868.9	924.6	981.4	1,041.3	1,099.6
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Space Heating	20.4	42.5	66.5	92.7	121.4	152.9	187.3	224.8	265.1	308.0	353.5	401.2	451.0	500.8	552.2	593.3	635.7	679.3	724.4	771.7	817.0
Water Heating	12.7	25.8	39.6	54.0	66.7	80.3	94.7	110.1	126.3	143.3	161.2	179.9	189.4	199.5	210.2	221.4	233.0	245.1	256.9	269.4	282.5
Multi_CZ1	3,727.5	7,731.3	12,009.1	16,619.4	21,210.3	26,220.2	31,691.5	37,636.8	44,042.8	50,882.8	58,149.5	65,817.2	72,252.9	78,842.9	85,715.2	91,843.5	98,195.5	104,760.9	111,579.2	118,861.0	126,225.0
Room Heating	0.3	0.9	1.7	2.7	4.0	5.7	7.8	10.3	13.3	16.7	20.5	24.7	29.2	33.9	38.9	44.1	49.4	54.9	60.6	66.6	72.8
Space Heating	1,756.1	3,743.6	5,943.4	8,402.6	11,160.2	14,255.2	17,720.6	21,566.1	25,782.1	30,344.3	35,238.6	40,440.3	45,906.1	51,454.6	57,212.4	62,159.6	67,269.3	72,532.4	77,990.7	83,802.9	89,620.4
Water Heating	1,971.1	3,986.8	6,064.0	8,214.1	10,046.1	11,959.3	13,963.1	16,060.3	18,247.4	20,521.8	22,890.3	25,352.3	26,317.5	27,354.3	28,463.9	29,639.9	30,876.8	32,173.5	33,528.0	34,991.5	36,531.9
Multi_CZ2	2,669.0	5,600.7	8,793.5	12,304.9	15,804.0	19,715.1	24,080.6	28,914.1	34,204.0	39,922.8	46,057.4	52,578.5	57,917.0	63,407.3	69,161.8	75,148.2	81,339.8	87,724.7	94,338.1	101,355.3	108,430.7
Room Heating	0.3	0.9	1.6	2.6	3.8	5.5	7.5	9.9	12.8	16.1	19.7	23.7	28.0	32.6	37.3	42.3	47.4	52.7	58.2	63.9	69.8
Space Heating	735.5	1,688.7	2,827.7	4,195.3	5,831.6	7,774.2	10,052.8	12,677.2	15,640.2	18,918.4	22,493.9	26,341.2	30,422.0	34,568.8	38,896.3	43,380.9	48,003.4	52,754.5	57,675.9	62,917.5	68,141.4
Water Heating	1,933.2	3,911.1	5,964.2	8,107.1	9,968.5	11,935.5	14,020.3	16,227.0	18,551.0	20,988.3	23,543.8	26,213.6	27,467.0	28,805.9	30,228.2	31,725.1	33,289.0	34,917.5	36,604.0	38,373.9	40,219.4
Multi_CZ3	3,358.7	6,938.8	10,746.8	14,830.3	18,880.3	23,273.4	28,044.0	33,201.3	38,732.9	44,616.9	50,848.9	57,408.9	62,882.6	68,460.8	74,270.7	79,314.4	84,542.4	89,946.6	95,556.0	101,532.0	107,566.7
Room Heating	0.3	0.7	1.4	2.2	3.3	4.7	6.4	8.5	11.0	13.8	16.9	20.3	24.0	27.9	32.0	36.3	40.7	45.2	49.9	54.8	59.9
Space Heating	1,652.4	3,504.3	5,541.7	7,805.3	10,328.6	13,145.1	16,283.4	19,752.0	23,542.2	27,633.1	32,013.2	36,661.3	41,539.9	46,476.3	51,595.9	55,904.1	60,354.9	64,940.2	69,696.0	74,758.4	79,828.1
Water Heating	1,706.0	3,433.8	5,203.8	7,022.8	8,548.4	10,123.7	11,754.2	13,440.7	15,179.7	16,970.0	18,818.8	20,727.2	21,318.6	21,956.5	22,642.9	23,374.1	24,146.9	24,961.2	25,810.2	26,718.8	27,678.7
Single_CZ1	21,711.6	44,692.8	69,114.9	95,259.5	121,940.3	150,719.9	180,754.7	213,094.1	247,624.9	284,194.2	322,727.0	363,145.8	399,663.7	435,321.0	472,305.0	506,381.0	541,515.8	577,668.5	614,488.2	653,210.8	691,590.6
Other	1.1	2.6	4.8	7.6	11.2	15.9	21.7	28.7	36.9	46.2	56.6	67.9	80.1	92.9	106.3	120.2	134.6	149.3	164.4	179.9	195.7
Room Heating	0.9	2.3	4.2	6.7	10.1	14.4	19.7	26.1	33.7	42.3	51.9	62.5	73.8	85.8	98.4	111.5	125.0	138.9	153.3	168.4	184.0
Space Heating	14,557.3	30,143.1	46,832.4	64,839.9	84,313.6	105,409.4	127,237.9	150,841.1	176,133.0	202,989.6	231,327.0	261,090.1	292,071.6	321,853.2	352,629.2	380,199.5	408,560.7	437,680.4	467,699.9	499,227.2	530,095.3
Water Heating	7,152.3	14,544.8	22,273.6	30,405.3	37,605.3	45,280.2	53,475.4	62,198.1	71,421.3	81,116.1	91,291.5	101,925.3	107,438.3	113,289.1	119,471.1	125,949.8	132,695.6	139,700.0	146,470.6	153,635.3	161,115.6
Single_CZ2	33,168.4	68,678.5	106,729.7	147,831.2	189,720.5	235,389.1	283,195.1	335,164.5	391,108.7	450,747.0	513,902.2	580,421.5	639,243.2	696,394.8	755,882.8	817,441.1	880,848.5	946,023.9	1,012,303.7	1,082,024.8	1,150,851.5
Other	2.1	5.1	9.1	14.5	21.6	30.5	41.7	55.1	70.8	88.6	108.5	130.2	153.5	178.1	203.9	230.6	258.1	286.3	315.3	344.9	375.3
Room Heating	1.6	4.1	7.6	12.3	18.4	26.2	35.8	47.6	61.3	77.0	94.5	113.7	134.3	156.1	179.0	202.8	227.4	252.7	278.9	306.4	334.8
Space Heating	19,449.7	40,778.9	64,002.2	89,500.7	117,570.4	148,505.1	180,575.7	215,793.5	254,022.4	295,036.8	338,642.9	384,730.3	432,936.7	478,822.5	526,407.6	575,492.1	625,911.9	677,602.7	730,844.3	786,769.4	841,193.6
Water Heating	13,715.0	27,890.4	42,710.8	58,303.8	72,110.2	86,827.2	102,541.9	119,268.3	136,954.2	155,544.6	175,056.3	195,447.3	206,018.7	217,238.0	229,092.4	241,515.6	254,451.0	267,882.2	280,865.3	294,604.0	308,947.8
Single_CZ3	29,740.1	61,138.4	94,432.8	129,989.2	166,279.7	205,315.3	246,018.0	289,736.9	336,323.4	385,580.4	437,419.6	491,743.5	541,104.0	589,043.8	638,739.6	684,078.2	730,821.9	778,918.1	827,944.4	879,489.8	930,651.8
Other	1.4	3.4	6.1	9.7	14.5	20.5	27.9	36.9	47.5	59.4	72.8	87.3	103.0	119.4	136.7	154.6	173.0	192.0	211.4	231.3	251.7
Room Heating	1.1	2.8	5.1	8.2	12.3	17.5	24.0	31.9	41.1	51.6	63.4	76.2	90.1	104.7	120.1	136.0	152.5	169.5	187.0	205.5	224.5
Space Heating	20,560.8	42,475.3	65,857.8	90,992.4	118,068.4	147,289.5	177,519.6	210,098.4	244,911.3	281,797.3	320,655.6	361,416.2	403,804.2	444,341.7	486,213.9	523,351.2	561,553.4	600,778.8	641,212.7	683,664.8	725,331.7
Water Heating	9,176.8	18,656.8	28,563.8	38,978.9	48,184.5	57,987.8	68,446.4	79,569.7	91,323.5	103,672.1	116,627.8	130,163.7	137,106.8	144,477.9	152,269.0	160,436.4	168,942.9	177,777.9	186,333.2	195,388.1	204,843.9
Grand Total	94,517.3	195,074.4	302,284.3	417,468.9	534,650.0	661,645.2	795,011.6	939,209.0	1,093,749.2	1,257,923.6	1,431,366.7	1,613,674.8	1,775,885.3	1,934,558.3	2,099,438.8	2,257,813.4	2,421,122.0	2,589,159.5	2,760,589.8	2,941,131.1	3,120,243.3

C-10: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #10)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	71.5	146.9	226.5	311.3	392.6	480.5	575.5	678.2	788.2	905.3	1,029.6	1,160.7	1,259.8	1,358.5	1,462.0	1,569.8	1,681.5	1,796.7	1,915.7	2,041.1	2,165.4
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Space Heating	24.3	51.6	81.8	115.6	153.6	196.3	244.4	298.1	357.3	421.8	491.5	565.9	644.5	721.1	801.0	883.7	968.9	1,056.5	1,147.2	1,242.7	1,335.5
Water Heating	47.2	95.3	144.7	195.7	239.0	284.1	331.0	380.0	430.8	483.4	538.0	594.5	615.1	637.1	660.8	685.8	712.1	739.8	767.9	797.9	829.4
Mfg_CZ2	21.6	44.3	68.3	93.9	118.4	144.9	173.6	204.6	237.9	273.3	310.9	350.5	380.4	410.2	441.5	474.1	507.9	542.8	578.7	616.7	654.3
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Space Heating	7.2	15.3	24.2	34.3	45.6	58.4	72.8	88.9	106.7	126.0	147.0	169.4	193.0	216.1	240.2	265.2	290.9	317.3	344.7	373.5	401.5
Water Heating	14.4	29.0	44.1	59.6	72.8	86.5	100.8	115.7	131.2	147.2	163.9	181.1	187.3	194.1	201.2	208.9	216.9	225.3	233.9	243.0	252.6
Mfg_CZ3	25.4	52.1	80.4	110.5	139.4	170.6	204.3	240.7	279.7	321.1	365.1	411.5	446.9	481.8	518.5	556.7	596.2	637.0	679.1	723.6	767.6
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Space Heating	9.0	19.1	30.3	42.7	56.6	72.2	89.7	109.2	130.7	154.0	179.2	206.0	234.4	261.8	290.4	320.0	350.5	381.9	414.4	448.6	481.8
Water Heating	16.4	33.0	50.1	67.8	82.7	98.3	114.5	131.4	149.0	167.1	185.9	205.4	212.4	219.9	228.0	236.5	245.5	255.0	264.6	274.8	285.6
Multi_CZ1	3,343.4	6,909.6	10,680.6	14,701.5	18,479.2	22,570.9	27,013.2	31,820.5	36,989.5	42,505.3	48,368.7	54,564.7	58,955.5	63,410.5	68,107.7	73,020.8	78,127.7	83,420.0	88,952.1	94,910.9	101,004.4
Room Heating	0.4	1.1	2.0	3.3	4.8	6.8	9.3	12.3	15.7	19.6	24.0	28.8	33.9	39.3	45.0	50.9	57.0	63.3	69.8	76.6	83.7
Space Heating	722.6	1,614.4	2,634.0	3,813.0	5,179.6	6,762.6	8,587.4	10,666.3	13,000.8	15,578.8	18,391.4	21,423.2	24,647.2	27,847.8	31,200.8	34,687.2	38,291.8	42,006.7	45,887.6	50,067.1	54,288.4
Water Heating	2,620.4	5,294.1	8,044.6	10,885.3	13,294.8	15,801.5	18,416.5	21,141.9	23,973.0	26,906.9	29,953.3	33,112.7	34,274.4	35,523.4	36,861.9	38,282.6	39,779.0	41,350.1	42,994.8	44,767.2	46,632.4
Multi_CZ2	3,248.8	6,713.2	10,393.5	14,336.7	18,074.0	22,144.3	26,585.8	31,414.0	36,623.9	42,199.6	48,140.0	54,427.2	59,004.4	63,670.0	68,583.4	73,716.4	79,045.2	84,560.1	90,310.2	96,445.0	102,709.6
Room Heating	0.4	1.1	2.0	3.1	4.6	6.6	8.9	11.8	15.1	18.8	23.0	27.6	32.5	37.7	43.2	48.8	54.7	60.7	67.0	73.5	80.3
Space Heating	681.8	1,526.0	2,493.0	3,612.9	4,912.9	6,420.8	8,160.9	10,145.1	12,374.8	14,838.5	17,527.6	20,427.1	23,511.2	26,580.6	29,796.3	33,140.1	36,597.2	40,160.1	43,882.5	47,891.6	51,940.4
Water Heating	2,566.6	5,186.1	7,898.6	10,720.7	13,156.5	15,717.0	18,416.0	21,257.1	24,234.0	27,342.2	30,589.4	33,972.5	35,460.7	37,051.6	38,743.9	40,527.4	42,393.4	44,339.2	46,360.8	48,479.8	50,688.9
Multi_CZ3	2,920.8	6,011.5	9,265.8	12,718.6	15,938.2	19,404.0	23,144.6	27,170.6	31,478.5	36,056.8	40,908.0	46,021.0	49,544.7	53,084.4	56,815.8	60,718.6	64,775.3	68,979.8	73,371.1	78,088.5	82,905.3
Room Heating	0.4	0.9	1.7	2.7	4.0	5.6	7.7	10.1	12.9	16.2	19.8	23.7	27.9	32.4	37.0	41.9	46.9	52.1	57.4	63.1	68.9
Space Heating	652.1	1,448.6	2,354.8	3,397.7	4,601.3	5,990.0	7,585.6	9,398.4	11,429.5	13,668.6	16,108.3	18,735.6	21,527.1	24,276.3	27,155.8	30,149.7	33,244.8	36,434.5	39,766.1	43,352.2	46,973.5
Water Heating	2,268.3	4,562.0	6,909.3	9,318.2	11,332.9	13,408.4	15,551.3	17,762.1	20,036.1	22,372.0	24,779.9	27,261.7	27,989.7	28,775.8	29,623.0	30,526.9	31,483.6	32,493.2	33,547.6	34,673.3	35,863.0
Single_CZ1	20,359.8	41,608.4	63,875.7	87,370.1	110,388.5	134,893.4	161,050.2	188,914.1	218,443.0	249,568.4	282,321.2	316,637.2	344,975.4	371,519.9	399,205.8	427,911.5	457,533.1	488,033.5	519,442.3	552,455.9	585,686.4
Other	1.4	3.3	5.9	9.3	13.6	19.2	26.0	34.1	43.6	54.3	66.2	79.1	93.0	107.6	123.0	138.8	155.2	172.0	189.3	207.0	225.1
Room Heating	1.1	2.8	5.2	8.2	12.2	17.3	23.5	31.0	39.8	49.7	60.7	72.8	85.7	99.4	113.7	128.7	144.1	160.0	176.5	193.8	211.6
Space Heating	11,168.0	23,074.3	35,731.2	49,299.0	63,886.3	79,620.7	96,629.7	114,961.4	134,593.6	155,468.1	177,580.8	200,868.5	225,177.9	247,394.9	270,449.1	294,245.0	318,702.1	343,786.9	369,695.5	396,859.1	423,942.8
Water Heating	9,189.2	18,528.0	28,133.6	38,053.6	46,476.3	55,236.2	64,371.0	73,887.5	83,766.0	93,996.4	104,613.5	115,616.8	119,618.8	123,918.0	128,520.0	133,399.0	138,531.7	143,914.6	149,381.0	155,195.9	161,306.9
Single_CZ2	36,857.4	75,397.8	115,844.3	158,589.7	200,372.7	244,955.6	292,650.0	343,562.2	397,616.3	454,681.7	514,807.6	577,868.5	629,411.4	677,709.6	728,143.0	780,481.9	834,529.9	890,215.5	947,595.0	1,007,986.5	1,068,727.3
Other	2.7	6.3	11.2	17.7	26.2	36.8	49.8	65.4	83.6	104.1	126.9	151.7	178.3	206.4	235.8	266.2	297.6	329.8	363.1	397.0	431.7
Room Heating	2.0	5.1	9.4	15.0	22.3	31.5	42.8	56.5	72.3	90.4	110.4	132.4	156.0	180.9	207.0	234.2	262.2	291.1	321.1	352.6	385.0
Space Heating	19,231.9	39,858.0	61,876.1	85,587.1	111,203.4	138,968.8	169,122.5	201,757.0	236,834.4	274,244.1	313,968.3	355,882.9	399,701.6	439,702.9	481,256.1	524,181.6	568,328.0	613,630.5	660,464.7	709,640.3	758,596.0
Water Heating	17,620.8	35,528.4	53,947.6	72,969.9	89,120.8	105,918.5	123,434.9	141,683.3	160,625.9	180,243.2	200,602.0	221,701.5	229,375.5	237,619.5	246,444.1	255,799.8	265,642.1	275,964.1	286,446.1	297,596.6	309,314.6
Single_CZ3	27,673.3	56,520.5	86,718.7	118,542.7	149,801.9	183,022.6	218,422.6	256,073.5	295,918.2	337,866.8	381,964.7	428,130.3	466,659.7	502,446.6	539,747.9	578,404.0	618,278.0	659,322.3	701,593.2	746,002.0	790,742.6
Other	1.8	4.2	7.5	11.9	17.5	24.7	33.4	43.9	56.0	69.8	85.1	101.7	119.6	138.4	158.1	178.5	199.6	221.2	243.5	266.2	289.5
Room Heating	1.3	3.4	6.3	10.1	14.9	21.1	28.7	37.9	48.5	60.6	74.1	88.8	104.6	121.3	138.8	157.0	175.9	195.2	215.4	236.5	258.2
Space Heating	15,862.2	32,708.8	50,566.0	69,648.2	90,095.0	112,074.4	135,756.5	161,204.2	188,385.6	217,223.8	247,719.1	279,789.9	313,231.2	343,551.1	374,999.0	407,448.1	440,790.9	474,984.3	510,287.4	547,283.4	584,232.6
Water Heating	11,807.9	23,804.0	36,138.8	48,872.6	59,674.4	70,902.4	82,603.9	94,787.6	107,428.0	120,512.6	134,086.5	148,149.9	153,204.4	158,635.8	164,452.0	170,620.4	177,111.6	183,921.5	190,847.0	198,215.9	205,962.3
Grand Total	94,521.9	193,404.3	297,153.8	406,775.2	513,705.0	627,786.8	749,819.9	880,078.4	1,018,375.1	1,164,378.4	1,318,215.9	1,479,571.6	1,610,638.3	1,734,091.7	1,863,025.7	1,996,853.7	2,135,074.9	2,277,507.7	2,424,437.4	2,579,270.2	2,735,363.0

C-11: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #11)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	48.6	100.4	156.1	216.8	277.7	345.4	420.9	504.9	597.4	698.4	807.6	924.5	1,025.6	1,129.1	1,237.8	1,351.0	1,468.3	1,589.9	1,714.4	1,845.1	1,974.9
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
Space Heating	19.7	42.1	67.2	95.9	129.0	167.2	211.4	261.9	319.1	382.6	452.3	527.7	608.2	689.5	774.6	862.9	954.1	1,048.5	1,145.7	1,247.8	1,347.6
Water Heating	28.8	58.3	89.0	120.9	148.7	178.2	209.5	242.9	278.3	315.7	355.2	396.7	417.3	439.4	463.0	487.9	513.9	541.2	568.3	597.0	627.0
Mfg_CZ2	14.8	30.5	47.5	65.9	84.4	105.0	128.0	153.6	181.7	212.5	245.7	281.4	312.1	343.7	376.8	411.4	447.1	484.2	522.2	562.1	601.7
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	6.0	12.7	20.4	29.1	39.1	50.7	64.2	79.6	97.0	116.3	137.5	160.5	185.0	209.8	235.8	262.7	290.5	319.3	349.0	380.1	410.6
Water Heating	8.8	17.8	27.1	36.8	45.3	54.3	63.8	74.0	84.8	96.2	108.2	120.8	127.1	133.8	141.0	148.6	156.5	164.8	173.1	181.8	191.0
Mfg_CZ3	17.1	35.4	55.1	76.4	97.9	121.7	148.2	177.6	210.1	245.4	283.7	324.6	360.0	396.1	434.1	473.6	514.5	557.0	600.4	646.1	691.4
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	7.2	15.2	24.3	34.6	46.4	60.1	75.8	93.8	114.0	136.5	161.2	187.8	216.2	244.8	274.7	305.8	337.9	371.0	405.2	441.1	476.2
Water Heating	10.0	20.2	30.8	41.8	51.4	61.6	72.4	83.9	96.1	108.9	122.5	136.7	143.7	151.3	159.3	167.7	176.6	185.9	195.1	204.9	215.1
Multi_CZ1	2,213.6	4,573.5	7,089.6	9,803.5	12,436.8	15,344.1	18,570.5	22,144.6	26,077.0	30,363.6	35,004.7	39,983.0	44,000.0	48,159.2	52,553.4	57,152.5	61,931.1	66,912.4	72,081.9	77,586.4	83,202.0
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8
Space Heating	645.4	1,412.5	2,293.4	3,321.9	4,532.6	5,961.4	7,644.9	9,608.4	11,863.0	14,404.3	17,225.8	20,309.7	23,622.8	27,020.0	30,593.4	34,318.3	38,174.2	42,180.5	46,329.2	50,734.5	55,191.7
Water Heating	1,568.1	3,160.6	4,795.4	6,480.3	7,902.2	9,379.8	10,921.3	12,530.5	14,206.5	15,949.6	17,766.7	19,658.3	20,359.2	21,118.0	21,935.3	22,805.8	23,724.8	24,695.9	25,712.6	26,807.5	27,961.5
Multi_CZ2	2,149.0	4,440.2	6,890.5	9,542.2	12,131.4	15,001.4	18,198.6	21,752.9	25,675.2	29,961.3	34,611.2	39,606.0	43,696.5	47,943.4	52,428.4	57,120.0	61,991.9	67,067.9	72,326.9	77,892.3	83,566.3
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8
Space Heating	623.8	1,364.9	2,215.7	3,208.8	4,377.6	5,756.6	7,381.3	9,275.7	11,450.9	13,902.4	16,624.1	19,598.7	22,794.3	26,076.1	29,527.7	33,125.5	36,849.5	40,718.6	44,725.1	48,979.1	53,283.4
Water Heating	1,525.1	3,074.9	4,674.0	6,332.2	7,751.8	9,241.9	10,813.3	12,471.7	14,217.1	16,049.5	17,975.3	19,992.9	20,884.9	21,846.9	22,876.9	23,967.3	25,111.6	26,314.7	27,563.3	28,870.6	30,236.1
Multi_CZ3	1,928.1	3,973.3	6,147.4	8,484.2	10,739.6	13,218.3	15,956.6	18,977.1	22,287.5	25,884.1	29,767.6	33,923.9	37,229.1	40,631.2	44,223.5	47,981.9	51,885.9	55,953.9	60,172.8	64,655.1	69,221.5
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1
Space Heating	569.7	1,243.8	2,016.1	2,915.4	3,971.7	5,215.7	6,679.0	8,383.1	10,337.9	12,539.5	14,982.3	17,650.9	20,517.0	23,442.8	26,520.4	29,728.6	33,049.5	36,499.9	40,072.8	43,865.7	47,703.1
Water Heating	1,358.3	2,729.1	4,130.7	5,567.6	6,766.2	8,000.2	9,274.1	10,589.2	11,943.4	13,336.6	14,775.3	16,260.7	16,697.4	17,170.9	17,682.7	18,230.0	18,810.0	19,424.3	20,067.0	20,752.8	21,478.2
Single_CZ1	13,242.8	27,141.9	41,850.3	57,574.5	73,387.7	90,561.0	109,304.2	129,737.5	151,883.2	175,705.5	201,209.6	228,307.0	252,388.9	275,900.4	300,515.0	326,093.3	352,517.6	379,886.9	407,863.7	437,201.8	466,683.5
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3
Space Heating	7,628.5	15,778.0	24,517.6	34,005.8	44,381.6	55,786.0	68,379.0	82,256.3	97,441.3	113,904.3	131,634.2	150,556.3	170,513.0	189,598.6	209,498.4	230,105.8	251,331.6	273,253.0	295,820.5	319,452.8	342,974.8
Water Heating	5,613.3	11,361.5	17,328.2	23,561.5	28,995.0	34,759.1	40,902.8	47,450.8	54,401.9	61,749.8	69,511.1	77,671.8	81,781.0	86,189.8	90,886.7	95,838.6	101,017.5	106,444.9	111,833.0	117,517.1	123,454.3
Single_CZ2	24,991.7	51,239.0	79,030.5	108,761.8	138,656.4	171,152.1	206,649.5	245,379.5	287,385.3	332,598.0	381,025.4	432,497.0	478,176.2	522,898.3	569,726.0	618,392.2	668,672.0	720,754.8	773,993.0	829,827.3	885,917.7
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4
Space Heating	14,226.0	29,448.2	45,794.4	63,567.8	83,036.2	104,469.7	128,174.4	154,333.2	182,991.9	214,093.3	247,613.8	283,409.4	321,179.2	357,415.2	395,202.8	434,337.9	474,650.3	516,287.4	559,154.2	604,048.4	648,711.7
Water Heating	10,763.8	21,786.2	33,227.7	45,180.4	55,599.6	66,652.4	78,433.3	90,989.6	104,318.5	118,408.6	133,291.2	148,939.9	156,819.6	165,273.7	174,280.1	183,775.8	193,706.5	204,113.9	214,445.9	225,345.3	236,730.3
Single_CZ3	18,739.8	38,335.0	59,004.6	81,021.4	103,191.8	127,147.3	153,161.8	181,390.3	211,858.7	244,521.1	279,392.6	316,361.9	349,497.2	381,654.8	415,273.4	450,170.8	486,193.3	523,469.5	561,581.7	601,498.5	641,647.5
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5
Space Heating	11,531.6	23,750.6	36,767.3	50,791.6	66,000.0	82,575.9	100,731.0	120,589.1	142,178.0	165,459.1	190,426.1	216,984.7	244,925.1	271,508.0	299,186.0	327,818.6	357,287.9	387,695.1	418,974.9	451,683.4	484,302.0
Water Heating	7,207.0	14,581.4	22,231.7	30,220.6	37,177.9	44,551.3	52,402.7	60,763.1	69,630.6	78,997.6	88,885.8	99,278.3	104,453.1	110,006.5	115,924.4	122,165.4	128,694.0	135,537.4	142,343.3	149,524.3	157,026.6
Grand Total	63,345.5	129,869.4	200,271.5	275,546.7	351,003.7	432,996.3	522,538.3	620,217.9	726,156.2	840,189.7	962,348.1	1,092,209.3	1,206,685.6	1,319,056.1	1,436,768.5	1,559,146.8	1,685,621.7	1,816,676.6	1,950,857.0	2,091,714.6	2,233,506.5

C-12: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #12)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034		
Mfg_CZ1	96.9	197.3	302.5	413.7	526.1	646.2	775.1	913.5	1,061.3	1,218.5	1,385.0	1,560.5	1,721.1	1,885.1	2,055.4	2,207.5	2,364.4	2,526.8	2,692.8	2,866.1	3,039.6		
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	
Space Heating	66.5	135.8	208.8	286.4	369.3	458.2	554.1	657.3	767.9	885.8	1,011.0	1,143.1	1,281.1	1,421.0	1,565.7	1,690.8	1,819.7	1,952.6	2,089.3	2,231.8	2,373.2	2,514.6	
Water Heating	30.4	61.5	93.7	127.3	156.8	187.9	221.0	256.2	293.4	332.6	373.9	417.3	439.9	464.0	489.5	516.4	544.5	573.9	603.2	634.0	666.1	700.2	
Mfg_CZ2	15.3	31.6	49.0	68.0	87.1	108.2	131.8	157.9	186.7	218.0	251.9	288.2	319.6	351.8	385.6	420.8	457.2	495.0	533.7	574.3	614.6		
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	6.0	12.8	20.5	29.2	39.3	51.0	64.5	79.9	97.3	116.7	138.0	161.0	185.6	210.4	236.4	263.5	291.3	320.2	349.9	381.1	411.6	441.6	
Water Heating	9.3	18.7	28.5	38.8	47.7	57.2	67.3	78.0	89.4	101.3	113.9	127.1	134.0	141.3	149.1	157.3	165.8	174.8	183.7	193.1	202.9	212.9	
Mfg_CZ3	35.9	73.0	111.8	152.8	194.2	238.3	285.6	336.1	390.0	447.2	507.7	571.3	629.8	689.4	751.3	805.8	862.0	920.2	979.7	1,041.9	1,104.1		
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Space Heating	25.4	51.7	79.4	108.8	140.0	173.4	209.2	247.7	288.8	332.4	378.7	427.4	478.2	529.6	582.7	628.1	674.8	723.0	772.5	824.1	875.3	926.3	
Water Heating	10.5	21.3	32.4	44.0	54.2	64.9	76.4	88.5	101.3	114.8	129.0	143.9	151.6	159.8	168.5	177.6	187.2	197.2	207.2	217.7	228.7	239.7	
Multi_CZ1	3,020.4	6,192.3	9,536.9	13,097.8	16,594.9	20,382.9	24,508.8	29,012.2	33,869.0	39,107.8	44,721.9	50,694.9	55,724.0	60,913.1	66,355.7	71,225.4	76,291.0	81,576.2	87,065.6	92,909.7	98,882.3		
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8		
Space Heating	1,451.4	3,028.8	4,735.8	6,608.0	8,678.1	10,981.8	13,557.7	16,430.4	19,609.6	23,090.7	26,871.0	30,934.0	35,244.1	39,654.7	44,259.3	48,236.5	52,360.5	56,650.8	61,098.6	65,820.4	70,610.4		
Water Heating	1,568.8	3,163.0	4,800.2	6,488.4	7,914.7	9,398.1	10,947.0	12,565.1	14,251.9	16,007.5	17,838.7	19,745.9	20,462.0	21,237.1	22,071.8	22,960.5	23,898.4	24,889.4	25,926.9	27,044.9	28,223.1		
Multi_CZ2	2,153.9	4,451.0	6,907.9	9,567.1	12,165.0	15,045.1	18,254.1	21,821.9	25,759.6	30,062.8	34,731.6	39,747.1	43,857.9	48,126.4	52,634.0	57,349.4	62,245.8	67,347.4	72,633.0	78,227.4	83,931.5		
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8		
Space Heating	627.9	1,373.2	2,228.4	3,225.8	4,399.1	5,782.6	7,411.9	9,311.0	11,491.0	13,947.4	16,674.0	19,653.7	22,854.4	26,141.4	29,598.4	33,201.6	36,931.1	40,805.7	44,817.8	49,077.6	53,387.7		
Water Heating	1,525.8	3,077.3	4,678.7	6,340.0	7,764.0	9,259.6	10,838.1	12,505.4	14,261.4	16,106.1	18,045.9	20,079.0	20,986.2	21,964.6	23,011.9	24,120.6	25,283.9	26,507.1	27,776.6	29,107.2	30,497.0		
Multi_CZ3	2,711.5	5,545.0	8,523.1	11,681.6	14,774.9	18,107.5	21,717.6	25,627.7	29,843.9	34,362.1	39,187.1	44,305.7	48,590.0	52,988.0	57,594.1	61,605.4	65,778.2	70,131.2	74,650.3	79,451.4	84,353.6		
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1		
Space Heating	1,352.5	2,813.3	4,387.5	6,105.8	7,996.0	10,088.8	12,417.5	15,003.3	17,854.3	20,966.4	24,338.0	27,954.9	31,786.3	35,693.3	39,769.0	43,213.6	46,786.0	50,503.3	54,357.5	58,448.2	62,599.4		
Water Heating	1,358.9	2,731.3	4,134.9	5,574.8	6,777.2	8,016.2	9,296.6	10,619.7	11,983.4	13,387.8	14,839.1	16,338.5	16,788.9	17,277.2	17,804.7	18,368.5	18,965.8	19,598.1	20,259.8	20,966.7	21,714.0		
Single_CZ1	20,863.0	42,448.4	65,017.0	88,801.1	112,862.3	138,479.4	165,884.6	195,199.6	226,430.4	259,537.4	294,535.6	331,366.2	365,389.5	399,036.5	433,983.0	466,809.9	500,652.1	535,614.9	571,348.7	608,646.3	646,268.3		
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0		
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3		
Space Heating	14,943.2	30,472.0	46,759.0	63,987.5	82,286.0	101,803.1	122,720.6	145,135.8	169,056.3	194,448.8	221,310.5	249,595.9	279,117.2	307,955.5	337,797.6	365,257.8	393,500.0	422,607.3	452,518.7	483,690.8	514,926.2		
Water Heating	5,918.9	11,974.1	18,253.6	24,806.3	30,565.2	36,660.3	43,141.6	50,033.5	57,334.1	65,037.2	73,160.8	81,691.4	86,177.4	90,969.1	96,055.4	101,403.1	106,983.6	112,818.6	118,620.0	124,723.7	131,087.8		
Single_CZ2	26,785.9	54,889.2	84,622.5	116,399.8	148,455.8	183,243.7	221,181.7	262,507.6	307,261.5	355,368.7	406,793.5	461,402.6	510,340.2	558,423.4	608,710.8	660,924.1	714,828.8	770,621.3	827,647.8	887,387.5	947,429.1		
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2		
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4		
Space Heating	15,434.3	31,923.7	49,612.0	68,818.8	89,824.7	112,915.6	138,413.5	166,508.8	197,245.4	230,560.2	266,383.3	304,607.3	344,913.0	383,775.9	424,276.3	466,199.6	509,366.8	553,932.0	599,794.6	647,789.4	695,585.7		
Water Heating	11,349.8	22,960.9	35,002.2	47,567.4	58,610.4	70,298.2	82,726.3	95,942.0	109,941.3	124,712.4	140,289.7	156,647.6	165,249.8	174,438.1	184,191.4	194,446.0	205,146.8	216,335.9	227,460.3	239,164.4	251,367.9		
Single_CZ3	28,859.7	58,661.3	89,767.2	122,483.9	155,602.4	190,763.8	228,271.4	268,282.3	310,800.3	355,774.7	403,234.9	453,108.1	499,422.0	545,016.5	592,331.4	636,437.3	681,892.2	728,832.8	776,825.5	826,889.7	877,426.0		
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4		
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5		
Space Heating	21,258.6	43,289.2	66,340.0	90,653.5	116,391.6	143,747.6	172,961.8	204,160.1	237,349.1	272,485.5	309,575.3	348,562.2	389,196.8	428,724.2	469,597.7	506,929.9	545,315.2	584,862.6	625,491.6	667,807.8	710,264.8		
Water Heating	7,599.9	15,369.1	23,421.6	31,821.3	39,196.9	46,996.1	55,281.5	64,084.1	73,401.0	83,224.7	93,578.8	104,446.9	110,106.2	116,152.0	122,570.7	129,320.6	136,365.6	143,733.2	151,070.5	158,791.1	166,842.2		
Grand Total	84,542.4	172,489.0	264,838.0	362,665.9	461,262.7	567,015.2	681,010.7	803,847.9	935,602.9	1,076,097.2	1,225,349.2	1,383,044.5	1,525,994.1	1,667,430.1	1,814,801.4	1,957,785.6	2,105,371.9	2,258,065.9	2,414,377.2	2,577,994.2	2,743,049.2		

C-13: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #13)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Mfg_CZ1	97.3	198.1	303.9	415.7	528.7	649.5	779.3	918.7	1,067.7	1,226.1	1,394.0	1,571.0	1,733.2	1,898.9	2,070.9	2,224.8	2,383.7	2,548.0	2,716.0	2,891.6	3,067.1	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4
Space Heating	66.8	136.5	209.8	287.8	371.1	460.4	556.6	660.2	771.3	889.6	1,015.2	1,147.7	1,286.2	1,426.5	1,571.7	1,697.3	1,826.6	1,960.0	2,097.2	2,240.1	2,381.6	2,528.5
Water Heating	30.4	61.6	94.0	127.8	157.6	189.1	222.7	258.4	296.3	336.4	378.7	423.2	446.9	472.2	499.1	527.4	556.9	587.7	618.6	651.1	685.1	720.7
Mfg_CZ2	29.0	59.0	90.6	123.9	157.7	193.8	232.6	274.4	319.0	366.5	416.9	470.1	518.7	568.5	620.1	666.6	714.5	764.1	814.8	867.8	920.7	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	19.7	40.3	61.9	85.0	109.7	136.2	164.8	195.6	228.7	264.0	301.6	341.2	382.6	424.6	468.1	505.9	544.8	585.0	626.3	669.3	711.9	759.9
Water Heating	9.3	18.8	28.6	38.9	48.0	57.6	67.8	78.7	90.3	102.5	115.4	128.9	136.1	143.8	152.0	160.6	169.6	179.0	188.4	198.3	208.7	219.7
Mfg_CZ3	36.0	73.3	112.3	153.5	195.1	239.5	287.0	338.0	392.2	449.8	510.8	574.9	634.0	694.2	756.6	811.8	868.7	927.6	987.8	1,050.7	1,113.6	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	25.5	52.0	79.8	109.3	140.6	174.1	210.1	248.7	289.9	333.7	380.1	429.0	480.0	531.5	584.8	630.3	677.2	725.5	775.2	826.9	878.3	931.6
Water Heating	10.5	21.3	32.5	44.2	54.5	65.4	76.9	89.2	102.3	116.1	130.6	145.9	154.0	162.6	171.8	181.4	191.5	202.0	212.5	223.6	235.2	247.3
Multi_CZ1	3,228.7	6,631.6	10,237.7	14,098.3	17,940.5	22,126.5	26,709.8	31,721.9	37,170.3	43,046.4	49,351.5	56,063.6	61,870.2	67,869.6	74,152.2	79,886.8	85,838.9	92,034.5	98,441.4	105,224.0	112,153.2	
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8	
Space Heating	1,651.4	3,446.3	5,396.2	7,542.6	9,924.0	12,581.9	15,559.7	18,884.2	22,563.2	26,588.7	30,955.4	35,642.3	40,607.0	45,697.9	51,005.5	55,705.2	60,568.3	65,616.1	70,835.6	76,342.6	81,930.8	
Water Heating	1,577.1	3,184.8	4,840.7	6,554.3	8,014.4	9,541.6	11,145.9	12,832.0	14,599.5	16,448.0	18,383.9	20,406.4	21,245.1	22,150.5	23,122.0	24,153.2	25,238.5	26,382.3	27,565.7	28,837.0	30,173.6	
Multi_CZ2	3,085.0	6,338.6	9,795.7	13,507.5	17,215.6	21,270.5	25,726.8	30,617.0	35,948.9	41,714.5	47,914.3	54,525.1	60,283.9	66,247.0	72,493.4	78,256.5	84,235.6	90,457.1	96,882.9	103,653.3	110,565.2	
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8	
Space Heating	1,551.1	3,240.0	5,077.3	7,102.9	9,359.9	11,870.2	14,693.5	17,849.6	21,346.1	25,175.4	29,332.2	33,796.1	38,526.6	43,382.6	48,446.3	52,959.8	57,629.7	62,476.8	67,488.4	72,776.0	78,140.9	
Water Heating	1,533.8	3,098.2	4,717.5	6,403.3	7,859.7	9,397.5	11,029.3	12,761.9	14,595.6	16,529.8	18,570.4	20,714.6	21,740.1	22,844.0	24,023.4	25,269.6	26,575.0	27,945.7	29,356.1	30,834.7	32,377.5	
Multi_CZ3	2,892.2	5,925.7	9,130.2	12,548.0	15,939.7	19,616.4	23,621.6	27,980.6	32,697.9	37,766.2	43,187.6	48,944.1	53,899.1	58,996.4	64,327.4	69,085.1	74,022.8	79,161.4	84,472.8	90,084.3	95,812.5	
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1	
Space Heating	1,526.3	3,176.0	4,961.0	6,917.2	9,077.3	11,477.0	14,153.8	17,130.8	20,414.3	23,997.4	27,876.4	32,033.0	36,430.6	40,925.9	45,609.7	49,679.1	53,890.8	58,263.2	62,784.7	67,554.5	72,396.0	
Water Heating	1,365.8	2,749.3	4,168.5	5,629.7	6,860.7	8,136.9	9,464.3	10,845.1	12,277.4	13,760.8	15,301.2	16,898.8	17,453.7	18,053.0	18,697.3	19,382.7	20,105.6	20,868.5	21,655.1	22,493.3	23,376.3	
Single_CZ1	21,717.6	44,175.2	67,641.0	92,351.8	117,370.0	143,977.5	171,590.8	201,154.3	232,673.3	266,108.1	301,477.1	338,721.4	373,190.3	407,315.9	442,774.7	476,144.2	510,556.8	546,119.8	582,483.7	620,460.8	658,765.7	
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0	
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3	
Space Heating	15,788.8	32,168.7	49,323.5	67,438.2	86,639.1	107,074.7	128,108.2	150,656.9	174,726.7	200,284.2	227,330.5	255,821.6	285,567.2	314,646.5	344,748.1	372,485.2	401,020.5	430,437.7	460,674.4	492,190.0	523,757.5	
Water Heating	5,927.7	12,004.1	18,313.1	24,906.4	30,719.8	36,886.8	43,460.2	50,467.0	57,906.6	65,772.6	74,082.2	82,820.8	87,528.2	92,557.5	97,896.6	103,510.1	109,367.7	115,493.2	121,599.2	128,039.0	134,753.9	
Single_CZ2	40,639.9	82,692.8	126,660.0	172,993.0	219,896.8	269,829.6	321,669.4	377,227.8	436,517.2	499,460.9	566,089.5	636,288.0	701,141.5	765,460.5	832,312.8	895,409.2	960,485.6	1,027,747.1	1,096,523.9	1,168,366.9	1,240,804.9	
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2	
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4	
Space Heating	29,271.3	59,669.8	91,535.3	125,220.1	160,969.2	199,067.2	238,290.2	280,397.8	325,403.4	373,242.4	423,912.5	477,327.0	533,124.0	587,767.1	644,347.7	696,644.5	750,451.8	805,929.1	862,957.9	922,411.6	981,931.3	
Water Heating	11,366.8	23,018.5	35,116.3	47,759.3	58,907.0	70,732.5	83,337.4	96,773.3	111,039.0	126,122.4	142,056.7	158,813.4	167,840.1	177,484.0	187,721.9	198,486.2	209,718.6	221,464.4	233,173.1	245,521.6	258,397.9	
Single_CZ3	29,957.4	60,879.4	93,138.0	127,045.2	161,393.1	197,826.8	235,602.0	275,932.2	318,820.8	364,216.7	412,153.7	462,559.0	509,445.8	555,656.0	603,629.6	648,433.4	694,621.8	742,334.3	791,137.4	842,075.5	893,490.3	
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4	
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.7	136.9	150.5	
Space Heating	22,344.9	45,468.7	69,634.2	95,086.0	121,983.4	150,519.4	179,882.5	211,252.3	244,633.0	279,981.3	317,308.3	356,559.4	397,482.0	437,319.0	478,525.8	516,213.7	554,975.5	594,920.9	635,967.9	678,725.2	721,608.9	
Water Heating	7,611.3	15,407.7	23,498.2	31,950.1	39,395.8	47,287.4	55,691.5	64,641.9	74,137.6	84,171.0	94,764.6	105,900.5	111,844.9	118,196.6	124,940.7	132,032.9	139,434.9	147,176.4	154,906.0	163,059.4	171,562.5	
Grand Total	101,683.0	206,973.8	317,109.4	433,236.9	550,637.2	675,730.1	806,219.5	946,164.9	1,095,607.4	1,254,355.2	1,422,495.4	1,599,717.1	1,762,716.8	1,924,707.0	2,093,137.7	2,250,918.4	2,413,728.4	2,582,093.7	2,754,460.8	2,934,674.8	3,116,693.1	

C-14: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #14)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	38.6	78.9	121.2	166.1	208.3	254.1	304.1	358.6	417.8	481.8	550.7	624.3	679.4	737.9	799.7	864.4	931.6	1,001.7	1,074.0	1,150.2	1,227.0
Space Heating	10.4	22.0	35.0	49.7	66.5	85.8	108.2	133.9	163.3	196.3	232.8	272.8	315.7	361.1	408.8	458.4	509.8	563.1	618.2	676.1	733.7
Water Heating	28.2	56.8	86.2	116.4	141.9	168.3	195.9	224.6	254.5	285.6	317.9	351.5	363.7	376.8	390.9	406.0	421.9	438.6	455.8	474.1	493.3
Mfg_CZ2	11.7	24.0	36.8	50.5	63.3	77.2	92.4	109.0	127.0	146.4	167.4	189.7	206.5	224.2	243.0	262.7	283.1	304.4	326.4	349.5	372.8
Space Heating	3.1	6.7	10.6	15.0	20.1	25.9	32.7	40.5	49.4	59.4	70.5	82.7	95.7	109.5	123.9	139.0	154.6	170.8	187.5	205.1	222.6
Water Heating	8.6	17.3	26.2	35.5	43.2	51.3	59.7	68.4	77.5	87.0	96.8	107.1	110.8	114.8	119.1	123.7	128.5	133.6	138.8	144.4	150.2
Mfg_CZ3	13.7	27.9	42.9	58.8	73.8	90.1	107.8	127.1	148.0	170.7	195.0	221.0	240.6	261.4	283.4	306.4	330.2	355.1	380.8	407.9	435.1
Space Heating	3.9	8.3	13.1	18.5	24.7	31.8	40.0	49.3	60.0	71.9	85.1	99.5	115.0	131.3	148.5	166.3	184.8	203.9	223.7	244.5	265.3
Water Heating	9.8	19.7	29.9	40.3	49.1	58.3	67.8	77.7	88.1	98.8	109.9	121.5	125.6	130.1	134.9	140.1	145.5	151.2	157.1	163.3	169.9
Multi_CZ1	1,857.3	3,809.4	5,861.5	8,039.4	10,049.2	12,231.4	14,616.7	17,225.9	20,069.2	23,147.6	26,466.6	30,018.4	32,520.3	35,194.4	38,036.5	41,026.3	44,146.5	47,413.8	50,820.6	54,489.4	58,274.1
Space Heating	289.3	648.8	1,066.1	1,559.2	2,147.0	2,851.6	3,695.4	4,695.4	5,862.7	7,198.0	8,699.9	10,360.1	12,161.1	14,076.4	16,101.2	18,220.5	20,421.7	22,717.9	25,108.0	27,681.9	30,312.6
Water Heating	1,568.1	3,160.6	4,795.4	6,480.3	7,902.2	9,379.8	10,921.3	12,530.5	14,206.5	15,949.6	17,766.7	19,658.3	20,359.2	21,118.0	21,935.3	22,805.8	23,724.8	24,695.9	25,712.6	26,807.5	27,961.5
Multi_CZ2	1,806.7	3,705.7	5,709.5	7,845.3	9,833.9	12,005.1	14,391.5	17,015.4	19,886.9	23,007.3	26,381.2	29,999.3	32,627.1	35,435.3	38,416.7	41,549.5	44,815.0	48,230.8	51,782.3	55,569.3	59,469.1
Space Heating	281.6	630.8	1,035.5	1,513.2	2,082.0	2,763.2	3,578.2	4,543.6	5,669.8	6,957.8	8,405.9	10,006.4	11,742.3	13,588.3	15,539.8	17,582.2	19,703.4	21,916.0	24,219.0	26,698.7	29,233.0
Water Heating	1,525.1	3,074.9	4,674.0	6,332.2	7,751.8	9,241.9	10,813.3	12,471.7	14,217.1	16,049.5	17,975.3	19,992.9	20,884.9	21,846.9	22,876.9	23,967.3	25,111.6	26,314.7	27,563.3	28,870.6	30,236.1
Multi_CZ3	1,619.6	3,311.8	5,084.2	6,957.0	8,672.5	10,523.3	12,533.1	14,717.6	17,084.0	19,633.0	22,369.7	25,288.4	27,278.6	29,402.8	31,658.9	34,031.2	36,506.2	39,096.8	41,795.9	44,695.0	47,681.7
Space Heating	261.3	582.6	953.5	1,389.3	1,906.3	2,523.2	3,259.0	4,128.4	5,140.6	6,296.4	7,594.4	9,027.7	10,581.3	12,231.9	13,976.1	15,801.2	17,696.2	19,672.5	21,729.0	23,942.1	26,203.5
Water Heating	1,358.3	2,729.1	4,130.7	5,567.6	6,766.2	8,000.2	9,274.1	10,589.2	11,943.4	13,336.6	14,775.3	16,260.7	16,697.4	17,170.9	17,682.7	18,230.0	18,810.0	19,424.3	20,067.0	20,752.8	21,478.2
Single_CZ1	11,538.2	23,464.7	35,900.9	48,968.7	61,656.0	75,169.5	89,649.0	105,181.4	121,795.9	139,494.1	158,314.5	178,223.0	194,691.3	210,238.5	226,571.5	243,596.6	261,232.8	279,552.2	298,425.1	318,283.7	338,501.0
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Space Heating	6,043.5	12,404.5	19,128.4	26,308.9	34,022.5	42,368.5	51,458.5	61,367.4	72,128.5	83,743.1	96,225.3	109,540.4	123,589.6	136,519.9	150,038.1	164,069.0	178,548.5	193,536.5	208,994.8	225,226.9	241,629.7
Water Heating	5,494.2	11,058.9	16,770.1	22,656.0	27,627.7	32,792.5	38,178.7	43,798.1	49,646.5	55,724.2	62,055.6	68,641.5	71,052.4	73,660.5	76,466.0	79,450.4	82,596.9	85,917.8	89,321.6	92,937.1	96,740.4
Single_CZ2	21,675.3	44,044.4	67,338.6	91,777.8	115,407.4	140,526.4	167,387.7	196,148.4	226,861.6	259,532.9	294,238.6	330,921.0	360,911.4	389,201.2	418,924.5	449,911.6	482,016.3	515,368.9	549,727.6	585,888.8	622,674.7
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Space Heating	11,138.8	22,835.8	35,176.4	48,326.4	62,418.6	77,628.8	94,155.4	112,132.7	131,621.6	152,627.3	175,179.3	199,218.5	224,570.0	247,841.7	272,167.4	297,413.1	323,464.7	350,429.2	378,240.2	407,447.3	436,918.6
Water Heating	10,535.5	21,206.1	32,157.6	43,444.0	52,977.6	62,881.4	73,209.8	83,985.2	95,199.9	106,854.2	118,995.1	131,623.7	136,246.8	141,247.9	146,627.7	152,350.4	158,384.1	164,752.0	171,279.1	178,212.0	185,504.9
Single_CZ3	16,352.7	33,222.1	50,781.9	69,194.6	87,156.8	106,222.6	126,577.3	148,333.7	171,527.6	196,160.7	222,289.4	249,871.4	273,077.5	294,858.7	317,694.9	341,462.1	366,053.2	391,562.9	417,829.0	445,422.7	473,525.8
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Space Heating	9,290.4	19,008.2	29,229.8	40,081.7	51,661.3	64,099.5	77,545.7	92,098.3	107,798.5	124,647.7	142,671.0	161,824.6	181,974.6	200,449.4	219,728.0	239,710.0	260,309.5	281,605.7	303,548.7	326,549.7	349,820.5
Water Heating	7,061.6	14,212.2	21,549.1	29,107.9	35,488.0	42,112.4	49,016.5	56,215.0	63,702.2	71,478.5	79,575.3	87,993.9	91,039.4	94,334.6	97,880.1	101,652.7	105,631.4	109,831.3	114,140.6	118,719.2	123,536.9
Grand Total	54,913.9	111,688.8	170,877.5	233,058.1	293,121.2	357,099.6	425,659.5	499,216.9	577,918.1	661,774.5	750,973.2	845,356.5	922,232.7	995,554.3	1,072,629.1	1,153,010.7	1,236,314.8	1,322,886.5	1,412,161.8	1,506,256.5	1,602,161.4

C-15: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #15)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	33.2	66.9	101.6	137.4	168.8	201.6	235.8	271.8	309.3	348.5	389.5	432.3	454.1	477.2	501.7	527.5	554.4	582.4	611.3	641.8	673.7
Space Heating	4.9	10.0	15.4	21.0	26.9	33.2	39.9	47.1	54.8	63.0	71.6	80.8	90.4	100.4	110.8	121.5	132.5	143.8	155.5	167.8	180.4
Water Heating	28.2	56.8	86.2	116.4	141.9	168.3	195.9	224.6	254.5	285.6	317.9	351.5	363.7	376.8	390.9	406.0	421.9	438.6	455.8	474.1	493.3
Mfg_CZ2	10.0	20.2	30.7	41.6	51.1	60.9	71.3	82.1	93.5	105.3	117.7	130.6	137.1	144.0	151.3	159.0	167.1	175.5	184.1	193.3	202.8
Space Heating	1.4	2.9	4.5	6.1	7.8	9.7	11.6	13.7	16.0	18.3	20.9	23.5	26.3	29.3	32.3	35.4	38.6	41.9	45.3	48.9	52.6
Water Heating	8.6	17.3	26.2	35.5	43.2	51.3	59.7	68.4	77.5	87.0	96.8	107.1	110.8	114.8	119.1	123.7	128.5	133.6	138.8	144.4	150.2
Mfg_CZ3	11.7	23.7	36.0	48.8	60.1	71.8	84.2	97.3	111.0	125.3	140.3	156.1	164.6	173.6	183.2	193.2	203.6	214.6	225.8	237.8	250.2
Space Heating	1.9	4.0	6.2	8.5	10.9	13.6	16.4	19.5	22.9	26.5	30.4	34.6	39.0	43.5	48.2	53.1	58.2	63.4	68.7	74.5	80.3
Water Heating	9.8	19.7	29.9	40.3	49.1	58.3	67.8	77.7	88.1	98.8	109.9	121.5	125.6	130.1	134.9	140.1	145.5	151.2	157.1	163.3	169.9
Multi_CZ1	1,506.1	3,080.9	4,726.8	6,462.0	7,985.1	9,627.8	11,411.4	13,349.9	15,450.4	17,713.9	20,145.6	22,741.2	24,357.8	26,099.6	27,962.0	29,931.0	31,994.8	34,165.0	36,438.1	38,914.5	41,508.7
Space Heating	68.9	182.7	327.9	515.1	755.6	1,062.6	1,449.3	1,926.0	2,500.3	3,173.0	3,942.8	4,805.3	5,750.8	6,766.2	7,846.6	8,983.0	10,168.3	11,410.5	12,712.3	14,142.0	15,633.4
Water Heating	1,437.2	2,898.2	4,398.9	5,946.9	7,229.5	8,565.2	9,962.1	11,423.9	12,950.1	14,541.0	16,202.8	17,936.0	18,607.0	19,333.4	20,115.4	20,948.0	21,826.5	22,754.6	23,725.8	24,772.5	25,875.3
Multi_CZ2	1,460.1	2,981.7	4,576.6	6,262.9	7,753.2	9,367.1	11,126.8	13,046.7	15,133.5	17,388.1	19,815.4	22,409.9	24,072.6	25,862.2	27,772.1	29,787.4	31,895.6	34,108.5	36,415.1	38,885.6	41,463.7
Space Heating	60.6	158.6	283.0	442.5	646.9	907.0	1,234.0	1,636.9	2,122.1	2,690.3	3,340.8	4,069.7	4,869.1	5,727.8	6,641.5	7,602.9	8,605.7	9,656.7	10,758.3	11,967.8	13,229.6
Water Heating	1,399.5	2,823.1	4,293.6	5,820.4	7,106.3	8,460.2	9,892.8	11,409.8	13,011.4	14,697.8	16,474.6	18,340.2	19,203.5	20,134.4	21,130.5	22,184.5	23,290.0	24,451.8	25,656.8	26,917.8	28,234.1
Multi_CZ3	1,309.5	2,671.4	4,090.1	5,579.4	6,876.0	8,265.3	9,763.7	11,381.3	13,123.1	14,989.7	16,985.8	19,108.4	20,367.9	21,719.8	23,165.3	24,694.0	26,296.8	27,982.3	29,747.4	31,667.4	33,679.4
Space Heating	64.8	169.9	303.2	474.3	693.2	971.7	1,321.5	1,751.9	2,269.4	2,874.8	3,566.9	4,341.5	5,190.2	6,096.7	7,061.0	8,075.3	9,133.2	10,241.8	11,403.6	12,679.5	14,010.6
Water Heating	1,244.8	2,501.5	3,786.8	5,105.1	6,182.8	7,293.6	8,442.2	9,629.5	10,853.7	12,114.9	13,418.9	14,766.9	15,177.7	15,623.1	16,104.3	16,618.7	17,163.5	17,740.6	18,343.8	18,987.9	19,668.8
Single_CZ1	10,356.9	20,928.1	31,820.4	43,101.1	53,700.0	64,758.5	76,349.4	88,510.5	101,246.6	114,559.7	128,493.3	143,043.1	153,949.3	163,583.8	173,689.0	184,217.4	195,127.3	206,454.1	218,107.7	230,410.6	243,174.7
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Space Heating	5,070.9	10,286.2	15,679.8	21,291.4	27,138.7	33,255.9	39,687.8	46,460.2	53,581.7	61,053.6	68,896.5	77,105.5	85,640.0	92,709.3	100,055.7	107,650.4	115,468.1	123,532.0	131,843.3	140,596.4	149,627.6
Water Heating	5,285.5	10,640.6	16,138.2	21,805.8	26,555.4	31,494.1	36,649.8	42,034.4	47,644.1	53,479.2	59,563.3	65,896.5	68,260.0	70,816.4	73,565.8	76,489.8	79,571.9	82,824.3	86,155.8	89,694.5	93,416.1
Single_CZ2	19,438.8	39,279.6	59,723.7	80,897.3	100,748.0	121,462.4	143,177.2	165,963.9	189,831.6	214,783.7	240,902.2	268,178.7	288,447.7	306,405.8	325,248.1	344,885.5	365,239.7	386,377.0	408,124.8	431,090.7	454,922.2
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Space Heating	9,302.4	18,873.1	28,773.3	39,076.1	49,815.4	61,054.5	72,876.7	85,330.3	98,431.4	112,183.0	126,622.1	141,739.8	157,460.9	170,500.0	184,052.3	198,064.1	212,488.8	227,369.3	242,708.2	258,867.1	275,540.5
Water Heating	10,135.3	20,403.9	30,945.8	41,813.9	50,921.5	60,391.7	70,278.1	80,603.2	91,360.1	102,549.3	114,215.8	126,360.1	130,892.2	135,794.3	141,066.4	146,673.3	152,583.5	158,820.0	165,208.3	171,994.1	179,130.5
Single_CZ3	14,134.0	28,557.4	43,415.4	58,798.5	73,330.7	88,482.0	104,350.4	120,986.1	138,395.1	156,579.6	175,599.7	195,449.8	210,648.4	223,957.2	237,901.4	252,417.2	267,448.9	283,043.7	299,091.2	316,020.0	333,573.8
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Space Heating	7,340.0	14,881.5	22,675.9	30,778.7	39,213.9	48,028.4	57,284.7	67,018.6	77,240.8	87,953.5	99,186.1	110,932.8	123,136.3	133,205.0	143,663.8	154,472.1	165,595.1	177,064.5	188,881.8	201,316.5	214,143.1
Water Heating	6,793.3	13,674.2	20,736.4	28,014.8	34,109.3	40,442.8	47,050.6	53,947.1	61,127.4	68,591.7	76,370.4	84,464.2	87,448.7	90,677.5	94,150.8	97,845.7	101,741.6	105,853.4	110,069.7	114,549.6	119,262.3
Grand Total	48,260.4	97,609.8	148,521.3	201,328.9	250,672.8	302,297.5	356,570.1	413,689.6	473,694.2	536,594.0	602,589.7	671,650.1	722,599.4	768,423.3	816,574.2	866,812.3	918,928.2	973,103.1	1,028,945.5	1,088,061.7	1,149,449.2

C-16: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #16)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Mfg_CZ1	106.3	216.4	331.5	452.9	575.7	706.6	842.4	987.9	1,143.3	1,308.4	1,483.2	1,667.4	1,837.1	2,010.4	2,190.3	2,352.2	2,519.3	2,692.1	2,868.8	3,053.3	3,238.0	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4
Space Heating	75.9	154.6	237.2	324.7	417.6	516.7	618.5	727.8	844.8	969.2	1,101.1	1,240.1	1,385.3	1,532.5	1,684.8	1,817.6	1,954.4	2,095.5	2,240.4	2,391.4	2,541.1	
Water Heating	30.5	61.8	94.2	128.2	158.2	190.0	223.9	260.0	298.5	339.1	382.1	427.2	451.7	477.7	505.3	534.4	564.7	596.4	628.1	661.6	696.5	
Mfg_CZ2	30.3	61.8	94.7	129.5	164.8	202.4	241.5	283.5	328.5	376.4	427.2	480.9	530.1	580.3	632.6	679.6	728.2	778.5	830.0	883.7	937.5	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	21.0	43.0	66.0	90.5	116.6	144.5	173.3	204.3	237.6	273.1	310.8	350.7	392.5	434.8	478.6	516.8	556.2	596.8	638.6	682.1	725.2	
Water Heating	9.3	18.8	28.7	39.1	48.2	57.9	68.2	79.2	90.9	103.3	116.4	130.1	137.6	145.5	153.9	162.8	172.0	181.6	191.3	201.5	212.2	
Mfg_CZ3	39.2	79.6	121.9	166.4	211.5	259.3	308.9	362.0	418.5	478.4	541.8	608.4	670.1	732.9	798.1	856.0	915.8	977.6	1,040.9	1,106.9	1,173.0	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	28.6	58.3	89.3	122.1	156.8	193.7	231.6	272.2	315.4	361.4	409.9	461.1	514.4	568.4	624.1	672.1	721.6	772.6	825.0	879.5	933.7	
Water Heating	10.6	21.4	32.6	44.3	54.7	65.7	77.4	89.8	103.0	117.0	131.8	147.3	155.6	164.5	173.9	183.8	194.2	205.0	215.8	227.3	239.2	
Multi_CZ1	3,440.1	7,055.4	10,878.0	14,959.7	19,027.0	23,442.2	28,046.5	33,084.0	38,561.6	44,470.9	50,814.2	57,569.6	63,424.1	69,475.8	75,815.2	81,610.9	87,628.2	93,893.2	100,373.4	107,233.6	114,245.5	
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8	
Space Heating	1,862.8	3,870.1	6,036.5	8,404.0	11,010.6	13,897.6	16,896.4	20,246.3	23,954.6	28,013.2	32,418.1	37,148.3	42,161.0	47,304.1	52,668.5	57,429.3	62,357.6	67,474.8	72,767.5	78,352.2	84,023.1	
Water Heating	1,577.1	3,184.8	4,840.7	6,554.3	8,014.4	9,541.6	11,145.9	12,832.0	14,599.5	16,448.0	18,383.9	20,406.4	21,245.1	22,150.5	23,122.0	24,153.2	25,238.5	26,382.3	27,565.7	28,837.0	30,173.6	
Multi_CZ2	3,265.3	6,700.1	10,341.9	14,242.3	18,142.5	22,392.9	26,867.1	31,779.0	37,135.9	42,928.9	49,162.1	55,809.8	61,609.6	67,617.2	73,912.0	79,727.3	85,762.0	92,042.7	98,531.0	105,367.6	112,350.0	
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8	
Space Heating	1,731.4	3,601.5	5,623.6	7,837.8	10,280.8	12,992.6	15,833.8	19,011.5	22,533.0	26,390.6	30,579.9	35,080.8	39,852.2	44,752.8	49,864.9	54,430.6	59,156.2	64,062.4	69,136.4	74,490.4	79,925.8	
Water Heating	1,533.8	3,098.2	4,717.5	6,403.3	7,859.7	9,397.5	11,029.3	12,761.9	14,595.6	16,529.8	18,570.4	20,714.6	21,740.1	22,844.0	24,023.4	25,269.6	26,575.0	27,945.7	29,356.1	30,834.7	32,377.5	
Multi_CZ3	3,055.1	6,252.3	9,623.7	13,211.9	16,777.1	20,630.4	24,651.8	29,030.3	33,770.2	38,864.1	44,314.8	50,104.7	55,096.8	60,234.3	65,609.0	70,413.9	75,401.9	80,593.9	85,961.8	91,633.2	97,425.0	
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1	
Space Heating	1,689.2	3,502.6	5,454.5	7,581.1	9,914.7	12,491.0	15,184.0	18,180.5	21,486.6	25,095.3	29,003.6	33,193.6	37,628.2	42,163.8	46,891.4	51,007.9	55,269.8	59,695.7	64,273.7	69,103.4	74,008.5	
Water Heating	1,365.8	2,749.3	4,168.5	5,629.7	6,860.7	8,136.9	9,464.3	10,845.1	12,277.4	13,760.8	15,301.2	16,898.8	17,453.7	18,053.0	18,697.3	19,382.7	20,105.6	20,868.5	21,655.1	22,493.3	23,376.3	
Single_CZ1	22,412.1	45,582.2	69,783.4	95,257.1	121,067.2	148,498.9	176,973.1	207,435.8	239,892.0	274,299.4	310,678.0	348,967.7	384,506.6	419,711.2	456,276.2	490,777.0	526,343.8	563,085.3	600,651.8	639,875.7	679,456.4	
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0	
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3	
Space Heating	16,472.9	33,540.2	51,395.8	70,226.0	90,155.6	111,333.0	133,122.7	156,441.7	181,294.6	207,647.7	235,505.7	264,825.3	295,414.3	325,350.8	356,324.3	384,947.3	414,381.7	444,711.4	475,873.3	508,328.4	540,851.5	
Water Heating	5,938.2	12,039.5	18,383.2	25,023.8	30,900.5	37,149.9	43,828.1	50,963.7	58,557.4	66,600.4	75,107.9	84,063.4	88,997.4	94,248.5	99,821.9	105,680.8	111,793.5	118,184.9	124,568.5	131,315.5	138,350.5	
Single_CZ2	41,933.9	85,314.9	130,653.5	178,410.0	226,792.1	278,264.2	331,712.9	388,953.2	449,996.3	514,761.2	583,280.7	655,438.1	722,296.9	788,637.2	857,562.7	922,779.5	990,019.4	1,059,490.2	1,130,522.0	1,204,703.9	1,279,535.2	
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2	
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4	
Space Heating	30,545.1	62,224.0	95,394.4	130,411.9	167,518.0	206,997.3	247,628.4	291,170.7	337,634.5	386,955.2	439,136.7	494,094.3	551,462.0	607,701.3	665,905.6	719,852.3	775,334.0	832,510.7	891,262.3	952,465.7	1,013,765.0	
Water Heating	11,386.9	23,086.4	35,250.7	47,984.5	59,253.4	71,237.0	84,042.7	97,725.8	112,287.0	127,709.9	144,023.5	161,196.2	170,657.4	180,726.6	191,413.9	202,648.7	214,370.2	226,626.0	238,868.8	251,804.5	265,294.6	
Single_CZ3	30,853.5	62,694.7	95,901.9	130,793.3	166,162.7	203,659.6	242,545.1	284,035.2	328,132.4	374,782.7	424,021.6	475,775.3	524,042.1	571,643.8	621,044.2	667,307.1	714,984.1	764,216.5	814,570.6	867,116.7	920,176.7	
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4	
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5	
Space Heating	23,227.5	47,238.4	72,308.0	98,683.1	126,520.6	156,013.6	186,352.4	218,716.2	253,107.2	289,482.1	327,856.3	368,176.5	410,187.3	451,130.3	493,462.0	532,292.9	572,214.9	613,337.6	655,578.3	699,547.9	743,664.5	
Water Heating	7,624.8	15,453.3	23,588.3	32,101.1	39,628.2	47,625.9	56,164.7	65,280.9	74,975.0	85,236.2	96,084.6	107,499.7	113,735.8	120,373.1	127,419.1	134,827.3	142,557.8	150,641.8	158,728.9	167,278.0	176,193.3	
Grand Total	105,135.7	213,957.3	327,730.5	447,623.0	568,920.6	698,056.6	832,189.4	975,950.9	1,129,378.7	1,292,271.4	1,464,723.5	1,646,422.0	1,814,013.2	1,980,643.0	2,153,840.3	2,316,503.6	2,484,302.7	2,657,770.0	2,835,350.2	3,020,974.6	3,208,537.4	

C-17: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #17)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	106.3	216.4	331.5	452.9	575.7	706.6	842.4	987.9	1,143.3	1,308.4	1,483.2	1,667.4	1,837.1	2,010.4	2,190.3	2,352.2	2,519.3	2,692.1	2,868.8	3,053.3	3,238.0
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
Space Heating	75.9	154.6	237.2	324.7	417.6	516.7	618.5	727.8	844.8	969.2	1,101.1	1,240.1	1,385.3	1,532.5	1,684.8	1,817.6	1,954.4	2,095.5	2,240.4	2,391.4	2,541.1
Water Heating	30.5	61.8	94.2	128.2	158.2	190.0	223.9	260.0	298.5	339.1	382.1	427.2	451.7	477.7	505.3	534.4	564.7	596.4	628.1	661.6	696.5
Mfg_CZ2	31.7	64.5	98.9	135.1	171.8	210.9	251.5	295.1	341.7	391.2	443.6	498.9	549.8	601.8	655.8	704.6	755.0	807.1	860.4	916.0	971.7
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	22.4	45.7	70.2	96.1	123.6	153.1	183.3	215.9	250.7	287.8	327.2	368.8	412.2	452.2	501.8	541.8	582.9	625.4	669.0	714.4	759.5
Water Heating	9.3	18.8	28.7	39.1	48.2	57.9	68.2	79.2	90.9	103.3	116.4	130.1	137.6	145.5	153.9	162.8	172.0	181.6	191.3	201.5	212.2
Mfg_CZ3	39.2	79.6	121.9	166.4	211.5	259.3	308.9	362.0	418.5	478.4	541.8	608.4	670.1	732.9	798.1	856.0	915.8	977.6	1,040.9	1,106.9	1,173.0
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	28.6	58.3	89.3	122.1	156.8	193.7	231.6	272.2	315.4	361.4	409.9	461.1	514.4	568.4	624.1	672.1	721.6	772.6	825.0	879.5	933.7
Water Heating	10.6	21.4	32.6	44.3	54.7	65.7	77.4	89.8	103.0	117.0	131.8	147.3	155.6	164.5	173.9	183.8	194.2	205.0	215.8	227.3	239.2
Multi_CZ1	3,440.1	7,055.4	10,878.0	14,959.7	19,027.0	23,442.2	28,046.5	33,084.0	38,561.6	44,470.9	50,814.2	57,569.6	63,424.1	69,475.8	75,815.2	81,610.9	87,628.2	93,893.2	100,373.4	107,233.6	114,245.5
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8
Space Heating	1,862.8	3,870.1	6,036.5	8,404.0	11,010.6	13,897.6	16,896.4	20,246.3	23,954.6	28,013.2	32,418.1	37,148.3	42,161.0	47,304.1	52,668.5	57,429.3	62,357.6	67,474.8	72,767.5	78,352.2	84,023.1
Water Heating	1,577.1	3,184.8	4,840.7	6,554.3	8,014.4	9,541.6	11,145.9	12,832.0	14,599.5	16,448.0	18,383.9	20,406.4	21,245.1	22,150.5	23,122.0	24,153.2	25,238.5	26,382.3	27,565.7	28,837.0	30,173.6
Multi_CZ2	3,265.3	6,700.1	10,341.9	14,242.3	18,142.5	22,392.9	26,867.1	31,779.0	37,135.9	42,929.8	49,162.1	55,809.8	61,609.6	67,617.2	73,912.0	79,727.3	85,762.0	92,042.7	98,531.0	105,367.6	112,350.0
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8
Space Heating	1,731.4	3,601.5	5,623.6	7,837.8	10,280.8	12,992.6	15,833.8	19,011.5	22,533.0	26,390.6	30,579.9	35,080.8	39,852.2	44,752.8	49,864.9	54,430.6	59,156.2	64,062.4	69,136.4	74,490.4	79,925.8
Water Heating	1,533.8	3,098.2	4,717.5	6,403.3	7,859.7	9,397.5	11,029.3	12,761.9	14,595.6	16,529.8	18,570.4	20,714.6	21,740.1	22,844.0	24,023.4	25,269.6	26,575.0	27,945.7	29,351.1	30,834.7	32,377.5
Multi_CZ3	3,055.1	6,252.3	9,623.7	13,211.9	16,777.1	20,630.4	24,651.8	29,030.3	33,770.2	38,864.1	44,314.8	50,104.7	55,096.8	60,234.3	65,609.0	70,413.9	75,401.9	80,593.9	85,961.8	91,633.2	97,425.0
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1
Space Heating	1,689.2	3,502.6	5,454.5	7,581.1	9,914.7	12,491.0	15,184.0	18,180.5	21,486.6	25,095.3	29,003.6	33,193.6	37,628.2	42,163.8	46,891.4	51,007.9	55,269.8	59,695.7	64,273.7	69,103.4	74,008.5
Water Heating	1,365.8	2,749.3	4,168.5	5,629.7	6,860.7	8,136.9	9,464.3	10,845.1	12,277.4	13,760.8	15,301.2	16,898.8	17,453.7	18,053.0	18,697.3	19,382.7	20,105.6	20,868.5	21,655.1	22,493.3	23,376.3
Single_CZ1	22,412.1	45,582.2	69,783.4	95,257.1	121,067.2	148,498.9	176,973.1	207,435.8	239,892.0	274,299.4	310,678.0	348,967.7	384,506.6	419,711.2	456,276.2	490,777.0	526,343.8	563,085.3	600,651.8	639,875.7	679,456.4
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3
Space Heating	16,472.9	33,540.2	51,395.8	70,226.0	90,155.6	111,333.0	133,122.7	156,441.7	181,294.6	207,647.7	235,505.7	264,825.3	295,414.3	325,350.8	356,324.3	384,947.3	414,381.7	444,711.4	475,873.3	508,328.4	540,851.5
Water Heating	5,938.2	12,039.5	18,383.2	25,023.8	30,900.5	37,149.9	43,828.1	50,963.7	58,557.4	66,600.4	75,107.9	84,063.4	88,997.4	94,248.5	99,821.9	105,680.8	111,793.5	118,184.9	124,568.5	131,315.5	138,350.5
Single_CZ2	41,933.9	85,314.9	130,653.5	178,410.0	226,792.1	278,264.2	331,712.9	388,953.2	449,996.3	514,761.2	583,280.7	655,438.1	722,296.9	788,637.2	857,562.7	922,779.5	990,019.4	1,059,490.2	1,130,522.0	1,204,703.9	1,279,535.2
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4
Space Heating	30,545.1	62,224.0	95,394.4	130,411.9	167,518.0	206,997.3	247,628.4	291,170.7	337,634.5	386,955.2	439,136.7	494,094.3	551,462.0	607,701.3	665,905.6	719,852.3	775,334.0	832,510.7	891,262.3	952,465.7	1,013,765.0
Water Heating	11,386.9	23,086.4	35,250.7	47,984.5	59,253.4	71,237.0	84,042.7	97,725.8	112,287.0	127,709.9	144,023.5	161,196.2	170,657.4	180,726.6	191,413.9	202,648.7	214,370.2	226,626.0	238,866.8	251,804.5	265,294.6
Single_CZ3	30,853.5	62,694.7	95,901.9	130,793.3	166,162.7	203,659.6	242,545.1	284,035.2	328,132.4	374,782.7	424,021.6	475,775.3	524,042.1	571,643.8	621,044.2	667,307.1	714,984.1	764,216.5	814,570.6	867,116.7	920,176.7
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5
Space Heating	23,227.5	47,238.4	72,308.0	98,683.1	126,520.6	156,013.6	186,352.4	218,716.2	253,107.2	289,482.1	327,856.3	368,176.5	410,187.3	451,130.3	493,462.0	532,292.9	572,214.9	613,337.6	655,578.3	699,547.9	743,664.5
Water Heating	7,624.8	15,453.3	23,588.3	32,101.1	39,628.2	47,625.9	56,164.7	65,280.9	74,975.0	85,236.2	96,084.6	107,499.7	113,735.8	120,373.1	127,419.1	134,827.3	142,557.8	150,641.8	158,728.9	167,278.0	176,193.3
Grand Total	105,137.1	213,960.1	327,734.7	447,628.6	568,927.6	698,065.2	832,199.5	975,962.5	1,129,391.9	1,292,286.1	1,464,739.9	1,646,440.0	1,814,033.0	1,980,664.5	2,153,863.5	2,316,528.6	2,484,329.5	2,657,798.6	2,835,380.7	3,021,007.0	3,208,571.6

C-18: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #18)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	106.6	216.9	332.3	454.0	577.3	708.7	844.8	990.8	1,146.8	1,312.5	1,488.2	1,673.2	1,843.8	2,018.0	2,199.0	2,362.0	2,530.2	2,704.1	2,882.1	3,067.9	3,254.1
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
Space Heating	76.0	155.0	237.8	325.4	418.5	517.8	619.6	729.0	846.0	970.4	1,102.3	1,241.4	1,386.6	1,533.9	1,686.2	1,819.1	1,955.9	2,097.1	2,242.1	2,393.1	2,542.9
Water Heating	30.5	61.9	94.5	128.6	158.8	190.9	225.1	261.8	300.8	342.1	385.8	431.8	457.0	484.0	512.5	542.6	574.0	606.8	639.7	674.5	710.8
Mfg_CZ2	31.7	64.6	99.0	135.4	172.1	211.3	251.9	295.5	342.0	391.6	444.0	499.4	550.2	602.3	656.3	705.1	755.5	807.7	861.0	916.7	972.4
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	22.5	45.8	70.3	96.3	123.9	153.4	183.7	216.2	251.1	288.2	327.6	369.2	412.6	456.7	502.3	542.3	583.4	625.9	669.5	715.0	760.0
Water Heating	9.3	18.8	28.7	39.1	48.2	57.9	68.2	79.2	90.9	103.3	116.4	130.2	137.6	145.5	154.0	162.8	172.1	181.7	191.4	201.6	212.3
Mfg_CZ3	39.2	79.8	122.1	166.7	211.8	259.7	309.3	362.4	418.9	478.9	542.2	608.9	670.6	733.5	798.7	856.6	916.5	978.3	1,041.6	1,107.6	1,173.8
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	28.7	58.4	89.5	122.3	157.1	194.1	232.0	272.6	315.9	361.8	410.4	461.5	514.9	568.8	624.6	672.7	722.1	773.1	825.6	880.1	934.3
Water Heating	10.6	21.4	32.6	44.3	54.7	65.7	77.4	89.8	103.1	117.1	131.8	147.4	155.7	164.6	174.0	183.9	194.3	205.1	215.9	227.4	239.4
Multi_CZ1	3,508.8	7,195.7	11,093.0	15,253.0	19,402.9	23,905.3	28,593.3	33,720.3	39,293.1	45,302.8	51,751.5	58,617.4	64,586.6	70,752.0	77,208.6	83,124.8	89,265.5	95,657.0	102,266.8	109,263.2	116,414.9
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8
Space Heating	1,871.5	3,887.7	6,063.1	8,439.7	11,055.6	13,952.2	16,951.8	20,302.8	24,012.2	28,072.3	32,478.7	37,210.7	42,225.4	47,370.7	52,737.4	57,500.8	62,431.8	67,551.9	72,847.6	78,435.6	84,109.9
Water Heating	1,637.1	3,307.6	5,029.2	6,812.0	8,345.2	9,950.1	11,637.3	13,411.8	15,273.3	17,220.8	19,260.6	21,391.7	22,343.1	23,360.0	24,446.5	25,595.7	26,801.6	28,069.1	29,379.1	30,783.3	32,256.3
Multi_CZ2	3,331.3	6,834.9	10,548.3	14,524.0	18,503.4	22,837.7	27,392.6	32,390.7	37,839.6	43,730.7	50,065.4	56,820.3	62,731.6	68,850.0	75,259.2	81,192.1	87,347.2	93,751.4	100,366.4	107,336.3	114,455.5
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8
Space Heating	1,739.8	3,618.4	5,649.0	7,872.0	10,324.0	13,044.9	15,887.0	19,065.7	22,588.4	26,447.3	30,638.1	35,140.8	39,914.1	44,816.7	49,931.1	54,999.2	59,227.4	64,136.4	69,213.3	74,570.4	80,009.1
Water Heating	1,591.3	3,216.1	4,898.4	6,650.7	8,177.4	9,789.9	11,501.6	13,319.5	15,244.0	17,274.1	19,415.5	21,665.2	22,800.3	24,012.9	25,304.4	26,665.7	28,089.0	29,580.4	31,114.6	32,723.3	34,399.7
Multi_CZ3	3,114.7	6,374.0	9,810.2	13,466.4	17,103.3	21,032.4	25,126.7	29,583.2	34,406.2	39,588.0	45,131.2	51,018.0	56,110.9	61,348.6	66,826.7	71,737.8	76,834.6	82,138.4	87,620.8	93,412.6	99,328.1
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1
Space Heating	1,696.8	3,517.9	5,477.5	7,612.0	9,953.8	12,538.3	15,232.1	18,229.5	21,536.6	25,146.5	29,056.2	33,247.8	37,684.1	42,221.6	46,951.2	51,069.9	55,334.1	59,762.5	64,343.2	69,175.6	74,083.8
Water Heating	1,417.8	2,855.8	4,332.0	5,853.3	7,147.9	8,491.6	9,891.2	11,349.0	12,863.4	14,433.5	16,065.0	17,758.0	18,412.0	19,109.5	19,855.1	20,644.6	21,474.1	22,346.2	23,244.6	24,200.4	25,204.2
Single_CZ1	22,444.4	45,656.5	69,906.8	95,438.7	121,318.7	148,834.3	177,383.4	207,939.7	240,509.0	275,049.1	311,579.6	350,039.5	385,748.2	421,136.3	457,897.5	492,605.6	528,389.4	565,359.0	603,165.6	642,655.2	682,514.0
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3
Space Heating	16,498.2	33,591.0	51,472.5	70,329.3	90,285.9	111,490.8	133,283.0	156,605.1	181,461.5	207,818.6	235,681.2	265,006.1	295,600.9	325,543.6	356,524.0	385,154.3	414,596.6	444,934.6	476,105.3	508,569.7	541,102.8
Water Heating	5,945.2	12,063.0	18,429.8	25,102.2	31,021.7	37,327.5	44,078.1	51,304.2	59,007.4	67,179.2	75,834.0	84,954.5	90,052.5	95,480.8	101,243.6	107,302.4	113,624.3	120,235.5	126,850.3	133,853.6	141,156.9
Single_CZ2	41,982.9	85,413.7	130,803.4	178,612.4	227,048.6	278,576.6	332,034.2	389,285.3	450,341.2	515,120.8	583,657.2	655,833.7	722,712.5	789,074.6	858,023.6	923,265.4	990,531.8	1,060,030.7	1,131,092.0	1,205,305.9	1,280,171.0
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4
Space Heating	30,593.8	62,321.5	95,541.7	130,610.0	167,767.9	207,299.9	247,935.9	291,484.1	337,954.7	387,283.1	439,473.4	494,441.0	551,819.9	608,071.1	666,288.6	720,249.4	775,746.1	832,938.9	891,707.3	952,928.6	1,014,247.0
Water Heating	11,387.3	23,087.7	35,253.3	47,988.8	59,260.0	71,246.7	84,056.4	97,744.4	112,311.6	127,741.6	144,063.3	161,245.0	170,715.2	180,794.1	191,491.8	202,737.5	214,470.5	226,738.3	238,991.8	251,943.6	265,448.4
Single_CZ3	30,886.3	62,760.8	96,002.2	130,928.8	166,334.5	203,868.8	242,760.3	284,257.6	328,363.4	375,023.6	424,273.8	476,040.2	524,320.5	571,936.8	621,353.0	667,632.6	715,327.4	764,578.6	814,952.6	867,520.1	920,602.7
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5
Space Heating	23,260.0	47,303.6	72,406.6	98,815.7	126,688.0	156,216.3	186,558.3	218,926.1	253,321.7	289,701.7	328,081.8	368,408.7	410,426.9	451,377.9	493,718.5	532,558.8	572,490.9	613,624.3	655,876.3	699,857.9	743,987.3
Water Heating	7,625.0	15,454.1	23,590.0	32,104.0	39,632.7	47,632.4	56,173.9	65,293.5	74,991.5	85,257.5	96,111.3	107,532.5	113,774.6	120,418.4	127,471.4	134,887.0	142,625.2	150,717.3	158,812.8	167,371.4	176,296.6
Grand Total	105,445.8	214,596.9	328,717.3	448,979.5	570,672.7	700,234.7	834,696.6	978,825.5	1,132,660.3	1,295,998.1	1,468,933.1	1,651,150.7	1,819,275.0	1,986,451.9	2,160,222.5	2,323,482.1	2,491,898.1	2,666,005.3	2,844,248.9	3,030,585.4	3,218,886.6

C-19: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #19)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	100.1	203.7	312.3	426.9	542.7	666.4	794.5	932.3	1,079.6	1,236.2	1,402.4	1,577.6	1,738.0	1,901.9	2,072.2	2,224.3	2,381.4	2,543.9	2,710.2	2,883.9	3,057.6
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
Space Heating	71.2	145.3	223.2	305.8	393.8	487.8	584.5	688.6	800.3	919.3	1,045.7	1,179.1	1,318.6	1,460.0	1,606.4	1,733.2	1,863.9	1,998.8	2,137.5	2,282.0	2,425.3
Water Heating	28.8	58.4	89.1	121.1	149.0	178.5	210.0	243.6	279.2	316.8	356.6	398.4	419.3	441.7	465.6	490.9	517.2	544.9	572.4	601.5	632.0
Mfg_CZ2	23.2	47.4	72.9	100.2	127.7	157.4	188.4	222.1	258.6	297.8	339.8	384.3	424.2	465.0	507.6	544.9	583.5	623.6	664.7	708.0	751.0
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	14.4	29.6	45.8	63.3	82.3	103.0	124.4	147.9	173.5	201.3	231.1	262.9	296.4	330.4	365.8	395.3	425.8	457.5	490.3	524.6	558.4
Water Heating	8.8	17.8	27.1	36.9	45.4	54.4	64.0	74.2	85.0	96.5	108.6	121.3	127.7	134.5	141.8	149.5	157.5	166.0	174.4	183.2	192.5
Mfg_CZ3	37.0	75.2	115.2	157.4	200.0	245.3	292.3	342.7	396.3	453.3	513.7	577.2	635.7	695.2	757.1	811.6	867.9	926.2	985.8	1,048.0	1,110.3
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	27.0	55.0	84.4	115.5	148.5	183.6	219.8	258.5	300.0	344.0	390.7	439.8	491.2	543.1	596.8	642.8	690.1	738.9	789.2	841.5	893.4
Water Heating	10.0	20.2	30.8	41.9	51.5	61.7	72.5	84.1	96.4	109.3	123.0	137.3	144.4	152.0	160.2	168.8	177.7	187.1	196.5	206.5	216.8
Multi_CZ1	3,243.7	6,645.4	10,229.1	14,040.6	17,800.8	21,866.0	26,072.6	30,662.7	35,644.9	41,014.4	46,775.8	52,912.1	58,116.7	63,493.0	69,134.3	74,212.7	79,496.0	85,008.6	90,722.3	96,802.7	103,018.1
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8
Space Heating	1,665.5	3,460.2	5,387.6	7,484.9	9,784.3	12,321.4	14,922.5	17,825.0	21,037.9	24,556.6	28,379.7	32,490.8	36,853.6	41,321.3	45,987.6	50,031.1	54,225.3	58,590.2	63,116.5	67,921.3	72,795.8
Water Heating	1,577.1	3,184.8	4,840.7	6,554.3	8,014.4	9,541.6	11,145.9	12,832.0	14,599.5	16,448.0	18,383.9	20,406.4	21,245.1	22,150.5	23,122.0	24,153.2	25,238.5	26,382.3	27,565.7	28,837.0	30,173.6
Multi_CZ2	2,893.7	5,939.5	9,164.3	12,613.9	16,024.2	19,740.3	23,811.9	28,269.7	33,123.1	38,367.5	44,005.8	50,019.2	55,151.1	60,462.8	66,035.9	71,107.2	76,378.4	81,874.4	87,561.2	93,579.5	99,723.4
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8
Space Heating	1,359.8	2,840.9	4,446.0	6,209.3	8,162.6	10,340.0	12,778.6	15,502.3	18,520.3	21,828.4	25,423.7	29,290.2	33,393.8	37,598.4	41,988.8	45,810.4	49,772.5	53,894.1	58,166.6	62,702.3	67,299.1
Water Heating	1,533.8	3,098.2	4,717.5	6,403.3	7,859.7	9,397.5	11,029.3	12,761.9	14,595.6	16,529.8	18,570.4	20,714.6	21,740.1	22,844.0	24,023.4	25,269.6	26,575.0	27,945.7	29,356.1	30,834.7	32,377.5
Multi_CZ3	2,721.5	5,569.3	8,566.3	11,749.6	14,875.0	18,248.3	21,909.0	25,880.5	30,168.9	34,770.0	39,687.9	44,908.7	49,301.5	53,814.6	58,541.7	62,678.8	66,981.6	71,469.4	76,117.9	81,054.9	86,094.1
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1
Space Heating	1,355.6	2,819.7	4,397.2	6,118.8	8,012.6	10,108.9	12,441.2	15,030.7	17,885.3	21,001.2	24,376.7	27,997.6	31,833.0	35,744.1	39,824.0	43,272.8	46,849.5	50,571.2	54,429.8	58,525.1	62,677.6
Water Heating	1,365.8	2,749.3	4,168.5	5,629.7	6,860.7	8,136.9	9,464.3	10,845.1	12,277.4	13,760.8	15,301.2	16,898.8	17,453.7	18,053.0	18,697.3	19,382.7	20,105.6	20,868.5	21,655.1	22,493.3	23,376.3
Single_CZ1	21,405.7	43,541.4	66,673.5	91,035.9	115,689.9	141,915.0	169,124.5	198,261.2	229,330.0	262,291.0	297,161.8	333,883.7	367,808.4	401,371.4	436,249.4	469,022.0	502,823.2	537,758.8	573,478.8	610,782.3	648,395.4
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3
Space Heating	15,788.8	32,168.7	49,323.5	67,438.2	86,639.1	107,074.7	128,108.2	150,656.9	174,726.7	200,284.2	227,330.5	255,821.6	285,567.2	314,646.5	344,748.1	372,485.2	401,020.5	430,437.7	460,674.4	492,190.0	523,757.5
Water Heating	5,615.9	11,370.2	17,345.5	23,590.5	29,039.8	34,824.2	40,993.9	47,574.0	54,563.3	61,955.5	69,766.9	77,983.1	82,146.3	86,613.0	91,371.3	96,387.9	101,634.2	107,132.1	112,594.3	118,360.4	124,383.5
Single_CZ2	33,787.2	68,936.5	105,856.5	144,978.6	184,521.0	226,938.1	271,086.2	318,779.1	370,041.9	424,798.7	483,047.4	544,664.5	600,758.9	656,152.2	713,908.4	767,737.0	823,397.1	881,088.7	940,149.4	1,002,087.1	1,064,438.0
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4
Space Heating	23,016.6	47,128.8	72,587.1	99,728.9	128,815.0	160,130.8	192,436.3	227,496.7	265,339.1	305,899.5	349,145.2	394,980.0	443,061.5	489,857.7	538,455.8	582,629.3	628,192.9	675,303.5	723,850.8	774,690.9	825,450.3
Water Heating	10,768.8	21,803.1	33,261.0	45,236.1	55,685.3	66,777.4	78,608.0	91,225.6	104,628.0	118,803.1	133,781.8	149,536.8	157,520.0	166,085.1	175,209.4	184,829.1	194,889.0	205,431.6	215,905.7	226,962.5	238,512.1
Single_CZ3	29,556.4	60,064.4	91,893.8	125,353.1	159,232.7	195,174.5	232,430.5	272,211.9	314,521.4	359,308.0	406,604.0	456,337.3	502,524.2	548,010.6	595,237.1	639,273.0	684,674.8	731,580.0	779,554.8	829,626.2	880,150.8
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5
Space Heating	22,344.9	45,468.7	69,634.2	95,086.0	121,983.4	150,519.4	179,882.5	211,252.3	244,633.0	279,981.3	317,308.3	356,559.4	397,482.0	437,319.0	478,525.8	516,213.7	554,975.5	594,920.9	635,967.9	678,725.2	721,608.9
Water Heating	7,210.3	14,592.7	22,254.0	30,258.0	37,235.4	44,635.1	52,520.0	60,921.5	69,838.2	79,262.3	89,215.0	99,678.9	104,923.2	110,551.2	116,548.2	122,872.5	129,487.9	136,422.1	143,323.4	150,610.1	158,223.0
Grand Total	93,768.5	191,022.8	292,884.0	400,456.2	509,013.9	624,951.3	745,709.9	875,562.0	1,014,564.8	1,162,537.0	1,319,538.6	1,485,264.6	1,636,458.7	1,786,366.7	1,942,443.7	2,087,611.4	2,237,583.8	2,392,873.6	2,551,945.2	2,718,572.5	2,886,738.8

C-20: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #20)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	45.4	94.0	146.3	203.4	260.6	324.3	395.7	475.3	563.2	659.3	763.4	875.0	970.4	1,068.1	1,170.8	1,278.0	1,388.9	1,504.1	1,621.9	1,745.7	1,868.5
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
Space Heating	16.6	35.6	57.3	82.5	111.8	146.1	186.1	232.3	284.8	343.5	408.1	478.2	553.0	628.5	707.6	789.9	874.7	962.7	1,053.3	1,148.4	1,241.1
Water Heating	28.8	58.3	89.0	120.9	148.7	178.2	209.5	242.9	278.3	315.7	355.2	396.7	417.3	439.4	463.0	487.9	513.9	541.2	568.3	597.0	627.0
Mfg_CZ2	13.8	28.5	44.3	61.7	79.0	98.4	120.0	144.2	170.9	200.1	231.8	265.7	294.7	324.4	355.7	388.3	422.1	457.1	493.0	530.7	568.0
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	5.0	10.7	17.3	24.8	33.7	44.1	56.2	70.2	86.1	103.9	123.6	144.8	167.6	190.5	214.6	239.6	265.5	292.2	319.8	348.7	376.9
Water Heating	8.8	17.8	27.1	36.8	45.3	54.3	63.8	74.0	84.8	96.2	108.2	120.8	127.1	133.8	141.0	148.6	156.5	164.8	173.1	181.8	191.0
Mfg_CZ3	16.2	33.6	52.2	72.5	92.9	115.5	140.9	169.0	200.1	234.0	270.8	310.1	343.9	378.3	414.5	452.2	491.2	531.8	573.3	616.9	660.2
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	6.2	13.4	21.4	30.7	41.5	54.0	68.5	85.1	104.0	125.1	148.2	173.3	200.1	227.0	255.1	284.4	314.6	345.9	378.1	411.9	445.0
Water Heating	10.0	20.2	30.8	41.8	51.4	61.6	72.4	83.9	96.1	108.9	122.5	136.7	143.7	151.3	159.3	167.7	176.6	185.9	195.1	204.9	215.1
Multi_CZ1	2,082.8	4,308.2	6,685.3	9,254.7	11,737.7	14,488.2	17,550.0	20,951.6	24,703.4	28,801.2	33,245.0	38,017.5	41,819.6	45,757.5	49,923.9	54,289.4	58,829.2	63,566.1	68,485.4	73,729.4	79,078.0
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8
Space Heating	513.8	1,144.7	1,884.2	2,764.9	3,820.9	5,087.1	6,598.9	8,380.8	10,443.9	12,784.0	15,394.1	18,256.6	21,339.6	24,499.1	27,827.4	31,300.6	34,898.7	38,640.7	42,518.3	46,640.0	50,806.1
Water Heating	1,568.8	3,163.0	4,800.2	6,488.4	7,914.7	9,398.1	10,947.0	12,565.1	14,251.9	16,007.5	17,838.7	19,745.9	20,462.0	21,237.1	22,071.8	22,960.5	23,898.4	24,889.4	25,926.9	27,044.9	28,223.1
Multi_CZ2	1,980.9	4,076.8	6,303.2	8,694.6	10,978.9	13,490.6	16,267.7	19,334.6	22,700.6	26,362.9	30,323.6	34,568.5	37,855.0	41,253.9	44,851.3	48,621.6	52,543.3	56,636.1	60,883.9	65,398.5	69,992.0
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8
Space Heating	454.9	999.1	1,623.7	2,353.3	3,212.9	4,228.1	5,425.5	6,823.7	8,432.0	10,247.5	12,266.0	14,475.1	16,851.6	19,269.0	21,815.6	24,473.8	27,228.6	30,094.4	33,068.8	36,248.8	39,448.2
Water Heating	1,525.8	3,077.3	4,678.7	6,340.0	7,764.0	9,259.6	10,838.1	12,505.4	14,261.4	16,106.1	18,045.9	20,079.0	20,986.2	21,964.6	23,011.9	24,120.6	25,283.9	26,507.1	27,776.6	29,107.2	30,497.0
Multi_CZ3	1,832.2	3,778.6	5,850.6	8,081.0	10,225.7	12,588.5	15,205.1	18,097.7	21,274.0	24,730.2	28,466.8	32,469.9	35,614.6	38,851.2	42,273.2	45,856.9	49,582.2	53,467.2	57,498.8	61,785.8	66,152.0
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1
Space Heating	473.2	1,047.0	1,715.0	2,505.1	3,446.8	4,569.8	5,905.0	7,473.4	9,284.4	11,334.5	13,617.7	16,119.0	18,810.8	21,556.5	24,448.1	27,465.0	30,590.0	33,839.4	37,206.0	40,782.6	44,397.8
Water Heating	1,358.9	2,731.3	4,134.9	5,574.8	6,777.2	8,016.2	9,296.6	10,619.7	11,983.4	13,387.8	14,839.1	16,338.5	16,788.9	17,277.2	17,804.7	18,368.5	18,965.8	19,598.1	20,259.8	20,966.7	21,714.0
Single_CZ1	12,449.8	25,548.0	39,437.4	54,322.0	69,275.9	85,569.3	103,409.4	122,915.9	144,112.4	166,963.3	191,446.7	217,496.6	240,507.6	262,927.2	286,428.0	310,872.0	336,143.1	362,339.5	389,124.1	417,243.4	445,483.1
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3
Space Heating	6,835.5	14,184.1	22,104.7	30,753.3	40,269.8	50,794.3	62,484.3	75,434.7	89,670.6	105,162.2	121,871.3	139,745.9	158,631.7	176,625.4	195,411.3	214,884.4	234,957.1	255,705.6	277,081.0	299,494.5	321,774.5
Water Heating	5,613.3	11,361.5	17,328.2	23,561.5	28,995.0	34,759.1	40,902.8	47,450.8	54,401.9	61,749.8	69,511.1	77,671.8	81,781.0	86,189.8	90,886.7	95,838.6	101,017.5	106,444.9	111,833.0	117,517.1	123,454.3
Single_CZ2	23,430.4	48,073.7	74,207.8	102,217.0	130,320.3	160,946.7	194,484.9	231,159.7	271,013.8	313,978.9	360,057.4	409,079.9	452,221.7	494,329.7	538,467.4	584,375.0	631,834.4	681,029.3	731,311.1	784,067.8	837,002.5
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4
Space Heating	12,664.7	26,282.9	40,971.7	57,023.0	74,700.1	94,264.3	116,009.7	140,113.4	166,620.4	195,474.2	226,645.7	259,992.4	295,224.7	328,846.7	363,944.1	400,320.7	437,812.7	476,561.9	516,472.3	558,288.8	599,796.5
Water Heating	10,763.8	21,786.2	33,227.7	45,180.4	55,599.6	66,652.4	78,433.3	90,989.6	104,318.5	118,408.6	133,291.2	148,939.9	156,819.6	165,273.7	174,280.1	183,775.8	193,706.5	204,113.9	214,445.9	225,345.3	236,730.3
Single_CZ3	17,305.7	35,457.0	54,653.2	75,163.2	95,796.4	118,183.9	142,595.9	169,187.4	197,987.3	228,949.7	262,052.8	297,213.6	328,505.1	358,787.1	390,495.8	423,451.3	457,501.8	492,775.2	528,855.3	566,703.2	604,746.8
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5
Space Heating	10,097.5	20,872.5	32,415.9	44,933.4	58,604.7	73,612.5	90,165.1	108,386.2	128,306.5	149,887.7	173,086.3	197,836.3	223,933.1	248,640.2	274,408.4	301,099.1	328,596.5	357,000.8	386,248.5	416,888.1	447,401.2
Water Heating	7,207.0	14,581.4	22,231.7	30,220.6	37,177.9	44,551.3	52,402.7	60,763.1	69,630.6	78,997.6	88,885.8	99,278.3	104,453.1	110,006.5	115,924.4	122,165.4	128,694.0	135,537.4	142,343.3	149,524.3	157,026.6
Grand Total	59,157.1	121,398.3	187,380.3	258,070.1	328,767.4	405,805.4	490,169.6	582,435.6	682,725.7	790,879.7	906,858.2	1,030,296.8	1,138,132.6	1,243,677.4	1,354,380.5	1,469,584.6	1,588,736.3	1,712,306.4	1,838,846.9	1,971,821.4	2,105,550.9

C-21: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #21)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Mfg_CZ1	42.8	87.3	134.0	183.3	230.0	280.4	335.0	394.3	458.4	527.3	601.2	679.9	740.3	801.0	865.1	932.1	1,001.8	1,074.5	1,149.4	1,228.3	1,307.9	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4
Space Heating	14.6	30.5	47.8	66.9	88.1	112.1	139.1	169.6	203.8	241.7	283.3	328.3	376.5	424.0	473.9	526.0	579.8	635.6	693.3	753.9	814.2	
Water Heating	28.2	56.8	86.2	116.4	141.9	168.3	195.9	224.6	254.5	285.6	317.9	351.5	363.7	376.8	390.9	406.0	421.9	438.6	455.8	474.1	493.3	
Mfg_CZ2	12.7	25.9	39.7	54.4	68.3	83.2	99.5	117.1	136.2	156.8	178.9	202.4	220.4	238.5	257.6	277.6	298.4	320.1	342.4	366.0	389.8	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	4.1	8.6	13.5	18.9	25.0	32.0	39.8	48.7	58.7	69.8	82.1	95.4	109.6	123.6	138.4	153.9	169.8	186.4	203.5	221.5	239.4	
Water Heating	8.6	17.3	26.2	35.5	43.2	51.3	59.7	68.4	77.5	87.0	96.8	107.1	110.8	114.8	119.1	123.7	128.5	133.6	138.8	144.4	150.2	
Mfg_CZ3	15.3	31.1	47.7	65.3	81.9	99.9	119.3	140.4	163.2	187.6	213.9	241.8	263.3	284.9	307.7	331.5	356.2	382.0	408.6	436.6	464.9	
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	5.5	11.4	17.9	24.9	32.8	41.6	51.5	62.6	75.1	88.8	103.9	120.2	137.6	154.7	172.7	191.3	210.7	230.7	251.4	273.2	294.9	
Water Heating	9.8	19.7	29.9	40.3	49.1	58.3	67.8	77.7	88.1	98.8	109.9	121.5	125.6	130.1	134.9	140.1	145.5	151.2	157.1	163.3	169.9	
Multi_CZ1	1,967.9	4,031.2	6,196.7	8,490.7	10,618.8	12,921.6	15,430.1	18,165.2	21,136.6	24,345.6	27,798.1	31,486.4	34,127.4	36,839.2	39,721.7	42,754.2	45,919.3	49,234.0	52,690.3	56,411.2	60,250.6	
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8	
Space Heating	399.6	870.2	1,400.5	2,009.1	2,714.5	3,538.8	4,504.6	5,629.0	6,922.6	8,386.3	10,019.2	11,813.1	13,750.2	15,700.0	17,761.6	19,920.0	22,162.4	24,502.0	26,937.6	29,559.3	32,240.3	
Water Heating	1,568.1	3,160.6	4,795.4	6,480.3	7,902.2	9,379.8	10,921.3	12,530.5	14,206.5	15,949.6	17,766.7	19,658.3	20,359.2	21,118.0	21,935.3	22,805.8	23,724.8	24,695.9	25,712.6	26,807.5	27,961.5	
Multi_CZ2	1,908.1	3,909.3	6,017.2	8,259.5	10,356.7	12,638.6	15,138.2	17,877.6	20,866.9	24,107.2	27,603.7	31,347.1	34,102.8	36,945.7	39,964.3	43,136.4	46,443.3	49,902.7	53,499.9	57,334.8	61,285.1	
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8	
Space Heating	382.9	833.9	1,342.4	1,926.0	2,602.9	3,393.9	4,320.9	5,400.4	6,642.6	8,048.3	9,616.7	11,339.8	13,200.7	15,078.3	17,063.6	19,141.9	21,300.9	23,553.4	25,898.1	28,421.7	31,002.2	
Water Heating	1,525.1	3,074.9	4,674.0	6,332.2	7,751.8	9,241.9	10,813.3	12,471.7	14,217.1	16,049.5	17,975.3	19,992.9	20,884.9	21,846.9	22,876.9	23,967.3	25,111.6	26,314.7	27,563.3	28,870.6	30,236.1	
Multi_CZ3	1,732.5	3,538.3	5,426.6	7,417.8	9,254.1	11,228.0	13,363.5	15,676.3	18,173.3	20,855.3	23,727.8	26,785.5	28,917.3	31,084.0	33,385.2	35,805.1	38,330.0	40,972.8	43,726.4	46,682.4	49,728.8	
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1	
Space Heating	374.1	808.8	1,295.2	1,849.1	2,486.2	3,225.4	4,085.9	5,082.3	6,223.7	7,510.7	8,942.5	10,512.5	12,205.1	13,895.6	15,682.1	17,551.8	19,493.6	21,518.9	23,626.4	25,893.0	28,210.4	
Water Heating	1,358.3	2,729.1	4,130.7	5,567.6	6,766.2	8,000.2	9,274.1	10,589.2	11,943.4	13,336.6	14,775.3	16,260.7	16,697.4	17,170.9	17,682.7	18,230.0	18,810.0	19,424.3	20,067.0	20,752.8	21,478.2	
Single_CZ1	12,021.3	24,433.5	37,365.0	50,939.0	64,142.2	78,181.3	93,197.4	109,277.1	126,448.7	144,713.7	164,113.0	184,613.1	201,684.1	217,844.8	234,802.3	252,462.0	270,742.6	289,716.3	309,252.7	329,785.5	350,688.6	
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0	
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3	
Space Heating	6,526.1	13,372.1	20,590.4	28,275.8	36,503.4	45,372.8	54,996.3	65,448.7	76,762.2	88,938.2	101,993.0	115,892.7	130,536.9	144,072.4	158,206.3	172,862.7	187,977.2	203,609.5	219,721.0	236,616.5	253,693.9	
Water Heating	5,494.2	11,058.9	16,770.1	22,656.0	27,627.7	32,792.5	38,178.7	43,798.1	49,646.5	55,724.2	62,055.6	68,641.5	71,052.4	73,660.5	76,466.0	79,450.4	82,596.9	85,917.8	89,321.6	92,937.1	96,740.4	
Single_CZ2	22,624.4	45,992.1	70,344.8	95,917.0	120,765.7	147,204.1	175,500.6	205,820.9	238,219.7	272,699.6	309,337.4	348,068.6	380,209.0	410,735.6	442,776.1	476,150.1	510,702.7	546,571.5	583,506.5	622,330.6	661,846.1	
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2	
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4	
Space Heating	12,087.1	24,781.4	38,178.8	52,459.4	67,767.5	84,292.8	102,249.0	121,779.0	142,945.0	165,749.4	190,222.0	216,297.2	243,784.7	269,278.3	295,905.2	323,521.2	352,003.4	381,466.0	411,834.5	443,684.9	475,865.6	
Water Heating	10,535.5	21,206.1	32,157.6	43,444.0	52,977.6	62,881.4	73,209.8	83,985.2	95,199.9	106,854.2	118,995.1	131,623.7	136,246.8	141,247.9	146,627.7	152,350.4	158,384.1	164,752.0	171,279.1	178,212.0	185,504.9	
Single_CZ3	16,762.8	34,044.6	52,025.1	70,867.8	89,268.4	108,781.2	129,592.3	151,814.6	175,482.9	200,599.0	227,221.3	255,307.9	279,028.3	301,332.7	324,701.6	349,010.3	374,151.3	400,219.5	427,052.0	455,221.3	483,910.1	
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4	
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5	
Space Heating	9,699.9	19,829.4	30,470.4	41,750.8	53,766.6	66,648.8	80,547.7	95,561.6	111,730.5	129,056.1	147,565.2	167,214.9	187,869.9	206,857.8	226,658.4	247,170.8	268,308.6	290,151.1	312,647.9	336,211.4	360,054.3	
Water Heating	7,061.6	14,212.2	21,549.1	29,107.9	35,488.0	42,112.4	49,016.5	56,215.0	63,702.2	71,478.5	79,575.3	87,993.9	91,039.4	94,334.6	97,880.1	101,652.7	105,631.4	109,831.3	114,140.6	118,719.2	123,536.9	
Grand Total	57,087.8	116,093.2	177,596.9	242,194.8	304,786.1	371,418.5	442,776.0	519,283.5	601,086.0	688,192.2	780,795.4	878,732.7	959,292.9	1,036,106.3	1,116,781.3	1,200,859.4	1,287,945.8	1,378,393.4	1,471,628.2	1,569,796.6	1,669,871.8	

C-22: Residential Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #22)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Mfg_CZ1	106.3	216.4	331.5	452.9	575.7	706.6	842.4	987.9	1,143.3	1,308.4	1,483.2	1,667.4	1,837.1	2,010.4	2,190.3	2,352.2	2,519.3	2,692.1	2,868.8	3,053.3	3,238.0
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
Space Heating	75.9	154.6	237.2	324.7	417.6	516.7	618.5	727.8	844.8	969.2	1,101.1	1,240.1	1,385.3	1,532.5	1,684.8	1,817.6	1,954.4	2,095.5	2,240.4	2,391.4	2,541.1
Water Heating	30.5	61.8	94.2	128.2	158.2	190.0	223.9	260.0	298.5	339.1	382.1	427.2	451.7	477.7	505.3	534.4	564.7	596.4	628.1	661.6	696.5
Mfg_CZ2	31.7	64.5	98.9	135.1	171.8	210.9	251.5	295.1	341.7	391.2	443.6	498.9	549.8	601.8	655.8	704.6	755.0	807.1	860.4	916.0	971.7
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	22.4	45.7	70.2	96.1	123.6	153.1	183.3	215.9	250.7	287.8	327.2	368.8	412.2	456.2	501.8	541.8	582.9	625.4	669.0	714.4	759.5
Water Heating	9.3	18.8	28.7	39.1	48.2	57.9	68.2	79.2	90.9	103.3	116.4	130.1	137.6	145.5	153.9	162.8	172.0	181.6	191.3	201.5	212.2
Mfg_CZ3	39.2	79.6	121.9	166.4	211.5	259.3	308.9	362.0	418.5	478.4	541.8	608.4	670.1	732.9	798.1	856.0	915.8	977.6	1,040.9	1,106.9	1,173.0
Room Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Space Heating	28.6	58.3	89.3	122.1	156.8	193.7	231.6	272.2	315.4	361.4	409.9	461.1	514.4	568.4	624.1	672.1	721.6	772.6	825.0	879.5	933.7
Water Heating	10.6	21.4	32.6	44.3	54.7	65.7	77.4	89.8	103.0	117.0	131.8	147.3	155.6	164.5	173.9	183.8	194.2	205.0	215.8	227.3	239.2
Multi_CZ1	3,498.2	7,171.8	11,054.0	15,196.4	19,325.7	23,803.8	28,472.4	33,575.3	39,119.4	45,096.3	51,508.4	58,334.2	64,260.4	70,384.9	76,798.4	82,669.4	88,763.1	95,105.6	101,664.4	108,604.5	115,697.5
Room Heating	0.2	0.4	0.8	1.4	2.1	3.0	4.2	5.7	7.6	9.7	12.2	15.0	18.0	21.3	24.7	28.3	32.1	36.0	40.1	44.4	48.8
Space Heating	1,862.8	3,870.1	6,036.5	8,404.0	11,010.6	13,897.6	16,896.4	20,246.3	23,954.6	28,013.2	32,418.1	37,148.3	42,161.0	47,304.1	52,668.5	57,429.3	62,357.6	67,474.8	72,767.5	78,352.2	84,023.1
Water Heating	1,635.2	3,301.3	5,016.7	6,791.0	8,313.0	9,903.2	11,571.7	13,323.2	15,157.3	17,073.4	19,078.2	21,171.0	22,081.4	23,059.6	24,105.2	25,211.7	26,373.4	27,594.8	28,856.8	30,207.9	31,625.6
Multi_CZ2	3,321.1	6,811.9	10,510.8	14,469.5	18,429.1	22,739.9	27,275.8	32,250.4	37,671.1	43,529.8	49,828.3	56,543.5	62,412.1	68,489.6	74,855.5	80,743.1	86,851.1	93,206.1	99,769.9	106,683.1	113,743.4
Room Heating	0.2	0.4	0.8	1.3	2.0	2.9	4.0	5.5	7.2	9.3	11.7	14.4	17.3	20.4	23.7	27.2	30.8	34.6	38.5	42.6	46.8
Space Heating	1,731.4	3,601.5	5,623.6	7,837.8	10,280.8	12,992.6	15,833.8	19,011.5	22,533.0	26,390.6	30,579.9	35,080.8	39,852.2	44,752.8	49,864.9	54,430.6	59,156.2	64,062.4	69,136.4	74,490.4	79,925.8
Water Heating	1,589.5	3,210.0	4,886.4	6,630.5	8,146.3	9,744.5	11,437.9	13,233.3	15,130.8	17,129.9	19,236.6	21,448.4	22,542.6	23,716.4	24,966.8	26,285.3	27,664.1	29,109.1	30,594.9	32,150.1	33,770.9
Multi_CZ3	3,105.5	6,353.3	9,776.3	13,417.2	17,036.2	20,944.0	25,021.2	29,456.4	34,253.9	39,406.5	44,916.9	50,767.9	55,822.1	61,022.8	66,461.8	71,331.9	76,386.2	81,645.4	87,081.5	92,822.1	98,684.4
Room Heating	0.1	0.4	0.7	1.1	1.7	2.5	3.5	4.7	6.2	8.0	10.0	12.3	14.8	17.5	20.3	23.3	26.4	29.7	33.0	36.5	40.1
Space Heating	1,689.2	3,502.6	5,454.5	7,581.1	9,914.7	12,491.0	15,184.0	18,180.5	21,486.6	25,095.3	29,003.6	33,193.6	37,628.2	42,163.8	46,891.4	51,007.9	55,269.8	59,695.7	64,273.7	69,103.4	74,008.5
Water Heating	1,416.2	2,850.3	4,321.1	5,835.0	7,119.7	8,450.5	9,833.7	11,271.2	12,761.1	14,303.2	15,903.3	17,561.9	18,179.1	18,841.5	19,550.0	20,300.7	21,089.9	21,920.1	22,774.8	23,682.2	24,635.7
Single_CZ1	22,412.1	45,582.2	69,783.4	95,257.1	121,067.2	148,498.9	176,973.1	207,435.8	239,892.0	274,299.4	310,678.0	348,967.7	384,506.6	419,711.2	456,276.2	490,777.0	526,343.8	563,085.3	600,651.8	639,875.7	679,456.4
Other	0.5	1.3	2.4	3.8	5.8	8.4	11.7	15.9	20.9	26.8	33.5	41.1	49.3	58.1	67.5	77.2	87.3	97.8	108.7	119.7	131.0
Room Heating	0.4	1.1	2.1	3.4	5.2	7.6	10.6	14.5	19.1	24.6	30.8	37.8	45.5	53.8	62.5	71.7	81.2	91.1	101.4	112.2	123.3
Space Heating	16,472.9	33,540.2	51,395.8	70,226.0	90,155.6	111,333.0	133,122.7	156,441.7	181,294.6	207,647.7	235,505.7	264,825.3	295,414.3	325,350.8	356,324.3	384,947.3	414,381.7	444,711.4	475,873.3	508,328.4	540,851.5
Water Heating	5,938.2	12,039.5	18,383.2	25,023.8	30,900.5	37,149.9	43,828.1	50,963.7	58,557.4	66,600.4	75,107.9	84,063.4	88,997.4	94,248.5	99,821.9	105,680.8	111,793.5	118,184.9	124,568.5	131,315.5	138,350.5
Single_CZ2	41,933.9	85,314.9	130,653.5	178,410.0	226,792.1	278,264.2	331,712.9	388,953.2	449,996.3	514,761.2	583,280.7	655,438.1	722,296.9	788,637.2	857,562.7	922,779.5	990,019.4	1,059,490.2	1,130,522.0	1,204,703.9	1,279,535.2
Other	1.0	2.5	4.6	7.4	11.1	16.1	22.5	30.5	40.1	51.4	64.3	78.8	94.6	111.5	129.4	148.1	167.5	187.6	208.3	229.5	251.2
Room Heating	0.8	2.0	3.8	6.2	9.5	13.8	19.4	26.3	34.8	44.7	56.1	68.9	82.8	97.8	113.8	130.4	147.8	165.9	184.6	204.2	224.4
Space Heating	30,545.1	62,224.0	95,394.4	130,411.9	167,518.0	206,997.3	247,628.4	291,170.7	337,634.5	386,955.2	439,136.7	494,094.3	551,462.0	607,701.3	665,905.6	719,852.3	775,334.0	832,510.7	891,262.3	952,465.7	1,013,765.0
Water Heating	11,386.9	23,086.4	35,259.7	47,984.5	59,253.4	71,237.0	84,042.7	97,725.8	112,287.0	127,709.9	144,023.5	161,196.2	170,657.4	180,726.6	191,413.9	202,648.7	214,370.2	226,626.0	238,866.8	251,804.5	265,294.6
Single_CZ3	30,853.5	62,694.7	95,901.9	130,793.3	166,162.7	203,659.6	242,545.1	284,035.2	328,132.4	374,782.7	424,021.6	475,775.3	524,042.1	571,643.8	621,044.2	667,307.1	714,984.1	764,216.5	814,570.6	867,116.7	920,176.7
Other	0.7	1.7	3.1	4.9	7.5	10.8	15.1	20.4	26.9	34.5	43.1	52.8	63.4	74.8	86.8	99.3	112.3	125.8	139.7	153.9	168.4
Room Heating	0.5	1.4	2.6	4.2	6.4	9.3	13.0	17.6	23.3	30.0	37.6	46.2	55.6	65.6	76.3	87.5	99.1	111.2	123.8	136.9	150.5
Space Heating	23,227.5	47,238.4	72,308.0	98,683.1	126,520.6	156,013.6	186,352.4	218,716.2	253,107.2	289,482.1	327,856.3	368,176.5	410,187.3	451,130.3	493,462.0	532,292.9	572,214.9	613,337.6	655,578.3	699,547.9	743,664.5
Water Heating	7,624.8	15,453.3	23,588.3	32,101.1	39,628.2	47,625.9	56,164.7	65,280.9	74,975.0	85,236.2	96,084.6	107,499.7	113,735.8	120,373.1	127,419.1	134,827.3	142,557.8	150,641.8	158,728.9	167,278.0	176,193.3
Grand Total	105,301.4	214,289.4	328,232.2	448,297.9	569,771.9	699,087.5	833,403.3	977,351.3	1,130,968.6	1,294,053.9	1,466,702.5	1,648,601.5	1,816,397.1	1,983,234.4	2,156,642.9	2,319,520.8	2,487,537.7	2,661,226.0	2,839,030.3	3,024,882.2	3,212,676.4

C.2 Commercial Sector Scenario Findings

C-23: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #23)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	38,857.0	78,314.2	118,532.2	159,587.3	200,957.6	243,036.8	285,913.5	319,544.5	353,019.5	387,047.9	421,915.4	455,303.3	488,810.0	520,906.7	552,446.3	583,751.1	615,825.4	644,365.4	673,916.4	700,006.0	727,064.6
Cooking	683.0	1,383.6	2,098.4	2,829.0	3,572.9	4,330.4	5,103.1	5,891.6	6,693.8	7,508.5	8,339.2	9,188.9	10,052.5	10,930.3	11,125.4	11,334.8	11,559.9	11,797.3	12,057.2	12,337.8	12,639.2
Other	2,363.0	4,749.4	7,185.0	9,674.5	12,209.3	14,790.7	17,423.9	20,111.2	22,204.2	24,340.1	26,530.4	28,785.2	31,088.0	33,438.9	35,843.1	38,296.5	40,803.9	43,353.6	45,990.4	48,696.8	51,474.7
Space Heating	15,223.8	30,702.9	46,480.2	62,586.1	78,577.8	94,847.8	111,430.8	126,960.2	142,544.2	158,389.0	174,563.0	191,133.3	207,999.8	223,027.3	237,696.3	252,662.2	267,930.2	282,243.5	296,954.9	307,616.0	318,647.5
Water Heating	20,587.2	41,478.3	62,768.6	84,497.6	106,597.6	129,067.9	151,955.7	166,581.5	181,577.3	196,810.3	212,482.8	226,195.9	239,669.7	253,510.2	267,781.5	281,457.6	295,531.5	306,971.0	318,914.0	331,355.4	344,303.2
Grocery	17,365.5	35,025.3	53,025.7	71,401.4	90,091.5	109,099.6	128,465.3	146,038.3	163,927.0	182,113.8	200,676.8	219,395.8	238,450.4	256,141.8	271,033.2	286,119.9	301,552.3	316,230.0	331,359.4	343,511.4	356,059.3
Cooking	1,754.3	3,554.0	5,390.2	7,266.9	9,177.7	11,123.4	13,108.2	15,133.5	17,194.1	19,287.0	21,420.8	23,603.2	25,821.7	28,076.4	28,577.6	29,115.8	29,694.2	30,304.1	30,971.6	31,692.5	32,466.8
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	12,740.7	25,687.6	38,882.6	52,350.6	66,046.9	79,974.0	94,160.9	107,446.4	120,960.3	134,690.8	148,694.9	163,028.5	177,608.6	190,752.4	202,789.1	215,072.2	227,604.3	239,857.5	252,430.8	261,902.2	271,643.5
Water Heating	2,870.5	5,783.6	8,752.9	11,783.9	14,866.9	18,002.2	21,196.2	23,458.3	25,772.7	28,136.0	30,561.1	32,764.1	35,020.0	37,313.0	39,666.5	41,931.9	44,253.9	46,068.4	47,957.0	49,916.8	51,949.1
Healthcare	12,191.3	24,571.4	37,188.6	50,066.6	63,020.6	76,195.0	89,617.7	100,098.3	110,679.2	121,070.4	131,722.8	141,917.0	151,788.4	161,161.5	170,366.6	179,488.0	188,846.8	196,791.8	205,040.7	212,656.4	220,540.8
Cooking	148.9	301.6	457.4	616.7	778.9	944.0	1,112.4	1,284.3	1,459.2	1,636.8	1,817.9	2,003.1	2,191.3	2,382.7	2,425.2	2,470.8	2,519.8	2,571.5	2,628.2	2,689.4	2,755.1
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,940.0	9,960.9	15,078.1	20,301.4	25,469.8	30,727.8	36,086.8	41,120.6	46,124.1	51,211.7	56,405.6	61,727.4	67,145.0	71,955.1	76,597.4	81,335.5	86,170.4	90,624.8	95,204.3	98,974.2	102,833.6
Water Heating	7,102.4	14,308.9	21,653.0	29,148.6	36,772.0	44,523.3	52,418.5	57,693.4	63,096.0	68,221.9	73,499.4	78,186.5	82,452.1	86,823.8	91,344.1	95,681.7	100,156.5	103,595.5	107,208.2	110,992.9	114,952.2
Lodging	14,259.3	28,736.6	43,490.9	58,549.9	73,852.5	89,412.4	105,262.2	118,399.8	131,675.2	144,187.6	157,005.0	168,740.6	177,960.4	187,027.1	196,161.4	204,821.0	213,757.6	222,173.0	230,933.5	239,528.5	248,456.9
Cooking	7.9	16.0	24.2	32.7	41.3	50.0	58.9	68.0	77.3	86.7	96.3	106.1	116.1	126.2	136.6	147.0	157.7	168.5	171.5	174.8	178.2
Other	287.2	577.3	873.4	1,176.0	1,484.1	1,797.9	2,117.9	2,444.5	2,662.9	2,886.6	3,116.9	3,355.0	3,598.9	3,848.7	4,104.9	4,367.1	4,635.8	4,909.6	5,193.8	5,486.4	5,787.7
Space Heating	2,659.7	5,362.8	8,117.8	10,929.7	13,775.9	16,670.3	19,619.9	22,406.9	25,237.5	28,113.3	31,046.2	34,048.0	37,101.2	39,837.3	42,397.9	45,009.9	47,673.9	50,252.1	52,897.2	55,094.5	57,338.6
Water Heating	11,304.5	22,780.5	34,475.5	46,411.5	58,551.2	70,894.2	83,466.3	93,480.3	103,697.5	113,100.9	122,745.6	131,231.5	137,144.2	143,214.8	149,522.1	155,297.0	161,290.2	166,842.8	172,671.0	178,772.8	185,152.4
Misc.	9,015.8	18,183.9	27,528.8	37,068.6	46,661.3	56,419.1	66,362.6	75,643.5	85,042.2	94,591.4	104,335.9	114,238.6	124,296.9	133,196.3	141,479.2	149,911.9	158,524.0	167,002.1	175,710.2	181,881.5	188,274.8
Cooking	51.1	103.4	156.9	211.5	267.1	323.7	381.5	440.4	500.4	561.3	623.4	686.9	751.5	817.1	838.8	861.5	885.4	910.2	929.6	950.6	973.1
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	8,615.5	17,376.8	26,307.0	35,423.3	44,585.5	53,905.3	63,402.6	72,372.5	81,452.8	90,681.0	100,095.8	109,735.1	119,542.2	128,187.4	136,252.8	144,486.3	152,891.3	161,168.0	169,671.6	175,628.3	181,797.0
Water Heating	349.2	703.7	1,065.0	1,433.7	1,808.8	2,190.1	2,578.5	2,830.6	3,089.0	3,349.1	3,616.7	3,816.6	4,003.2	4,191.8	4,387.7	4,564.1	4,747.3	4,923.9	5,109.5	5,302.6	5,504.7
Office	62,451.2	125,929.3	190,627.3	256,668.5	323,252.4	390,972.7	459,972.4	524,012.0	588,890.8	654,836.0	722,127.0	790,059.8	859,029.8	921,279.5	980,058.1	1,039,542.3	1,100,256.4	1,156,830.2	1,214,999.6	1,260,632.0	1,307,646.9
Cooking	6.8	13.8	20.9	28.2	35.6	43.2	50.9	58.7	66.7	74.8	83.1	91.6	100.2	109.0	117.9	126.9	136.1	145.4	148.0	150.8	153.8
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	56,670.1	114,274.8	172,985.3	232,913.4	293,278.1	354,672.6	417,226.7	476,632.6	536,771.0	597,875.9	660,200.7	723,994.8	788,887.6	846,993.4	901,504.6	957,115.2	1,013,839.0	1,067,230.4	1,122,065.8	1,164,215.9	1,207,598.0
Water Heating	5,774.3	11,640.7	17,621.1	23,726.9	29,938.6	36,256.9	42,694.8	47,320.6	52,053.1	56,885.2	61,843.2	65,973.4	70,041.9	74,177.1	78,435.7	82,300.2	86,281.3	89,454.3	92,785.8	96,265.3	99,895.0
Restaurant	29,912.4	60,320.5	91,318.6	122,966.4	155,162.3	187,909.6	221,276.8	248,093.0	275,460.3	303,280.7	331,752.8	359,645.0	388,012.1	416,076.7	438,724.7	461,273.4	484,425.4	504,795.8	525,982.2	546,457.0	567,696.8
Cooking	5,302.3	10,741.7	16,291.4	21,963.6	27,738.8	33,619.7	39,618.5	45,739.8	51,967.7	58,293.4	64,742.6	71,338.7	78,043.9	84,858.5	86,354.8	87,962.7	89,692.3	91,517.0	93,534.4	95,712.8	98,052.9
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	7,374.5	14,856.6	22,484.5	30,272.7	38,195.8	46,255.2	54,467.6	60,185.6	66,039.0	72,019.8	78,161.5	84,496.4	90,975.4	96,847.7	102,261.4	107,820.2	113,528.7	119,085.9	124,848.3	129,322.4	133,977.5
Water Heating	17,235.5	34,722.3	52,542.8	70,730.1	89,227.7	108,034.7	127,190.7	142,167.5	157,453.6	172,967.5	188,848.7	203,809.9	218,992.7	234,370.6	250,108.5	265,490.5	281,204.5	294,192.9	307,599.6	321,421.8	335,666.4
Retail	56,554.1	114,035.9	172,620.3	232,418.9	293,059.5	354,726.7	417,549.9	476,700.3	536,767.6	597,798.6	660,045.9	723,240.3	787,525.2	845,340.9	899,098.3	953,126.4	1,008,263.3	1,061,234.5	1,115,640.0	1,156,015.4	1,197,413.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	53,968.6	108,823.2	164,729.1	221,792.5	279,650.3	338,486.4	398,424.7	455,691.5	513,827.1	572,881.3	633,095.1	694,705.8	757,361.5	813,527.2	865,578.9	918,675.6	972,828.0	1,024,856.3	1,078,244.7	1,117,535.3	1,157,779.5
Water Heating	2,585.6	5,212.7	7,891.2	10,626.3	13,409.2	16,240.2	19,125.3	21,008.8	22,940.5	24,917.2	26,950.8	28,534.4	30,163.7	31,813.7	33,519.4	34,507.3	35,435.3	36,378.2	37,395.3	38,480.1	39,633.6
Warehouse	5,028.3	10,143.9																			

C-24: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #24)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	15,217.8	30,606.7	46,302.7	62,335.5	78,651.8	95,256.2	112,183.0	122,668.3	133,215.7	143,918.2	154,959.3	163,880.9	172,653.8	181,705.8	189,854.8	198,309.3	207,087.7	215,179.9	223,749.1	232,620.2	241,912.7
Cooking	539.2	1,092.3	1,656.6	2,233.4	2,820.7	3,418.7	4,028.7	4,651.2	5,284.5	5,927.7	6,583.5	7,254.3	7,936.2	8,629.2	8,781.4	8,945.0	9,120.9	9,306.6	9,511.9	9,733.6	9,971.7
Other	1,722.2	3,461.2	5,236.2	7,050.5	8,897.9	10,779.4	12,698.8	14,657.7	16,650.9	18,675.4	20,739.6	22,851.1	24,997.5	27,179.1	29,399.7	31,656.1	33,952.2	36,279.5	38,671.0	41,113.6	43,608.6
Space Heating	1,400.7	2,820.6	4,266.4	5,740.8	7,239.4	8,761.6	10,310.8	11,887.3	13,260.5	14,656.2	16,080.4	17,539.1	19,023.8	20,533.4	21,389.4	22,270.8	23,176.4	24,097.0	25,041.8	25,905.6	26,799.2
Water Heating	11,555.7	23,232.6	35,143.5	47,310.8	59,693.8	72,296.5	85,144.8	91,472.2	98,019.9	104,658.9	111,555.8	116,236.4	120,696.3	125,364.0	130,284.4	135,437.4	140,838.2	145,496.9	150,524.5	155,867.4	161,533.2
Grocery	7,468.6	15,091.2	22,864.6	30,804.8	38,885.4	47,108.6	55,491.4	63,081.2	70,811.8	78,675.1	86,705.9	94,634.0	102,708.8	110,913.6	116,465.7	122,169.0	128,031.9	134,014.4	140,229.9	143,245.4	146,469.6
Cooking	1,405.0	2,846.2	4,316.7	5,819.6	7,349.8	8,908.0	10,497.5	12,119.5	13,769.7	15,445.8	17,154.7	18,902.5	20,679.3	22,485.0	22,881.6	23,307.9	23,766.3	24,250.1	24,785.0	25,362.6	25,983.1
Space Heating	4,795.2	9,694.6	14,690.2	19,792.0	24,983.6	30,265.9	35,649.9	41,138.8	46,716.4	52,378.6	58,147.6	64,044.7	70,037.1	76,123.8	80,939.4	85,851.4	90,864.0	95,951.2	101,181.7	103,135.7	105,220.9
Water Heating	1,268.4	2,550.4	3,857.8	5,193.2	6,552.0	7,934.7	9,344.0	9,822.9	10,325.7	10,850.6	11,403.5	11,686.8	11,992.4	12,304.8	12,644.7	13,009.8	13,401.6	13,813.1	14,263.2	14,747.1	15,265.5
Healthcare	4,546.3	9,146.8	13,838.2	18,629.3	23,504.3	28,464.4	33,519.8	36,470.2	39,505.7	42,218.2	45,030.7	47,179.4	49,277.0	51,435.2	53,314.2	55,283.4	57,347.3	59,171.7	61,130.9	62,988.4	64,968.5
Cooking	102.4	207.5	314.7	424.3	535.9	649.5	765.4	883.7	1,004.0	1,126.2	1,250.8	1,378.3	1,507.8	1,639.5	1,668.4	1,699.5	1,732.9	1,768.2	1,807.2	1,849.3	1,894.6
Space Heating	485.0	979.1	1,482.5	1,996.4	2,519.0	3,050.4	3,591.7	4,143.2	4,703.4	5,271.8	5,850.7	6,442.1	7,042.9	7,652.8	8,000.7	8,358.0	8,724.8	9,098.1	9,483.3	9,659.0	9,846.6
Water Heating	3,958.9	7,960.2	12,040.9	16,208.6	20,449.4	24,764.5	29,162.7	31,443.3	33,798.4	35,820.1	37,929.2	39,359.0	40,726.4	42,142.9	43,645.0	45,225.9	46,889.6	48,305.4	49,840.3	51,480.2	53,227.3
Lodging	11,439.8	23,052.2	34,888.1	46,969.8	59,259.2	71,756.5	84,488.0	94,511.2	104,742.3	114,097.6	123,699.2	132,146.0	138,313.5	144,643.6	150,983.2	156,802.5	162,847.0	168,440.1	174,327.5	180,371.3	186,703.3
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	353.3	712.8	1,079.0	1,452.7	1,832.8	2,219.1	2,612.4	3,013.1	3,420.0	3,832.8	4,253.1	4,682.5	5,118.6	5,561.2	5,779.3	6,004.1	6,235.5	6,471.5	6,715.4	6,840.3	6,973.6
Water Heating	11,086.5	22,339.5	33,809.1	45,517.1	57,426.4	69,537.5	81,875.5	91,498.1	101,322.3	110,264.8	119,446.0	127,463.5	133,194.9	139,082.4	145,203.9	150,798.4	156,611.5	161,968.7	167,612.1	173,531.0	179,729.7
Misc.	333.7	674.8	1,022.6	1,377.8	1,739.3	2,107.1	2,482.1	2,864.4	3,253.0	3,647.6	4,049.7	4,383.7	4,724.3	5,066.8	5,416.7	5,773.3	6,136.9	6,505.9	6,885.1	7,030.4	7,184.9
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	253.0	512.3	776.9	1,047.2	1,322.5	1,602.7	1,888.6	2,180.2	2,476.9	2,778.3	3,085.5	3,399.7	3,719.0	4,043.6	4,373.9	4,709.5	5,050.8	5,396.6	5,751.4	5,870.8	5,997.8
Water Heating	80.7	162.5	245.7	330.6	416.8	504.4	593.5	684.1	776.1	869.4	964.2	984.0	1,005.3	1,023.2	1,042.8	1,063.8	1,086.1	1,109.2	1,133.6	1,159.6	1,187.2
Office	8,658.1	17,438.9	26,384.2	35,510.5	44,789.9	54,220.9	63,823.4	72,604.0	81,234.1	90,007.4	98,961.5	107,148.4	115,276.5	123,518.4	127,140.3	130,924.8	134,868.5	138,918.5	143,152.8	146,350.0	149,747.1
Space Heating	6,432.4	12,962.5	19,613.6	26,397.6	33,294.5	40,302.4	47,436.3	54,698.3	61,769.3	68,945.6	76,254.6	83,724.8	91,316.0	99,023.6	102,064.3	105,224.3	108,499.4	111,849.4	115,324.8	117,707.8	120,234.3
Water Heating	2,225.7	4,476.3	6,770.7	9,112.8	11,495.4	13,918.4	16,387.1	17,905.7	19,464.8	21,061.9	22,706.9	23,423.6	23,960.5	24,494.8	25,076.0	25,700.5	26,369.1	27,069.1	27,828.0	28,642.1	29,512.8
Restaurant	17,700.3	35,741.9	54,141.7	72,937.3	92,066.3	111,533.9	131,380.6	146,798.9	162,557.4	178,630.8	195,102.0	210,574.9	226,388.9	242,421.2	253,742.0	264,742.0	276,122.6	287,789.2	300,016.9	311,179.0	322,838.7
Cooking	4,973.5	10,075.1	15,280.2	20,600.3	26,017.0	31,532.9	37,159.3	42,900.8	48,742.3	54,675.5	60,724.6	66,911.5	73,200.8	79,592.7	80,996.6	82,505.2	84,128.0	85,840.2	87,733.4	89,777.8	91,973.9
Space Heating	1,736.1	3,514.1	5,327.6	7,180.7	9,066.9	10,987.1	12,945.2	14,942.7	16,974.2	19,037.2	21,140.0	23,290.2	25,475.6	27,696.3	29,955.8	32,251.3	34,585.3	36,948.9	39,371.2	40,286.2	41,251.9
Water Heating	10,990.7	22,152.7	33,533.9	45,156.4	56,982.3	69,013.9	81,276.0	88,955.4	96,840.8	104,918.0	113,237.5	120,373.3	127,712.5	135,132.3	142,789.6	149,985.5	157,409.2	165,000.1	172,912.3	181,115.0	189,612.9
Retail	8,778.1	17,698.6	26,787.8	36,063.0	45,495.3	55,084.1	64,849.5	74,606.8	84,408.8	94,358.2	104,493.5	114,334.2	124,337.6	134,474.4	139,533.5	144,760.0	150,152.8	155,659.6	161,369.1	164,735.8	168,313.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	8,042.3	16,219.3	24,550.2	33,050.4	41,694.1	50,480.0	59,426.8	68,537.8	77,679.4	86,955.3	96,400.5	106,050.5	115,854.2	125,806.5	130,664.9	135,675.7	140,836.8	146,099.6	151,540.7	154,618.5	157,886.1
Water Heating	735.8	1,479.2	2,237.7	3,012.5	3,801.2	4,604.1	5,422.7	6,069.0	6,729.4	7,402.9	8,093.0	8,283.7	8,483.4	8,667.9	8,868.6	9,084.3	9,316.0	9,559.9	9,828.4	10,117.3	10,427.3
Warehouse	560.0	1,133.3	1,718.2	2,315.8	2,924.1	3,543.4	4,175.0	4,819.3	5,474.6	6,140.1	6,818.4	7,460.9	8,114.6	8,775.7	9,449.5	10,134.8	10,832.6	11,540.0	12,266.5	12,515.0	12,780.0
Space Heating	505.4	1,023.5	1,552.1	2,092.3	2,642.4	3,202.5	3,773.9	4,356.9	4,950.0	5,552.4	6,166.6	6,794.8	7,433.4	8,082.4	8,742.9	9,414.0	10,096.7	10,788.4	11,498.4	11,729.4	11,975.6
Water Heating	54.6	109.8	166.1	223.4	281.7	340.9	401.2	462.4	524.6	587.6	651.8	666.1	681.2	693.4	706.6	720.8	735.9	751.6	768.1	785.7	804.4
Grand Total	74,702.8	150,584.4	227,948.3	306,943.8	387,315.6	469,075.2	552,392.7	618,424.2	685,203.4	751,693.1	819,820.3	881,742.4	941,795.2	1,002,954.8	1,045,899.7	1,088,899.1	1,133,427.3	1,177,219.3	1,223,127.7	1,261,035.4	1,300,918.1

C-25: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #25)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	4,973.6	10,089.4	15,407.8	20,974.7	26,814.1	32,967.8	39,487.7	43,846.9	48,486.9	53,436.2	58,755.9	63,379.0	68,102.1	73,083.9	78,009.7	83,158.2	88,527.6	94,041.7	99,867.7	105,918.4	112,215.4
Cooking	18.7	45.0	81.5	131.6	199.0	287.5	401.3	543.6	715.7	917.5	1,148.4	1,407.0	1,688.9	1,990.6	2,283.6	2,590.9	2,911.0	3,244.7	3,592.8	3,950.5	4,319.0
Other	514.6	1,042.6	1,590.0	2,161.0	2,757.9	3,384.7	4,046.9	4,748.3	5,489.2	6,269.2	7,090.1	7,952.9	8,849.5	9,776.9	10,733.5	11,715.4	12,722.4	13,753.1	14,819.3	15,910.5	17,029.1
Space Heating	544.1	1,096.7	1,661.4	2,239.8	2,831.1	3,435.9	4,056.4	4,693.2	5,250.0	5,821.7	6,410.5	7,018.4	7,641.2	8,277.7	8,942.2	9,619.6	10,308.7	10,999.2	11,691.1	12,383.1	13,075.1
Water Heating	3,896.2	7,905.1	12,074.9	16,442.2	21,026.1	25,859.6	30,983.1	33,861.8	37,032.0	40,427.8	44,106.8	47,000.7	49,922.6	53,038.7	56,350.4	59,832.3	63,485.5	67,237.7	71,240.5	75,425.8	79,806.0
Grocery	1,215.5	2,516.1	3,932.3	5,497.5	7,242.7	9,205.5	11,426.0	13,629.3	16,130.2	18,927.4	22,020.1	25,270.7	28,756.2	32,439.3	35,660.2	39,035.3	42,549.3	46,203.4	50,015.7	53,779.2	57,669.4
Cooking	48.7	117.3	212.6	343.2	518.7	749.5	1,046.0	1,416.6	1,864.9	2,390.7	2,992.4	3,666.2	4,400.4	5,186.7	5,949.7	6,750.4	7,584.3	8,453.7	9,360.5	10,292.1	11,252.1
Space Heating	734.2	1,523.5	2,387.0	3,346.6	4,422.6	5,639.6	7,023.6	8,594.6	10,358.5	12,315.1	14,463.6	16,797.6	19,285.8	21,907.6	24,071.2	26,334.8	28,687.4	31,129.9	33,670.2	36,119.2	38,647.7
Water Heating	432.5	875.3	1,332.6	1,807.6	2,301.4	2,816.4	3,356.4	3,618.1	3,906.8	4,221.6	4,564.1	4,806.8	5,070.0	5,345.0	5,639.2	5,950.2	6,277.6	6,619.9	6,985.1	7,367.9	7,769.5
Healthcare	1,502.7	3,050.0	4,660.6	6,349.1	8,123.1	9,996.0	11,981.9	13,293.2	14,719.5	16,076.0	17,544.2	18,791.8	20,066.8	21,409.8	22,710.2	24,077.1	25,510.0	26,983.1	28,548.4	30,171.8	31,868.8
Cooking	3.5	8.5	15.5	25.0	37.8	54.6	76.2	103.2	135.9	174.2	218.1	267.2	320.7	378.0	433.7	492.0	552.8	616.2	682.3	750.3	820.3
Space Heating	120.7	245.9	377.3	516.4	664.3	822.5	993.0	1,176.9	1,374.7	1,586.1	1,811.4	2,050.5	2,301.0	2,561.4	2,716.7	2,879.7	3,049.8	3,226.4	3,410.5	3,589.8	3,775.8
Water Heating	1,378.4	2,795.5	4,267.8	5,807.7	7,421.1	9,118.9	10,912.7	12,013.0	13,209.0	14,315.7	15,514.8	16,474.0	17,445.1	18,470.4	19,559.8	20,705.4	21,907.3	23,140.5	24,455.6	25,831.8	27,272.7
Lodging	3,568.8	7,272.0	11,159.8	15,275.8	19,645.4	24,305.7	29,297.1	33,569.3	38,177.7	42,770.4	47,678.6	52,280.3	56,044.9	60,001.5	64,064.8	68,200.6	72,502.3	76,713.9	81,131.1	85,707.9	90,461.2
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	100.7	204.3	312.1	425.0	543.4	668.3	800.8	941.7	1,091.0	1,248.7	1,415.0	1,590.0	1,772.0	1,960.4	2,057.2	2,159.1	2,265.5	2,376.0	2,491.3	2,604.5	2,722.1
Water Heating	3,468.2	7,067.7	10,847.7	14,850.8	19,102.0	23,637.4	28,496.3	32,627.6	37,086.7	41,521.7	46,263.6	50,690.4	54,272.9	58,041.1	62,007.5	66,041.5	70,236.7	74,337.8	78,639.8	83,103.4	87,739.1
Misc.	48.1	100.2	157.5	221.6	294.0	376.4	470.8	578.6	700.2	835.6	984.8	1,114.8	1,255.8	1,404.4	1,561.4	1,725.6	1,896.2	2,073.1	2,257.1	2,434.6	2,617.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	14.2	31.9	54.2	82.7	118.9	164.5	221.5	291.2	374.2	470.4	579.7	701.4	833.4	974.5	1,123.3	1,278.7	1,439.8	1,607.1	1,780.8	1,947.4	2,118.9
Water Heating	33.9	68.3	103.2	138.9	175.1	211.9	249.3	287.4	326.1	365.2	405.1	413.4	422.4	429.9	438.1	446.9	456.3	466.0	476.3	487.2	498.8
Office	3,027.1	6,114.5	9,286.4	12,558.2	15,931.5	19,417.1	23,033.9	26,486.8	29,950.9	33,550.6	37,297.0	40,784.3	44,319.7	47,948.2	49,672.9	51,494.9	53,406.8	55,392.2	57,474.9	59,588.7	61,799.2
Space Heating	2,226.8	4,499.2	6,834.8	9,245.3	11,732.4	14,304.2	16,975.1	19,752.7	22,507.8	25,365.5	28,333.5	31,418.1	34,596.0	37,857.7	39,187.4	40,589.3	42,056.9	43,577.9	45,165.6	46,758.7	48,421.2
Water Heating	800.2	1,615.3	2,451.6	3,312.9	4,199.1	5,112.9	6,058.9	6,734.1	7,443.0	8,185.1	8,963.5	9,366.2	9,723.7	10,090.5	10,485.6	10,905.6	11,349.9	11,814.4	12,309.3	12,830.0	13,378.0
Restaurant	3,385.7	7,021.6	10,996.7	15,405.6	20,329.3	25,862.5	32,095.0	36,988.4	42,640.3	49,020.3	56,115.3	63,268.2	70,971.2	79,099.2	87,411.9	95,962.2	104,850.5	114,071.2	123,703.2	133,558.4	143,739.4
Cooking	178.9	430.4	778.5	1,255.1	1,894.0	2,732.8	3,808.8	5,151.7	6,773.9	8,673.3	10,844.4	13,273.2	15,917.4	18,746.7	21,486.7	24,360.7	27,353.4	30,472.1	33,724.5	37,066.1	40,509.1
Space Heating	142.9	308.6	504.8	741.0	1,027.4	1,375.1	1,795.6	2,298.2	2,886.4	3,559.8	4,317.3	5,155.0	6,059.8	7,022.5	8,036.2	9,092.2	10,185.9	11,318.7	12,493.5	13,623.0	14,785.0
Water Heating	3,063.9	6,282.6	9,713.4	13,409.5	17,407.9	21,754.7	26,490.5	29,538.5	32,980.0	36,787.2	40,953.7	44,840.0	48,994.0	53,330.0	57,889.0	62,509.3	67,311.3	72,280.3	77,485.1	82,869.3	88,445.3
Retail	2,638.8	5,348.7	8,156.6	11,084.2	14,141.9	17,349.2	20,732.1	24,298.8	28,011.6	31,915.2	36,017.4	40,104.1	44,353.3	48,735.7	51,047.7	53,478.9	56,018.7	58,654.8	61,407.9	64,138.0	66,977.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	2,402.6	4,870.8	7,429.3	10,098.1	12,887.0	15,814.1	18,903.4	22,170.5	25,569.2	29,144.0	32,902.1	36,846.7	40,942.8	45,173.2	47,321.7	49,579.7	51,936.4	54,380.7	56,928.8	59,443.9	62,057.4
Water Heating	236.2	477.8	727.3	986.1	1,254.9	1,535.1	1,828.8	2,128.2	2,442.4	2,771.2	3,115.4	3,257.5	3,410.4	3,562.5	3,726.0	3,899.3	4,082.2	4,274.1	4,479.1	4,694.1	4,919.7
Warehouse	47.7	102.7	167.4	245.1	338.8	452.2	588.9	751.9	942.4	1,160.1	1,404.8	1,653.8	1,924.3	2,211.7	2,515.4	2,832.8	3,162.2	3,504.3	3,860.0	4,200.8	4,552.1
Space Heating	24.8	56.6	97.8	151.4	220.6	309.2	420.6	557.9	722.3	913.6	1,131.4	1,374.3	1,638.4	1,920.6	2,218.8	2,530.1	2,853.1	3,188.6	3,537.2	3,870.6	4,214.1
Water Heating	22.9	46.1	69.6	93.7	118.2	143.0	168.3	194.0	220.1	246.5	273.5	279.5	285.9	291.1	296.7	302.7	309.1	315.7	322.7	330.2	338.1
Grand Total	20,408.0	41,615.2	63,925.1	87,611.6	112,860.9	139,932.5	169,113.4	193,443.1	219,759.7	247,691.7	277,818.2	306,647.0	335,794.4	366,333.7	392,654.2	419,965.8	448,423.5	477,637.7	508,266.0	539,497.7	571,900.3

C-26: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #26)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	6,378.8	12,985.9	19,910.9	27,219.7	34,934.4	43,085.9	51,713.4	57,543.4	63,704.7	70,212.4	77,136.8	83,129.4	89,171.8	95,475.7	101,640.1	108,044.1	114,694.7	121,429.8	128,541.7	135,934.3	143,621.4
Cooking	38.2	91.1	162.9	259.2	384.7	544.7	743.4	983.1	1,263.5	1,582.1	1,936.9	2,325.3	2,740.9	3,179.7	3,586.1	4,009.5	4,448.3	4,899.0	5,369.9	5,855.8	6,355.9
Other	658.1	1,337.8	2,047.9	2,795.0	3,582.4	4,415.4	5,300.2	6,239.9	7,232.9	8,276.0	9,370.5	10,516.4	11,703.0	12,926.5	14,185.4	15,475.2	16,796.2	18,142.1	19,536.7	20,966.6	22,432.1
Space Heating	683.2	1,378.2	2,089.6	2,819.7	3,567.7	4,334.2	5,121.7	5,931.0	6,640.9	7,369.7	8,119.8	8,893.6	9,685.6	10,494.4	10,963.0	11,447.4	11,946.3	12,454.7	12,977.9	13,507.2	14,053.3
Water Heating	4,999.2	10,178.9	15,610.5	21,345.8	27,399.5	33,791.6	40,548.1	44,389.4	48,567.5	52,984.6	57,709.6	61,394.1	65,042.3	68,875.1	72,905.6	77,112.0	81,503.9	85,933.9	90,657.1	95,604.7	100,780.1
Grocery	1,658.8	3,472.3	5,488.7	7,760.3	10,330.8	13,246.7	16,551.0	19,872.1	23,592.7	27,690.2	32,150.8	36,795.6	41,715.4	46,864.5	51,369.9	56,057.8	60,913.4	65,896.0	71,096.7	76,140.5	81,348.2
Cooking	99.5	237.4	424.7	675.4	1,002.7	1,419.5	1,937.1	2,561.8	3,292.2	4,122.3	5,046.7	6,058.6	7,141.4	8,284.6	9,343.3	10,446.4	11,589.7	12,763.9	13,990.7	15,256.5	16,559.4
Space Heating	1,009.1	2,118.7	3,359.4	4,765.4	6,365.4	8,190.0	10,267.3	12,612.5	15,219.2	18,073.6	21,166.5	24,485.1	27,985.4	31,642.0	34,717.6	37,912.0	41,214.2	44,597.4	48,116.7	51,417.3	54,821.4
Water Heating	550.2	1,116.2	1,704.5	2,319.5	2,962.7	3,637.1	4,346.5	4,697.9	5,081.3	5,494.2	5,937.6	6,251.9	6,588.7	6,937.9	7,309.0	7,699.5	8,109.5	8,534.8	8,989.2	9,466.7	9,967.4
Healthcare	1,929.7	3,931.3	6,032.5	8,254.0	10,599.9	13,079.9	15,704.5	17,451.7	19,333.1	21,106.0	22,999.8	24,595.1	26,198.9	27,867.2	29,462.2	31,127.7	32,865.5	34,620.6	36,484.5	38,412.5	40,427.1
Cooking	7.2	17.3	30.9	49.2	73.1	103.4	141.2	186.7	239.9	300.5	367.8	441.6	520.6	603.9	681.1	761.5	844.9	930.5	1,020.0	1,112.3	1,207.3
Space Heating	156.8	321.3	496.0	683.3	884.6	1,102.1	1,337.7	1,592.4	1,865.6	2,156.4	2,464.4	2,789.4	3,127.7	3,477.8	3,696.0	3,923.5	4,159.5	4,401.7	4,654.1	4,893.8	5,142.1
Water Heating	1,765.6	3,592.7	5,505.6	7,521.5	9,642.2	11,874.4	14,225.6	15,672.6	17,227.5	18,649.1	20,167.5	21,364.1	22,550.6	23,785.5	25,085.1	26,442.6	27,861.0	29,288.4	30,810.4	32,406.4	34,077.8
Lodging	4,631.4	9,483.8	14,626.7	20,117.0	25,976.6	32,230.4	38,902.2	44,625.8	50,723.4	56,726.6	63,056.1	68,937.3	73,692.4	78,636.0	83,671.3	88,691.4	93,893.3	98,925.7	104,201.8	109,673.5	115,353.2
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	129.3	263.4	404.2	552.9	710.5	877.9	1,056.5	1,246.8	1,448.4	1,660.8	1,883.8	2,117.5	2,359.7	2,609.3	2,744.1	2,885.1	3,031.6	3,182.0	3,338.9	3,489.3	3,645.4
Water Heating	4,502.2	9,220.4	14,222.5	19,564.1	25,266.2	31,352.5	37,845.7	43,379.0	49,274.9	55,065.8	61,172.3	66,819.8	71,332.8	76,026.7	80,927.1	85,806.3	90,861.7	95,743.6	100,862.8	106,184.2	111,707.8
Misc.	66.7	140.6	223.9	318.8	427.7	552.6	695.5	857.7	1,038.6	1,237.3	1,453.0	1,644.3	1,848.7	2,061.7	2,284.7	2,516.2	2,755.4	3,000.3	3,255.1	3,494.2	3,740.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	24.4	55.3	94.8	145.2	208.8	287.7	383.9	498.4	631.0	780.7	946.6	1,127.6	1,320.7	1,524.3	1,737.1	1,957.6	2,185.0	2,417.8	2,659.7	2,885.2	3,117.2
Water Heating	42.4	85.3	129.0	173.6	218.9	264.9	311.7	359.3	407.6	456.5	506.4	516.7	527.9	537.4	547.6	558.6	570.4	582.5	595.3	608.9	623.4
Office	3,827.1	7,744.5	11,785.9	15,973.7	20,311.9	24,813.7	29,500.6	33,988.2	38,499.8	43,184.2	48,051.5	52,592.0	57,185.6	61,890.5	64,211.9	66,651.9	69,203.0	71,831.2	74,588.9	77,350.5	80,235.6
Space Heating	2,817.4	5,703.4	8,682.7	11,772.4	14,975.9	18,303.3	21,770.7	25,384.4	28,977.4	32,701.2	36,562.5	40,567.3	44,684.5	48,902.5	50,702.5	52,590.5	54,559.4	56,583.2	58,695.9	60,777.7	62,947.9
Water Heating	1,009.7	2,041.1	3,103.2	4,201.3	5,336.0	6,510.4	7,729.9	8,603.9	9,522.4	10,483.0	11,488.9	12,024.7	12,501.1	12,988.0	13,509.4	14,061.4	14,643.6	15,247.9	15,893.0	16,572.8	17,287.8
Restaurant	4,642.6	9,728.8	15,390.6	21,756.4	28,913.7	36,951.9	45,943.2	53,240.7	61,456.4	70,507.2	80,357.9	90,184.6	100,601.4	111,465.7	122,305.6	133,300.5	144,680.2	156,353.4	168,550.1	181,004.9	193,858.5
Cooking	363.9	866.9	1,549.1	2,460.1	3,647.0	5,155.9	7,025.5	9,277.6	11,906.2	14,888.5	18,205.0	21,831.1	25,707.5	29,797.3	33,572.7	37,504.9	41,579.5	45,763.5	50,134.3	54,643.1	59,284.1
Space Heating	220.5	484.0	803.1	1,193.0	1,667.8	2,241.4	2,926.2	3,729.1	4,648.4	5,677.4	6,810.8	8,041.7	9,351.4	10,728.5	12,165.6	13,652.7	15,185.4	16,752.6	18,378.7	19,900.2	21,464.3
Water Heating	4,058.2	8,377.9	13,038.4	18,103.2	23,598.9	29,554.6	35,991.5	40,234.0	44,901.8	49,941.3	55,342.1	60,311.8	65,542.4	70,939.9	76,567.3	82,142.8	87,915.3	93,837.3	100,037.2	106,461.7	113,110.1
Retail	3,373.3	6,861.1	10,503.0	14,331.4	18,362.4	22,620.1	27,133.4	31,897.6	36,861.4	42,069.4	47,524.8	52,955.7	58,580.6	64,363.4	67,551.5	70,883.7	74,349.0	77,909.1	81,627.8	85,241.2	88,994.8
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	3,072.8	6,251.8	9,572.8	13,066.1	16,746.7	20,636.8	24,763.1	29,137.8	33,692.4	38,472.5	43,480.6	48,717.2	54,134.7	59,711.8	62,680.5	65,781.2	69,002.9	72,310.0	75,757.6	79,086.2	82,541.1
Water Heating	300.5	609.3	930.1	1,265.3	1,615.8	1,983.3	2,370.3	2,759.8	3,169.0	3,596.9	4,044.1	4,238.5	4,445.9	4,651.6	4,871.0	5,102.5	5,346.1	5,599.1	5,870.1	6,155.0	6,453.6
Warehouse	73.0	159.7	264.3	391.7	546.2	732.4	954.2	1,213.8	1,510.8	1,842.9	2,208.5	2,578.5	2,973.8	3,388.6	3,822.6	4,272.8	4,737.6	5,213.6	5,708.6	6,169.9	6,645.1
Space Heating	44.4	102.2	177.3	274.5	398.5	553.6	743.8	971.3	1,235.7	1,534.7	1,866.6	2,229.1	2,616.3	3,024.6	3,451.7	3,894.3	4,351.1	4,818.7	5,305.0	5,757.0	6,222.3
Water Heating	28.6	57.6	87.1	117.1	147.7	178.8	210.4	242.5	275.2	308.3	341.9	349.5	357.5	364.0	371.0	378.5	386.5	394.8	403.6	412.9	422.8
Grand Total	26,581.4	54,508.1	84,226.4	116,123.0	150,403.5	187,313.4	227,097.9	260,691.0	296,721.0	334,576.2	374,939.1	413,412.5	451,968.5	492,013.1	526,319.8	561,546.1	598,092.0	635,179.6	674,054.9	713,421.5	754,224.6

C-27: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #27)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	8,453.6	17,188.9	26,313.3	35,897.0	45,947.6	56,498.9	67,591.2	74,890.2	82,532.7	90,537.0	98,974.7	106,081.7	113,199.9	120,619.9	127,817.3	135,298.8	143,070.6	150,930.6	159,231.6	167,858.1	176,824.3
Cooking	47.7	113.0	200.7	316.9	466.9	656.1	888.9	1,167.6	1,491.6	1,858.0	2,264.6	2,708.8	3,183.5	3,684.3	4,143.0	4,621.2	5,117.0	5,626.5	6,161.7	6,713.0	7,279.0
Other	874.3	1,775.4	2,714.2	3,698.3	4,730.8	5,817.3	6,964.5	8,175.9	9,448.8	10,779.7	12,170.5	13,622.1	15,121.7	16,665.2	18,251.3	19,874.6	21,535.7	23,226.6	24,977.6	26,770.5	28,604.6
Space Heating	910.1	1,835.5	2,782.2	3,753.0	4,746.4	5,763.1	6,806.2	7,876.3	8,812.1	9,771.3	10,757.1	11,772.9	12,811.8	13,872.1	14,477.8	15,103.9	15,748.8	16,405.8	17,082.2	17,767.0	18,473.2
Water Heating	6,621.5	13,465.0	20,616.1	28,128.7	36,003.4	44,262.4	52,931.6	62,707.3	72,802.2	83,128.0	93,782.5	104,777.9	116,208.9	128,063.4	140,345.1	153,069.0	166,336.0	180,157.1	194,534.3	209,469.8	224,967.6
Grocery	2,179.9	4,547.3	7,158.2	10,071.4	13,332.5	16,990.7	21,091.4	25,132.5	29,621.2	34,531.6	39,850.7	45,347.1	51,155.7	57,224.6	62,410.2	67,807.6	73,400.5	79,141.1	85,157.9	90,960.7	96,940.9
Cooking	124.3	294.5	523.3	826.1	1,217.0	1,710.0	2,316.4	3,042.7	3,886.7	4,841.3	5,900.8	7,058.2	8,294.9	9,599.8	10,794.9	12,040.7	13,332.5	14,659.8	16,054.2	17,490.4	18,965.1
Space Heating	1,325.5	2,772.8	4,377.4	6,177.5	8,203.6	10,487.9	13,060.0	15,935.0	19,103.5	22,549.8	26,264.8	30,236.1	34,414.0	38,771.0	42,328.3	46,023.6	49,844.9	53,760.5	57,850.3	61,657.1	65,575.4
Water Heating	730.1	1,480.0	2,257.5	3,067.8	3,911.9	4,792.9	5,714.9	6,154.8	6,631.0	7,140.5	7,685.0	8,052.9	8,446.7	8,853.8	9,286.9	9,743.3	10,223.1	10,720.8	11,253.4	11,813.2	12,400.3
Healthcare	2,554.9	5,198.4	7,963.3	10,869.2	13,918.6	17,120.3	20,484.9	22,659.9	24,983.1	27,130.5	29,402.4	31,251.9	33,098.1	35,015.7	36,822.6	38,711.8	40,684.8	42,674.0	44,788.1	46,974.3	49,259.7
Cooking	9.0	21.4	38.1	60.2	88.7	124.6	168.8	221.7	283.3	352.9	430.1	514.5	604.6	699.8	786.9	877.8	972.0	1,068.7	1,170.4	1,275.1	1,382.7
Space Heating	207.8	425.1	654.8	899.6	1,161.2	1,441.5	1,742.8	2,066.0	2,410.4	2,774.8	3,159.0	3,562.8	3,982.3	4,415.5	4,671.1	4,937.9	5,214.9	5,499.2	5,796.6	6,077.7	6,368.5
Water Heating	2,338.1	4,751.8	7,270.4	9,909.4	12,668.8	15,554.3	18,573.4	20,372.2	22,289.4	24,002.9	25,813.2	27,174.6	28,511.1	29,900.4	31,364.5	32,896.1	34,498.0	36,106.1	37,821.4	39,621.4	41,508.5
Lodging	6,112.3	12,491.1	19,217.4	26,349.1	33,899.2	41,888.3	50,337.7	57,441.3	64,945.7	72,240.2	79,885.4	86,862.8	92,291.8	97,925.3	103,639.5	109,323.7	115,216.7	120,861.0	126,787.8	132,937.4	139,323.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	171.6	349.3	535.1	730.7	936.7	1,154.4	1,385.2	1,629.6	1,887.0	2,156.7	2,438.8	2,733.5	3,038.1	3,351.6	3,511.2	3,678.1	3,851.7	4,030.1	4,216.9	4,395.2	4,580.2
Water Heating	5,940.7	12,141.9	18,682.3	25,618.4	32,962.4	40,733.9	48,952.5	55,811.7	63,058.8	70,083.5	77,446.6	84,129.3	89,253.7	94,573.7	100,128.3	105,645.6	111,364.9	116,830.9	122,570.9	128,542.1	134,743.2
Misc.	87.6	183.8	291.1	412.4	549.8	705.7	882.1	1,080.1	1,299.3	1,538.3	1,796.5	2,019.0	2,256.3	2,503.0	2,761.3	3,029.4	3,306.4	3,590.2	3,886.4	4,162.5	4,466.5
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	31.0	70.0	119.1	181.0	258.0	352.6	466.6	601.2	755.9	929.7	1,121.5	1,330.1	1,552.5	1,786.6	2,031.2	2,284.6	2,546.0	2,813.6	3,092.8	3,350.7	3,615.3
Water Heating	56.5	113.8	172.0	231.4	291.8	353.1	415.5	479.0	543.4	608.7	675.1	748.9	803.8	864.4	919.1	974.8	1,030.4	1,086.0	1,141.6	1,197.2	1,252.9
Office	5,091.9	10,298.4	15,661.8	21,208.6	26,939.9	32,869.6	39,022.3	44,886.9	50,756.6	56,831.4	63,125.8	68,963.0	74,854.1	80,879.1	83,713.6	86,696.3	89,817.6	93,034.3	96,417.6	99,805.4	103,343.6
Space Heating	3,749.0	7,584.9	11,538.8	15,630.6	19,861.9	24,243.1	28,792.9	33,517.4	38,194.0	43,025.4	48,021.8	53,192.9	58,500.7	63,932.0	66,129.8	68,437.5	70,846.4	73,323.4	75,915.8	78,469.9	81,131.9
Water Heating	1,342.9	2,713.5	4,123.0	5,578.0	7,078.0	8,626.4	10,229.4	11,369.5	12,562.6	13,806.0	15,104.0	15,770.1	16,353.3	16,947.1	17,583.8	18,258.8	18,971.2	19,710.9	20,501.8	21,335.4	22,211.7
Restaurant	6,080.0	12,690.1	19,976.7	28,074.1	37,066.6	47,040.1	58,063.7	66,619.5	76,169.9	86,622.6	97,947.1	109,068.2	120,838.4	133,091.0	145,260.9	157,587.8	170,351.3	183,446.5	197,171.7	211,161.2	225,580.2
Cooking	454.3	1,075.2	1,907.9	3,007.3	4,423.8	6,205.9	8,393.6	11,007.6	14,039.2	17,461.8	21,254.7	25,392.3	29,809.2	34,465.7	38,714.2	43,140.8	47,729.7	52,443.9	57,394.5	62,493.6	67,729.0
Space Heating	284.9	621.5	1,024.2	1,510.0	2,093.9	2,790.7	3,613.2	4,568.4	5,653.4	6,860.7	8,184.5	9,618.0	11,140.2	12,738.8	14,405.9	16,130.4	17,907.4	19,724.4	21,616.3	23,372.8	25,174.0
Water Heating	5,340.9	10,993.4	17,044.7	23,556.8	30,549.0	38,043.6	46,057.0	51,043.5	56,477.2	62,300.1	68,507.8	74,057.9	79,889.0	85,886.6	92,140.8	98,316.6	104,714.3	111,278.2	118,160.9	125,294.8	132,677.2
Retail	4,481.2	9,105.3	13,920.3	18,963.8	24,250.4	29,805.4	35,661.0	41,808.2	48,176.2	54,826.6	61,766.2	68,636.4	75,735.9	83,021.8	86,827.2	90,807.8	94,950.8	99,208.6	103,670.3	107,995.6	112,485.3
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,081.8	8,295.8	12,685.9	17,286.8	22,112.3	27,185.7	32,536.7	38,177.4	44,015.9	50,115.0	56,480.5	63,116.5	69,966.6	77,007.1	80,550.5	84,254.4	88,105.8	92,060.8	96,197.2	100,180.7	104,312.3
Water Heating	399.4	809.5	1,234.4	1,677.0	2,138.1	2,619.7	3,124.3	3,630.8	4,160.4	4,711.6	5,285.7	5,820.0	6,369.3	6,916.7	7,472.3	8,036.4	8,609.0	9,189.8	9,778.8	10,376.1	10,981.0
Warehouse	94.4	205.3	337.5	496.4	686.7	913.2	1,179.9	1,489.2	1,840.2	2,230.2	2,657.7	3,084.6	3,539.9	4,016.9	4,515.9	5,033.4	5,567.8	6,115.1	6,686.7	7,214.6	7,756.9
Space Heating	56.2	128.6	221.5	340.2	489.8	674.8	899.5	1,165.9	1,473.4	1,819.3	2,201.9	2,618.8	3,063.4	3,531.8	4,021.5	4,529.0	5,052.7	5,589.0	6,148.9	6,664.4	7,193.6
Water Heating	38.1	76.7	116.1	156.2	196.9	238.3	280.4	323.3	366.8	410.9	455.8	465.8	476.5	485.1	494.4	504.4	515.1	526.2	537.8	550.2	563.4
Grand Total	35,135.8	71,908.5	110,839.7	152,341.9	196,591.4	243,832.3	294,314.2	336,007.9	380,324.9	426,488.5	475,406.5	521,314.7	566,970.1	614,297.1	653,768.4	694,296.5	736,366.5	779,001.5	823,798.0	869,069.6	915,960.6

C-28: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #28)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	38,857.0	78,314.2	118,532.2	159,587.3	200,957.6	243,036.8	285,913.5	319,544.5	353,019.5	387,047.9	421,915.4	455,303.3	488,810.0	520,906.7	552,446.3	583,751.1	615,825.4	644,365.4	673,916.4	700,060.0	727,064.6
Cooking	683.0	1,383.6	2,098.4	2,829.0	3,572.9	4,330.4	5,103.1	5,891.6	6,693.8	7,508.5	8,339.2	9,188.9	10,052.5	10,930.3	11,125.4	11,334.8	11,559.9	11,797.3	12,057.2	12,337.8	12,639.2
Other	2,363.0	4,749.4	7,185.0	9,674.5	12,209.3	14,790.7	17,423.9	20,111.2	22,204.2	24,340.1	26,530.4	28,785.2	31,088.0	33,438.9	35,843.1	38,296.5	40,803.9	43,353.6	45,990.4	48,696.8	51,474.7
Space Heating	15,223.8	30,770.9	46,480.2	62,586.1	78,577.8	94,847.8	111,430.8	126,960.2	142,544.2	158,389.0	174,563.0	191,133.3	207,999.8	223,027.3	237,696.3	252,662.2	267,930.2	282,243.5	296,954.9	307,616.0	318,647.5
Water Heating	20,587.2	41,478.3	62,768.6	84,497.6	106,597.6	129,067.9	151,955.7	166,581.5	181,577.3	196,810.3	212,482.8	226,195.9	239,669.7	253,510.2	267,781.5	281,457.6	295,531.5	306,971.0	318,914.0	331,355.4	344,303.2
Grocery	17,365.3	35,025.3	53,025.7	71,401.4	90,091.5	109,099.6	128,465.3	146,038.3	163,927.0	182,113.8	200,676.8	219,395.8	238,450.4	256,141.8	271,033.2	286,119.9	301,552.3	316,230.0	331,359.4	343,511.4	356,059.3
Cooking	1,754.3	3,554.0	5,390.2	7,266.9	9,177.7	11,123.4	13,108.2	15,133.5	17,194.1	19,287.0	21,420.8	23,603.2	25,821.7	28,076.4	28,577.6	29,115.8	29,694.2	30,304.1	30,971.6	31,692.5	32,466.8
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	12,740.7	25,687.6	38,882.6	52,350.6	66,046.9	79,974.0	94,160.9	107,446.4	120,960.3	134,690.8	148,694.9	163,028.5	177,608.6	190,752.4	202,789.1	215,072.2	227,604.3	239,857.5	252,430.8	261,902.2	271,643.5
Water Heating	2,870.5	5,783.6	8,752.9	11,783.9	14,866.9	18,002.2	21,196.2	23,458.3	25,772.7	28,136.0	30,561.1	32,764.1	35,020.0	37,313.0	39,666.5	41,931.9	44,253.9	46,068.4	47,957.0	49,916.8	51,949.1
Healthcare	12,191.3	24,571.4	37,188.6	50,066.6	63,020.6	76,195.0	89,617.7	100,098.3	110,679.2	121,070.4	131,722.8	141,917.0	151,788.4	161,161.5	170,366.6	179,488.0	188,846.8	196,791.8	205,040.7	212,656.4	220,540.8
Cooking	148.9	301.6	457.4	616.7	778.9	944.0	1,112.4	1,284.3	1,459.2	1,636.8	1,817.9	2,003.1	2,191.3	2,382.7	2,425.2	2,470.8	2,519.8	2,571.5	2,628.2	2,689.4	2,755.1
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,940.0	9,960.9	15,078.1	20,301.4	25,469.8	30,727.8	36,086.8	41,120.6	46,124.1	51,211.7	56,405.6	61,727.4	67,145.0	71,955.1	76,597.4	81,335.5	86,170.4	90,624.8	95,204.3	98,974.2	102,833.6
Water Heating	7,102.4	14,308.9	21,653.0	29,148.6	36,772.0	44,523.3	52,418.5	57,693.4	63,096.0	68,221.9	73,499.4	78,186.5	82,452.1	86,823.8	91,344.1	95,681.7	100,156.5	103,595.5	107,208.2	110,992.9	114,952.2
Lodging	14,259.3	28,736.6	43,490.9	58,549.9	73,852.5	89,412.4	105,262.2	118,399.8	131,675.2	144,187.6	157,005.0	168,740.6	177,960.4	187,027.1	196,161.4	204,821.0	213,757.6	222,173.0	230,933.5	239,528.5	248,456.9
Cooking	7.9	16.0	24.2	32.7	41.3	50.0	58.9	68.0	77.3	86.7	96.3	106.1	116.1	126.2	136.6	147.0	157.7	168.5	171.5	174.8	178.2
Other	287.2	577.3	873.4	1,176.0	1,484.1	1,797.9	2,117.9	2,444.5	2,662.9	2,886.6	3,116.9	3,355.0	3,598.9	3,848.7	4,104.9	4,367.1	4,635.8	4,909.6	5,193.8	5,486.4	5,787.7
Space Heating	2,659.7	5,362.8	8,117.8	10,929.7	13,775.9	16,670.3	19,619.0	22,406.9	25,237.5	28,113.3	31,046.2	34,048.0	37,101.2	39,837.3	42,397.9	45,009.9	47,673.9	50,252.1	52,897.2	55,094.5	57,338.6
Water Heating	11,304.5	22,780.5	34,475.5	46,411.5	58,551.2	70,894.2	83,466.3	93,480.3	103,697.5	113,100.9	122,745.6	131,231.5	137,144.2	143,214.8	149,522.1	155,297.0	161,290.2	166,842.8	172,671.0	178,772.8	185,152.4
Misc.	9,015.8	18,183.9	27,528.5	37,068.6	46,661.3	56,419.1	66,362.6	75,643.5	85,042.2	94,591.4	104,335.9	114,238.6	124,296.9	133,196.3	141,479.2	149,911.9	158,524.0	167,002.1	175,710.2	181,881.5	188,274.8
Cooking	51.1	103.4	156.9	211.5	267.1	323.7	381.5	440.4	500.4	561.3	623.4	686.9	751.5	817.1	838.8	861.5	885.4	910.2	929.6	950.6	973.1
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	8,615.5	17,376.8	26,307.0	35,423.3	44,585.5	53,905.3	63,402.6	72,372.5	81,452.8	90,681.0	100,095.8	109,735.1	119,542.2	128,187.4	136,252.8	144,486.3	152,891.3	161,168.0	169,671.6	175,628.3	181,797.0
Water Heating	349.2	703.7	1,065.0	1,433.7	1,808.8	2,190.1	2,578.5	2,830.6	3,089.0	3,349.1	3,616.7	3,816.6	4,003.2	4,191.8	4,387.7	4,564.1	4,747.3	4,923.9	5,109.0	5,302.6	5,504.7
Office	62,451.2	125,929.3	190,627.3	256,668.5	323,252.4	390,972.7	459,972.4	524,012.0	588,890.8	654,836.0	722,127.0	790,059.8	859,029.8	921,279.5	980,058.1	1,039,542.3	1,100,256.4	1,156,830.2	1,214,999.6	1,260,632.0	1,307,646.9
Cooking	6.8	13.8	20.9	28.2	35.6	43.2	50.9	58.7	66.7	74.8	83.1	91.6	100.2	109.0	117.9	126.9	136.1	145.4	148.0	150.8	153.8
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	56,670.1	114,274.8	172,985.3	232,913.4	293,278.1	354,672.6	417,226.7	476,632.6	536,771.0	597,875.9	660,200.7	723,994.8	788,887.6	846,993.4	901,504.6	957,115.2	1,013,839.0	1,067,230.4	1,122,065.8	1,164,215.9	1,207,598.0
Water Heating	5,774.3	11,640.7	17,621.1	23,726.9	29,938.6	36,256.9	42,694.8	47,320.6	52,053.1	56,885.2	61,843.2	65,973.4	70,041.9	74,177.1	78,435.7	82,300.2	86,281.3	89,454.3	92,785.8	96,265.3	99,895.0
Restaurant	29,912.4	60,320.5	91,318.6	122,966.4	155,162.3	187,909.6	221,276.8	248,093.0	275,460.3	303,280.7	331,752.8	359,645.0	388,012.1	416,076.7	438,724.7	461,273.4	484,425.4	504,795.8	525,982.2	546,457.0	567,696.8
Cooking	5,302.3	10,741.7	16,291.4	21,963.6	27,738.8	33,619.7	39,618.5	45,739.8	51,967.7	58,293.4	64,742.6	71,338.7	78,043.9	84,858.5	86,354.8	87,962.7	89,692.3	91,517.0	93,534.4	95,712.8	98,052.9
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	7,374.5	14,856.6	22,484.5	30,272.7	38,195.8	46,255.2	54,467.6	60,185.6	66,039.0	72,019.8	78,161.5	84,496.4	90,975.4	96,847.7	102,261.4	107,820.2	113,528.7	119,085.9	124,848.3	129,322.4	133,977.5
Water Heating	17,235.5	34,722.3	52,542.8	70,730.1	89,227.7	108,034.7	127,190.7	142,167.5	157,453.6	172,967.5	188,848.7	203,809.9	218,992.7	234,370.6	250,108.5	265,490.5	281,204.5	294,192.9	307,599.6	321,421.8	335,666.4
Retail	56,554.1	114,035.9	172,620.3	232,418.9	293,059.5	354,726.7	417,549.9	476,700.3	536,767.6	597,798.6	660,045.9	723,240.3	787,525.2	845,340.9	899,098.3	953,126.4	1,008,263.3	1,061,234.5	1,115,640.0	1,156,015.4	1,197,413.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	53,968.6	108,823.2	164,729.1	221,792.5	279,650.3	338,486.4	398,424.7	455,691.5	513,827.1	572,881.3	633,095.1	694,705.8	757,361.5	813,527.2	865,578.9	918,675.6	972,828.0	1,024,856.3	1,078,244.7	1,117,535.3	1,157,779.5
Water Heating	2,585.6	5,212.7	7,891.2	10,626.3	13,409.2	16,240.2	19,125.3	21,008.8	22,940.5	24,917.2	26,950.8	28,534.4	30,163.7	31,813.7	33,519.4	34,450.7	35,435.3	36,378.2	37,395.3	38,480.1	39,633.6
Warehouse	5,028.3	10,143.9	15,358.8	20,683.2	26,086.1	31,5															

C-29: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #29)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	29,818.6	60,124.6	91,024.2	122,577.3	154,681.6	187,342.3	220,627.4	247,973.7	275,010.2	302,455.2	330,556.3	356,954.0	383,494.8	410,594.3	437,090.9	463,192.4	489,908.7	512,121.7	535,194.3	554,615.3	574,815.1
Cooking	550.6	1,115.4	1,691.6	2,280.5	2,880.2	3,490.8	4,113.7	4,749.3	5,396.0	6,052.8	6,722.5	7,407.4	8,103.6	8,811.3	9,566.7	10,333.7	11,113.4	11,903.0	12,706.6	13,524.9	14,358.1
Other	2,357.0	4,737.2	7,166.4	9,649.4	12,177.6	14,752.3	17,378.7	20,059.0	22,144.9	24,273.6	26,456.6	28,704.0	30,999.2	33,342.5	35,738.9	38,184.3	40,683.7	43,225.3	45,853.9	48,552.0	51,321.4
Space Heating	7,149.2	14,446.4	21,885.3	29,481.1	37,209.2	45,070.5	53,081.6	61,247.0	69,319.7	77,517.1	85,871.8	94,415.4	103,100.0	111,923.3	120,219.6	128,657.9	137,242.5	145,214.9	153,388.8	157,315.0	161,413.7
Water Heating	19,761.7	39,825.7	60,280.9	81,166.3	102,414.7	124,028.7	146,053.4	161,918.5	178,149.7	194,611.7	211,505.5	226,427.2	241,291.9	256,517.2	272,165.7	287,216.6	302,669.1	314,178.5	326,239.0	338,809.4	351,897.9
Grocery	10,144.4	20,482.1	31,021.2	41,782.4	52,731.1	63,868.6	75,218.4	85,919.0	96,806.5	107,870.7	119,157.8	130,409.7	141,858.7	153,486.2	162,164.9	171,044.7	180,132.3	189,238.0	198,623.9	204,858.1	211,313.1
Cooking	1,753.0	3,551.2	5,385.9	7,261.1	9,170.4	11,114.7	13,097.9	15,121.6	17,180.6	19,271.9	21,404.0	23,584.7	25,801.5	28,054.4	28,555.3	29,093.1	29,671.1	30,280.6	30,947.6	31,668.0	32,441.8
Space Heating	7,020.0	14,173.8	21,464.6	28,906.5	36,476.2	44,173.6	52,015.0	60,004.0	68,118.5	76,353.0	84,739.0	93,307.3	102,012.0	110,850.0	118,461.1	126,208.6	134,094.1	141,943.8	149,971.5	154,756.5	159,670.2
Water Heating	1,371.4	2,757.1	4,170.6	5,614.7	7,084.4	8,580.4	10,105.6	10,793.4	11,507.5	12,245.8	13,014.8	13,517.7	14,045.2	14,581.8	15,148.6	15,743.0	16,367.1	17,013.6	17,704.7	18,433.6	19,201.1
Healthcare	7,777.4	15,679.9	23,736.2	31,961.5	40,329.7	48,841.6	57,514.9	64,185.8	70,879.0	77,307.4	83,905.5	89,929.7	95,967.0	102,126.1	108,054.5	113,803.5	119,710.1	124,532.5	129,569.7	133,877.8	138,354.6
Cooking	121.8	246.8	374.3	504.6	637.3	772.4	910.3	1,050.9	1,194.0	1,339.4	1,487.5	1,639.1	1,793.2	1,949.8	1,984.1	2,021.1	2,060.9	2,102.8	2,149.2	2,199.3	2,253.1
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	1,651.8	3,337.0	5,054.7	6,808.5	8,592.7	10,407.4	12,256.5	14,141.0	15,934.4	17,756.5	19,614.7	21,516.3	23,450.3	25,416.2	27,145.3	28,907.0	30,702.1	32,521.2	34,385.4	35,363.2	36,349.8
Water Heating	6,003.7	12,096.1	18,307.1	24,648.4	31,099.7	37,661.7	44,348.1	48,993.9	53,750.5	58,211.5	62,803.3	66,774.3	70,723.5	74,760.2	78,925.1	82,875.4	86,947.2	89,908.5	93,035.1	96,315.3	99,751.7
Lodging	12,818.9	25,839.8	39,111.8	52,659.9	66,441.4	80,456.7	94,735.3	106,371.4	118,235.9	129,263.1	140,567.3	150,754.9	158,693.5	166,821.6	174,989.5	182,657.4	190,579.2	197,546.4	204,847.9	211,957.9	219,393.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	174.0	349.8	529.1	712.5	899.1	1,089.3	1,283.2	1,481.2	1,682.6	1,887.2	2,095.8	2,309.1	2,526.0	2,746.5	2,970.9	3,198.9	3,430.9	3,666.1	3,907.7	4,154.6	4,406.7
Space Heating	912.5	1,843.1	2,791.7	3,760.1	4,745.2	5,747.2	6,768.1	7,808.4	8,860.0	9,927.3	11,014.5	12,125.6	13,254.6	14,401.1	15,335.5	16,287.7	17,258.3	18,242.0	19,250.2	19,769.6	20,312.5
Water Heating	11,732.4	23,647.0	35,791.0	48,187.4	60,797.0	73,620.3	86,684.0	97,081.8	107,693.3	117,448.7	127,457.0	136,320.2	142,912.9	149,674.0	156,683.2	163,170.8	169,889.9	175,638.3	181,690.0	188,033.8	194,674.2
Misc.	4,104.6	8,296.5	12,570.7	16,936.0	21,378.1	25,897.9	30,504.8	35,099.5	39,724.3	44,421.6	49,210.3	54,031.7	58,918.1	63,880.5	68,169.3	72,540.7	76,998.5	81,520.3	86,165.6	88,158.3	90,255.5
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	3,906.1	7,897.3	11,966.9	16,123.0	20,352.3	24,655.4	29,041.4	33,513.0	38,010.7	42,577.5	47,231.2	51,989.2	56,825.0	61,737.5	65,972.2	70,285.3	74,680.5	79,136.4	83,709.1	85,623.7	87,637.1
Water Heating	198.6	399.2	603.8	813.0	1,025.8	1,242.5	1,463.4	1,586.6	1,713.6	1,844.1	1,979.1	2,042.5	2,093.1	2,142.9	2,197.1	2,255.4	2,318.0	2,383.9	2,456.5	2,534.6	2,618.3
Office	24,011.9	48,501.0	73,470.1	98,969.7	124,916.7	151,315.7	178,221.8	204,341.8	230,614.1	257,308.2	284,535.0	311,414.3	338,554.1	366,118.8	389,410.1	413,182.0	437,455.2	462,097.7	487,449.4	499,392.3	511,981.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	21,481.7	43,414.7	65,776.0	88,611.1	111,845.9	135,484.0	159,575.0	184,132.9	208,794.1	233,832.3	259,346.0	285,430.2	311,940.1	338,869.3	361,469.3	384,498.5	407,973.4	431,775.4	456,201.7	467,148.4	478,668.9
Water Heating	2,530.2	5,086.3	7,694.2	10,358.7	13,070.8	15,831.6	18,646.8	20,208.9	21,819.9	23,475.9	25,189.0	25,984.1	26,614.0	27,249.4	27,940.7	28,683.5	29,481.8	30,322.3	31,247.7	32,243.9	33,312.8
Restaurant	19,732.7	39,833.8	60,330.5	81,263.9	102,565.4	124,239.4	146,331.1	164,078.2	182,198.0	200,599.6	219,439.7	237,331.7	255,602.3	274,126.9	287,344.2	300,270.6	313,611.4	327,079.2	341,139.7	354,169.9	367,726.6
Cooking	4,986.2	10,101.1	15,319.8	20,653.8	26,084.6	31,614.8	37,255.8	43,012.2	48,868.7	54,817.2	60,881.8	67,084.6	73,390.0	79,798.2	81,205.4	82,717.5	84,344.0	86,060.1	87,957.4	90,006.1	92,206.9
Space Heating	3,675.7	7,418.4	11,232.2	15,124.5	19,083.2	23,107.9	27,207.3	31,383.2	35,624.1	39,927.2	44,308.9	48,785.4	53,332.7	57,949.1	62,020.3	66,162.3	70,375.0	74,511.7	78,736.9	81,487.9	84,316.4
Water Heating	11,070.8	22,314.2	33,778.4	45,485.6	57,397.6	69,516.7	81,867.9	89,682.9	97,705.3	105,855.2	114,249.0	121,461.8	128,879.6	136,379.5	144,118.5	151,390.8	158,892.4	166,507.3	174,445.4	182,675.8	191,203.3
Retail	27,480.2	55,509.6	84,083.7	113,259.6	142,943.6	173,139.0	203,909.0	234,579.4	265,651.2	297,201.6	329,355.8	361,716.0	394,611.9	428,010.4	456,746.0	486,026.4	515,868.6	546,118.8	577,140.2	593,444.1	610,078.8
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	26,246.7	53,029.9	80,332.6	108,209.4	136,571.0	165,420.2	194,817.5	224,779.0	255,118.3	285,914.0	317,285.6	349,349.2	381,929.5	415,017.3	443,415.0	472,332.2	501,784.1	531,623.1	562,191.4	578,007.4	594,118.6
Water Heating	1,233.5	2,479.7	3,751.1	5,050.2	6,372.6	7,718.8	9,091.6	9,800.3	10,532.9	11,287.6	12,070.2	12,366.8	12,682.4	12,993.1	13,331.0	13,694.2	14,084.5	14,495.7	14,948.8	15,436.7	15,960.2
Warehouse	2,264.6	4,580.2	6,941.8	9,354.6	11,810.4	14,310.0	16,858.5	19,389.7	21,956.1	24,563.3	27,221.8	29,890.6	32,604.5	35,359.9	37,922.7	40,531.8	43,190.4	45,886.6	48,656.9	49,723.4	50,854.8
Space Heating	2,142.1	4,333.8	6,569.1	8,852.7	11,177.1	13,542.9	15,955.1	18,415.3	20,908.4	23,440.0	26,020.2	28,658.6	31,340.1	34,064.7	36,593.9	39,167.0	41,786.9	44,442.2	47,167.6	48,185.6	49,265.1
Water Heating	122.6	246.4	372.8	501.8	633.2	767.0	903.4	974.4	1,047.8	1,123.3	1,201.6	1,232.0	1,264.4	1,295.2	1,328.8	1,364.8	1,403.6	1,444.4	1,489.3	1,537.7	1,589.7
Grand Total	138,153.4	278,847.6	422,290.2	568,765.0	717,797.8	869,411.2	1,023,921.2	1,161,938.5	1,301,075.4	1,440,990.7	1,583,949.5	1,722,432.7	1,860,304.9	2,000							

C-30: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #30)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	7,822.5	15,993.7	24,644.0	33,895.9	43,837.9	54,588.3	66,274.9	76,425.5	87,272.4	99,022.6	111,723.3	124,288.8	137,406.7	151,171.6	165,230.7	179,641.1	194,535.0	208,529.8	223,122.6	237,951.8	253,268.3
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	710.9	1,440.3	2,196.4	2,985.2	3,809.5	4,675.0	5,589.0	6,556.8	7,377.2	8,250.9	9,180.6	10,167.2	11,199.9	12,274.5	13,388.9	14,537.9	15,721.0	16,936.4	18,200.2	19,498.3	20,833.7
Space Heating	1,332.7	2,743.1	4,258.2	5,907.5	7,716.8	9,718.2	11,947.1	14,429.9	17,079.4	19,988.3	23,156.7	26,577.7	30,207.7	34,019.5	37,709.2	41,536.6	45,487.0	49,256.9	53,161.1	56,949.6	60,847.0
Water Heating	5,759.8	11,764.2	18,106.0	24,868.7	32,108.2	39,901.2	48,328.5	54,883.3	62,084.3	69,845.7	78,212.5	86,106.2	94,273.3	102,843.6	111,799.5	120,919.5	130,353.0	139,021.6	148,090.9	157,468.1	167,175.4
Grocery	2,181.7	4,472.2	6,910.8	9,537.4	12,384.9	15,495.1	18,915.0	22,373.0	26,180.1	30,331.8	34,829.1	39,536.1	44,519.5	49,737.6	54,507.2	59,463.0	64,587.2	69,819.5	75,240.4	80,638.6	86,185.1
Cooking	66.8	160.2	288.9	464.4	699.1	1,006.5	1,400.1	1,890.4	2,481.7	3,173.1	3,962.4	4,844.4	5,803.9	6,829.9	7,822.7	8,863.6	9,947.2	11,076.0	12,251.0	13,458.2	14,702.0
Space Heating	1,659.8	3,389.5	5,214.0	7,158.2	9,240.3	11,485.2	13,922.0	16,570.8	19,434.9	22,512.5	25,805.9	29,312.2	32,993.1	36,826.8	40,222.9	43,737.7	47,358.7	51,024.9	54,805.4	58,510.4	62,305.0
Water Heating	455.1	922.6	1,407.9	1,914.9	2,445.5	3,003.4	3,592.9	3,911.7	4,263.5	4,646.2	5,060.8	5,379.5	5,722.5	6,080.9	6,461.6	6,861.8	7,281.3	7,718.6	8,184.0	8,670.0	9,178.1
Healthcare	2,168.6	4,432.9	6,828.6	9,388.8	12,136.9	15,104.0	18,321.5	21,012.2	23,912.1	26,880.0	30,092.1	33,210.2	36,457.3	39,858.8	43,295.0	46,808.5	50,446.3	53,801.9	57,312.7	60,898.7	64,607.0
Cooking	4.2	10.2	18.5	29.8	45.1	65.1	90.9	123.1	162.0	207.7	260.0	318.5	382.2	450.5	516.7	586.2	658.6	734.1	812.8	893.6	977.0
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	335.2	688.9	1,067.6	1,478.2	1,926.7	2,420.5	2,967.9	3,575.1	4,192.5	4,869.5	5,605.6	6,399.1	7,239.6	8,121.1	8,925.4	9,761.0	10,624.4	11,515.0	12,436.3	13,336.6	14,256.4
Water Heating	1,829.2	3,733.8	5,742.5	7,880.8	10,165.1	12,618.3	15,262.7	17,314.0	19,557.6	21,802.8	24,226.5	26,492.7	28,835.4	31,287.2	33,852.9	36,461.3	39,163.3	41,552.8	44,063.6	46,668.5	49,373.7
Lodging	3,809.7	7,769.7	11,935.9	16,357.8	21,066.4	26,105.4	31,522.3	36,272.7	41,410.6	46,585.8	52,129.4	57,418.0	61,912.3	66,635.3	71,498.1	76,458.2	81,608.9	86,668.7	91,961.6	97,416.2	103,069.8
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	52.0	105.4	160.7	218.4	278.7	342.0	408.9	479.8	554.7	633.5	716.5	803.6	894.3	988.0	1,084.6	1,183.9	1,285.6	1,389.8	1,497.5	1,607.8	1,720.8
Space Heating	191.1	391.5	604.5	833.5	1,081.5	1,351.9	1,649.0	1,975.8	2,330.6	2,715.7	3,131.3	3,576.7	4,046.7	4,538.3	4,952.0	5,382.2	5,827.1	6,286.4	6,761.5	7,224.5	7,701.0
Water Heating	3,566.6	7,272.9	11,170.7	15,305.9	19,706.2	24,411.5	29,464.3	33,817.1	38,525.3	43,236.6	48,281.7	53,037.7	56,971.3	61,109.1	65,461.5	69,892.2	74,496.2	78,992.5	83,702.6	88,583.9	93,648.0
Misc.	669.5	1,387.3	2,169.9	3,036.1	4,003.2	5,091.7	6,323.7	7,690.6	9,202.5	10,877.8	12,715.7	14,678.3	16,765.1	18,962.7	20,941.0	23,004.0	25,142.7	27,357.5	29,656.7	31,882.4	34,170.0
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	605.7	1,258.0	1,973.0	2,769.0	3,663.0	4,675.2	5,827.1	7,134.9	8,583.5	10,191.5	11,957.7	13,876.7	15,922.2	18,077.2	20,009.8	22,024.4	24,112.1	26,273.4	28,515.3	30,681.1	32,905.7
Water Heating	63.9	129.3	196.9	267.1	340.2	416.5	496.6	555.7	619.0	686.3	757.9	801.6	842.9	885.5	931.2	979.6	1,030.7	1,084.2	1,141.4	1,201.4	1,264.3
Office	4,517.1	9,290.9	14,413.3	19,982.2	26,082.9	32,821.9	40,316.8	48,332.9	57,093.0	66,716.8	77,206.9	88,126.8	99,669.5	111,801.9	122,470.1	133,600.8	145,147.2	157,106.4	169,532.3	181,633.1	194,114.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	3,704.5	7,646.3	11,908.8	16,584.0	21,754.8	27,522.6	33,997.8	41,263.4	49,219.9	57,988.1	67,567.7	77,935.1	88,955.9	100,544.1	110,628.3	121,140.3	132,033.9	143,309.0	155,003.4	166,337.8	178,015.3
Water Heating	812.6	1,644.6	2,504.5	3,398.2	4,328.1	5,299.3	6,319.0	7,069.5	7,873.1	8,728.6	9,639.1	10,191.6	10,713.6	11,257.8	11,841.8	12,460.5	13,113.3	13,797.5	14,528.9	15,295.3	16,099.4
Restaurant	4,279.7	8,836.0	13,767.5	19,175.4	25,137.6	31,744.3	39,085.7	45,122.6	51,940.0	59,473.6	67,739.3	76,082.5	84,988.8	94,332.9	103,610.3	113,137.1	123,017.7	133,124.0	143,662.9	154,445.2	165,573.4
Cooking	184.2	441.3	795.2	1,277.6	1,922.4	2,767.2	3,849.4	5,198.5	6,827.0	8,732.9	10,910.5	13,345.9	15,996.9	18,833.1	21,574.5	24,449.9	27,444.2	30,564.5	33,818.7	37,162.1	40,607.1
Space Heating	956.7	1,947.3	2,984.0	4,078.4	5,238.0	6,474.2	7,800.7	9,226.9	10,754.1	12,381.2	14,110.1	15,940.3	17,853.5	19,839.5	21,631.6	23,481.2	25,382.4	27,279.0	29,230.5	31,151.1	33,118.8
Water Heating	3,138.8	6,447.4	9,988.2	13,819.4	17,977.2	22,502.8	27,435.6	30,697.2	34,358.9	38,359.5	42,718.7	46,796.3	51,138.4	55,660.3	60,404.2	65,205.9	70,191.1	75,280.5	80,613.8	86,132.1	91,847.5
Retail	5,509.2	11,321.2	17,542.1	24,285.7	31,649.6	39,756.3	48,741.5	58,535.7	69,291.3	81,031.4	93,750.3	107,203.9	121,439.8	136,345.1	149,660.4	163,495.7	177,797.6	192,556.3	207,831.9	222,745.1	238,017.3
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	5,116.5	10,526.1	16,331.1	22,642.3	29,556.0	37,192.3	45,683.2	55,126.6	65,505.2	76,842.7	89,131.9	102,345.9	116,321.9	130,959.5	143,987.6	157,518.6	171,499.4	185,921.4	200,837.1	215,373.2	230,249.9
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	4,858.0	5,117.9	5,385.6	5,972.8	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5	
Warehouse	270.3	568.4	903.9	1,288.1	1,732.4	2,249.9	2,854.3	3,539.3	4,322.2	5,205.9	6,189.6	7,247.8	8,385.9	9,591.5	10,756.5	11,972.8	13,234.9	14,544.0	15,904.6	17,216.4	18,568.7
Space Heating	231.2	489.2	783.2	1,124.4	1,523.9	1,994.6	2,549.7	3,199.7	3,944.9	4,788.5	5,729.3	6,763.4	7,875.4	9,054.5	10,191.1	11,377.3	12,607.6	13,883.4	15,208.4	16,482.9	17,796.1
Water Heating	39.1	79.2	120.6	163.7	208.5	255.4	304.5	339.6	377.2	417.4	460.3	484.4	510.5	537.0	565.4	595.5	627.3	660.6	696.2	733.5	772.6
Grand Total	31,228.4	64,072.3	99,115.8	136,947.5	178,031.7	222,956.9	272,355.7	319,304.5	370,624.3	426,125.7	486,375.7	547,792.4	611,544.8	678,437.4	741,969.5	807,581.3	875,517.6	943,508.1	1,014,225.8	1,084,827.5	1,157,574.2

C-31: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #31)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	8,087.8	16,537.1	25,478.8	35,022.9	45,226.9	56,160.4	67,899.2	77,193.0	87,159.4	97,794.0	109,156.9	119,890.9	130,914.4	142,405.6	153,944.2	165,880.9	178,208.6	189,552.7	201,453.4	213,367.8	225,717.1
Cooking	39.0	93.1	166.6	264.9	393.3	556.7	759.7	1,004.7	1,291.1	1,616.5	1,979.0	2,375.7	2,800.2	3,248.3	3,663.3	4,095.7	4,543.9	5,004.1	5,485.0	5,981.2	6,491.9
Other	658.1	1,337.8	2,047.9	2,795.0	3,582.4	4,415.4	5,300.2	6,239.9	7,232.9	8,276.0	9,370.5	10,516.4	11,703.0	12,926.5	14,185.4	15,475.2	16,796.2	18,142.1	19,536.7	20,966.6	22,432.1
Space Heating	1,241.7	2,613.3	4,154.4	5,909.3	7,915.8	10,213.7	12,839.3	15,812.5	19,007.8	22,524.6	26,350.6	30,468.8	34,822.4	39,378.4	43,759.2	48,293.5	52,967.2	57,745.7	62,701.0	67,372.3	72,177.1
Water Heating	6,148.9	12,492.9	19,109.9	26,053.6	33,335.5	40,974.6	49,000.0	54,135.9	59,627.7	65,376.8	71,456.9	76,529.9	81,588.8	86,852.4	92,336.2	98,016.5	103,901.4	108,660.7	113,730.6	119,047.8	124,616.0
Grocery	2,102.3	4,373.3	6,865.7	9,634.6	12,724.1	16,180.3	20,045.6	23,947.4	28,266.0	32,976.5	38,065.7	43,355.4	48,932.2	54,749.1	59,931.7	65,307.2	70,861.1	76,549.2	82,468.6	88,244.1	94,176.3
Cooking	102.0	242.6	432.6	686.1	1,016.2	1,435.9	1,956.4	2,584.0	3,317.4	4,150.6	5,078.1	6,093.2	7,179.1	8,325.6	9,385.0	10,488.7	11,632.8	12,807.8	14,035.4	15,302.0	16,605.9
Space Heating	1,440.5	2,992.1	4,688.8	6,566.5	8,653.6	10,980.5	13,576.0	16,454.5	19,607.1	23,018.1	26,679.2	30,578.9	34,669.6	38,925.2	42,609.5	46,421.1	50,348.8	54,362.6	58,521.0	62,470.9	66,514.1
Water Heating	559.8	1,138.6	1,744.2	2,382.0	3,054.3	3,764.0	4,513.3	4,908.9	5,341.6	5,807.9	6,308.4	6,834.4	7,083.4	7,498.3	7,937.3	8,397.4	8,879.5	9,378.9	9,912.1	10,471.2	11,056.3
Healthcare	2,193.8	4,481.5	6,897.6	9,470.0	12,209.1	15,130.8	18,251.7	20,553.3	22,981.7	25,355.0	27,901.0	30,197.6	32,542.4	34,985.7	37,385.3	39,881.6	42,473.9	44,995.7	47,656.0	50,336.7	53,127.0
Cooking	8.3	19.8	35.5	56.4	83.8	118.6	161.8	214.0	275.0	344.4	421.6	506.1	596.6	692.0	780.5	872.6	968.1	1,066.2	1,167.7	1,274.4	1,383.2
Space Heating	315.6	659.3	1,039.4	1,465.4	1,945.2	2,486.9	3,098.4	3,783.7	4,477.5	5,239.6	6,067.5	6,958.1	7,899.0	8,883.3	9,764.1	10,678.0	11,622.0	12,588.6	13,593.0	14,538.4	15,512.8
Water Heating	1,869.8	3,802.4	5,822.7	7,948.1	10,180.2	12,525.3	14,991.6	16,555.5	18,229.2	19,771.1	21,411.9	22,733.4	24,046.8	25,410.4	26,840.8	28,331.0	29,883.7	31,340.9	32,894.4	34,523.9	36,230.9
Lodging	4,869.8	9,987.0	15,428.4	21,259.7	27,510.1	34,211.8	41,395.4	47,699.2	54,439.9	61,148.2	68,242.0	74,943.8	80,565.5	86,414.3	92,389.7	98,375.5	104,569.5	110,562.5	116,831.8	123,286.1	129,973.3
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	231.4	478.9	747.6	1,042.8	1,368.4	1,729.1	2,129.3	2,571.3	3,051.2	3,569.5	4,125.3	4,716.9	5,337.3	5,982.6	6,529.0	7,094.6	7,677.8	8,274.0	8,891.8	9,478.2	10,081.8
Water Heating	4,638.4	9,508.1	14,680.8	20,217.0	26,141.7	32,482.6	39,266.0	45,127.9	51,388.7	57,578.7	64,116.7	70,226.9	75,228.2	80,431.7	85,860.7	91,280.9	96,891.7	102,288.5	107,940.0	113,807.9	119,891.5
Misc.	811.7	1,704.7	2,704.1	3,837.3	5,127.9	6,600.6	8,278.1	10,172.9	12,280.7	14,589.5	17,091.6	19,736.2	22,520.5	25,429.1	28,051.6	30,770.2	33,576.3	36,448.1	39,430.5	42,236.3	45,126.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	761.9	1,604.6	2,552.4	3,633.0	4,869.9	6,287.9	7,909.5	9,747.1	11,796.6	14,046.0	16,487.5	19,110.5	21,879.6	24,774.4	27,382.0	30,084.7	32,874.0	35,728.3	38,692.2	41,478.3	44,347.3
Water Heating	49.7	100.2	151.6	204.3	258.0	312.7	368.7	425.8	484.1	543.5	604.1	625.7	640.9	654.7	669.6	685.5	702.4	719.8	738.4	758.0	778.8
Office	5,573.6	11,591.3	18,191.9	25,253.3	33,704.8	42,866.4	53,130.9	64,171.3	76,196.9	89,300.9	103,449.4	118,075.5	133,404.7	149,401.2	163,509.3	178,148.7	193,274.1	208,762.9	224,867.9	240,117.8	255,842.5
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,563.9	9,550.3	15,088.8	21,322.0	28,368.8	36,356.0	45,401.0	55,567.4	66,674.5	78,817.9	91,960.5	106,050.8	120,903.6	136,413.2	149,999.9	164,087.3	178,630.5	193,514.9	208,974.9	223,545.0	238,554.7
Water Heating	1,009.7	2,041.1	3,103.2	4,201.3	5,336.0	6,510.4	7,729.9	8,603.9	9,522.4	10,483.0	11,488.9	12,024.7	12,501.1	12,988.0	13,509.4	14,061.4	14,643.6	15,247.9	15,893.0	16,572.8	17,287.8
Restaurant	5,245.0	10,964.6	17,292.7	24,356.4	32,237.5	41,018.4	50,764.9	58,838.3	67,829.0	77,617.0	88,205.1	98,773.8	109,934.5	121,546.6	132,813.0	144,239.0	156,057.9	167,986.3	180,448.6	193,178.4	206,315.1
Cooking	364.9	868.9	1,552.1	2,464.2	3,652.2	5,162.2	7,032.9	9,286.2	11,916.0	14,899.4	18,217.1	21,844.4	25,722.1	29,813.1	33,588.8	37,521.2	41,596.1	45,780.5	50,151.5	54,660.6	59,302.0
Space Heating	701.7	1,453.8	2,271.9	3,172.4	4,168.2	5,273.5	6,501.3	7,858.3	9,340.5	10,941.1	12,656.5	14,481.7	16,395.0	18,384.4	20,116.6	21,907.8	23,752.8	25,571.7	27,457.3	29,245.5	31,081.8
Water Heating	4,178.4	8,641.9	13,468.7	18,719.8	24,417.1	30,582.8	37,230.6	41,693.9	46,572.5	51,776.5	57,331.6	62,447.7	67,817.5	73,349.1	79,107.6	84,809.9	90,709.0	96,634.1	102,839.9	109,272.3	115,931.3
Retail	6,490.0	13,468.8	21,089.4	29,513.4	38,869.2	49,297.7	60,933.5	73,623.2	87,504.3	102,564.4	118,767.6	135,790.6	153,687.8	172,327.4	188,899.3	206,055.7	223,746.5	241,835.4	260,596.9	278,423.1	296,772.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	5,989.5	12,453.0	19,537.3	27,399.6	36,166.7	45,976.2	56,958.8	69,183.8	82,565.8	97,094.3	112,732.7	129,429.6	146,976.8	165,257.9	181,447.7	198,201.7	215,469.2	233,118.5	251,409.1	268,740.8	286,571.6
Water Heating	500.4	1,015.8	1,552.1	2,113.8	2,702.5	3,321.5	3,974.7	4,439.4	4,938.6	5,470.1	6,034.9	6,361.0	6,711.1	7,069.5	7,451.5	7,854.0	8,277.3	8,716.8	9,187.7	9,682.4	10,200.9
Warehouse	331.2	713.2	1,161.1	1,692.9	2,324.5	3,072.1	3,950.3	4,945.1	6,071.7	7,326.8	8,704.7	10,170.9	11,729.8	13,366.2	14,946.3	16,586.0	18,280.0	20,015.5	21,821.7	23,511.8	25,253.4
Space Heating	281.3	612.0	1,006.6	1,482.4	2,055.4	2,741.4	3,554.7	4,503.0	5,579.8	6,782.0	8,103.6	9,537.0	11,060.7	12,661.7	14,204.0	15,803.9	17,456.1	19,148.1	20,907.7	22,548.9	24,239.2
Water Heating	49.9	101.2	154.6	210.5	269.1	330.7	395.6	442.0	491.8	544.8	601.1	633.9	669.1	704.5	742.3	782.1	823.9	867.4	914.0	962.9	1,014.2
Grand Total	35,705.2	73,821.5	115,109.6	160,310.6	209,934.0	264,538.5	324,649.7	381,143.7	442,729.6	508,672.3	579,584.1	650,934.8	724,231.9	800,625.3	871,870.4	945,244.9	1,021,047.9	1,096,708.3	1,175,575.5	1,252,702.2	1,332,303.2

C-32: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #32)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	8,830.5	18,080.8	27,896.3	38,393.5	49,622.5	61,658.8	74,577.3	84,062.5	94,244.8	105,121.5	116,746.9	127,335.5	138,174.0	149,519.1	160,822.0	172,561.2	184,729.1	197,092.2	210,098.0	223,046.8	236,450.8
Cooking	48.7	115.5	205.2	324.0	477.3	670.6	908.4	1,193.2	1,524.1	1,898.4	2,313.7	2,767.4	3,252.2	3,763.7	4,232.2	4,720.4	5,226.7	5,746.9	6,293.4	6,856.4	7,434.3
Other	874.3	1,775.4	2,714.2	3,698.3	4,730.8	5,817.3	6,964.5	8,175.9	9,448.8	10,779.7	12,170.5	13,622.1	15,121.7	16,665.2	18,251.3	19,874.6	21,535.7	23,226.6	24,977.6	26,770.5	28,604.6
Space Heating	1,285.9	2,724.9	4,360.7	6,242.4	8,410.9	10,908.5	13,772.7	17,023.0	20,491.7	24,315.3	28,480.2	32,968.1	37,717.2	42,691.8	47,393.5	52,267.1	57,297.7	62,446.9	67,816.9	72,812.2	77,944.3
Water Heating	6,621.5	13,465.0	20,616.1	28,128.7	36,003.4	44,262.4	52,931.6	57,670.3	62,780.2	68,128.0	73,782.5	77,977.9	82,082.9	86,398.4	90,945.1	95,699.0	100,669.0	105,671.7	111,010.0	116,607.8	122,467.6
Grocery	2,197.1	4,582.0	7,210.8	10,142.0	13,421.6	17,098.6	21,218.2	25,278.7	29,787.1	34,717.5	40,056.8	45,573.9	51,403.5	57,493.7	62,700.9	68,120.3	73,735.5	79,498.5	85,538.0	91,363.9	97,367.4
Cooking	124.3	294.5	523.3	826.1	1,217.0	1,710.0	2,316.4	3,042.7	3,886.7	4,841.3	5,900.8	7,058.2	8,294.9	9,599.8	10,794.9	12,040.7	13,332.5	14,659.8	16,054.2	17,490.4	18,965.1
Space Heating	1,342.7	2,807.5	4,429.9	6,248.2	8,292.7	10,595.7	13,186.9	16,081.2	19,269.4	22,735.6	26,470.9	30,462.8	34,661.8	39,040.2	42,619.1	46,336.3	50,179.9	54,117.9	58,230.4	62,060.2	66,002.0
Water Heating	730.1	1,480.0	2,257.5	3,067.8	3,911.9	4,792.9	5,714.9	6,154.8	6,631.0	7,140.5	7,685.0	8,052.9	8,446.7	8,853.8	9,286.9	9,743.3	10,223.1	10,720.8	11,253.4	11,813.2	12,400.3
Healthcare	2,622.7	5,356.5	8,240.8	11,302.5	14,551.3	18,002.7	21,672.9	24,212.6	26,958.5	29,583.2	32,384.0	34,810.9	37,273.6	39,841.3	42,328.3	44,922.6	47,623.5	50,358.2	53,250.8	56,152.8	59,173.1
Cooking	9.0	21.4	38.1	60.2	88.7	124.6	168.8	221.7	283.3	352.9	430.1	514.5	604.6	699.8	786.9	877.8	972.0	1,068.7	1,170.4	1,275.1	1,382.7
Space Heating	275.5	583.2	932.2	1,332.9	1,793.8	2,323.8	2,930.7	3,618.7	4,385.8	5,227.5	6,140.7	7,121.8	8,157.8	9,241.1	10,176.9	11,148.7	12,153.6	13,183.3	14,259.3	15,256.3	16,281.9
Water Heating	2,338.1	4,751.8	7,270.4	9,909.4	12,668.8	15,554.3	18,573.4	20,372.2	22,289.4	24,002.9	25,813.2	27,174.6	28,511.1	29,900.4	31,364.9	32,896.1	34,498.0	36,106.1	37,821.0	39,621.4	41,508.5
Lodging	6,162.1	12,607.0	19,419.9	26,663.7	34,356.1	42,521.8	51,185.3	58,542.9	66,335.6	73,954.2	81,957.3	89,324.1	95,168.4	101,238.9	107,409.6	113,566.6	119,946.9	126,026.3	132,408.2	139,025.9	145,892.0
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	175.6	357.4	547.3	747.1	957.5	1,179.5	1,414.7	1,663.6	1,921.7	2,192.1	2,475.1	2,770.7	3,076.3	3,390.8	3,551.5	3,719.6	3,894.5	4,074.2	4,262.4	4,442.2	4,628.7
Water Heating	5,986.5	12,249.6	18,872.6	25,916.6	33,398.6	41,342.2	49,770.6	56,879.2	64,413.9	71,762.0	79,482.2	86,553.4	92,092.1	97,848.1	103,858.1	109,847.0	116,052.3	121,952.0	128,145.8	134,583.8	141,263.4
Misc.	307.4	703.7	1,213.6	1,866.8	2,690.1	3,710.2	4,949.3	6,419.5	8,116.5	10,026.7	12,139.6	14,387.8	16,789.1	19,318.9	21,966.3	24,712.0	27,547.1	30,451.3	33,485.4	36,275.7	39,141.2
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	250.5	589.2	1,040.2	1,633.2	2,395.2	3,352.7	4,527.8	5,932.5	7,562.9	9,405.3	11,448.9	13,680.1	16,063.6	18,577.8	21,208.2	23,935.7	26,751.6	29,635.8	32,648.8	35,416.7	38,258.5
Water Heating	56.8	114.5	173.4	233.6	295.0	357.6	421.6	486.9	553.6	621.4	690.7	707.7	725.5	741.2	758.1	776.3	795.5	815.5	836.6	859.0	882.8
Office	5,208.6	10,533.9	16,019.3	21,691.6	27,551.8	33,614.1	39,903.5	45,909.1	51,923.7	58,147.3	64,594.6	70,589.2	76,641.2	82,830.5	88,832.6	88,985.9	92,280.8	95,673.2	99,235.9	102,806.5	106,531.0
Space Heating	3,865.7	7,820.4	11,896.3	16,113.6	20,473.8	24,987.6	29,674.1	34,539.6	39,361.1	44,341.3	49,490.6	54,819.1	60,287.9	65,883.4	68,248.8	70,727.2	73,309.6	75,962.3	78,734.1	81,471.1	84,319.3
Water Heating	1,342.9	2,713.5	4,123.0	5,578.0	7,078.8	8,626.4	10,229.4	11,369.5	12,562.6	13,806.0	15,104.0	15,770.1	16,353.3	16,947.1	17,583.8	18,258.8	18,971.2	19,710.9	20,501.8	21,335.4	22,211.7
Restaurant	6,253.9	13,059.7	20,562.5	28,894.4	38,131.9	48,353.0	59,619.3	68,433.5	78,228.5	88,865.5	100,362.6	111,647.8	123,574.0	135,975.8	148,290.5	160,756.5	173,658.0	186,739.3	200,450.3	214,427.5	228,837.0
Cooking	454.3	1,075.2	1,907.9	3,007.3	4,423.8	6,205.9	8,393.6	11,007.6	14,039.2	17,461.8	21,254.7	25,392.3	29,809.2	34,465.7	38,714.2	43,140.8	47,729.7	52,443.9	57,394.5	62,493.6	67,729.0
Space Heating	309.7	671.4	1,099.7	1,611.6	2,221.9	2,945.6	3,795.6	4,778.5	5,891.9	7,127.8	8,480.8	9,944.0	11,496.4	13,125.6	14,823.8	16,580.0	18,388.9	20,238.1	22,162.7	23,952.1	25,786.7
Water Heating	5,490.0	11,313.1	17,555.0	24,275.5	31,486.2	39,201.4	47,430.2	52,647.3	58,297.4	64,276.0	70,627.1	76,311.5	82,268.4	88,384.5	94,752.4	101,035.7	107,539.4	114,057.3	120,893.2	127,981.8	135,321.3
Retail	5,591.4	11,735.8	18,593.6	26,339.9	35,115.9	45,070.1	56,337.8	68,965.8	82,864.5	98,032.3	114,425.4	131,621.3	149,755.0	168,682.6	184,669.9	201,283.6	218,470.6	236,089.6	254,510.8	271,654.4	289,305.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	5,192.0	10,926.4	17,359.3	24,662.9	32,977.8	42,450.4	53,213.5	65,335.0	78,704.2	93,320.6	109,139.7	126,101.4	143,985.7	162,667.9	178,393.2	194,730.2	211,625.6	228,941.8	247,037.6	263,839.5	281,132.2
Water Heating	399.4	809.5	1,234.4	1,677.0	2,138.1	2,619.7	3,124.3	3,630.8	4,160.4	4,711.6	5,285.7	5,820.0	6,359.3	6,814.6	7,276.7	7,653.5	8,045.0	8,448.8	8,864.2	9,291.8	9,731.9
Warehouse	287.7	594.9	927.7	1,292.0	1,692.1	2,133.0	2,619.4	3,151.4	3,723.7	4,339.7	4,998.4	5,662.5	6,359.4	7,082.4	7,661.9	8,264.1	8,887.2	9,525.8	10,193.2	10,821.7	11,469.3
Space Heating	247.6	513.7	803.9	1,123.8	1,477.7	1,870.4	2,306.3	2,787.5	3,306.8	3,867.6	4,469.0	5,109.1	5,780.6	6,479.3	7,032.8	7,607.5	8,201.6	8,810.2	9,445.3	10,039.9	10,651.9
Water Heating	40.1	81.2	123.8	168.2	214.4	262.6	313.1	363.9	416.9	472.0	529.4	553.4	578.8	603.2	629.2	656.6	685.5	715.6	747.9	781.8	817.3
Grand Total	37,461.4	77,254.5	120,084.5	166,586.3	217,133.4	272,162.2	332,083.0	384,975.9	442,183.0	502,787.7	567,665.6	630,952.9	695,138.2	761,983.2	821,682.3	883,172.8	946,878.7	1,011,454.3	1,079,170.5	1,145,575.2	1,214,166.9

C-33: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #33)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	5,121.6	10,445.2	16,051.2	22,011.7	28,379.1	35,226.5	42,637.2	48,109.2	54,095.2	60,622.3	67,747.5	74,392.2	81,318.1	88,658.4	96,079.0	103,835.1	111,912.0	120,239.8	128,991.8	137,838.2	147,016.0
Cooking	18.7	45.0	81.5	131.6	199.0	287.5	401.3	543.6	715.7	917.5	1,148.4	1,407.0	1,688.9	1,990.6	2,283.6	2,590.9	2,911.0	3,244.7	3,592.8	3,950.5	4,319.0
Other	514.6	1,042.6	1,590.0	2,161.0	2,757.9	3,384.7	4,046.9	4,748.3	5,489.2	6,269.2	7,090.1	7,952.9	8,849.5	9,776.9	10,733.5	11,715.4	12,722.4	13,753.1	14,819.3	15,910.5	17,029.1
Space Heating	692.1	1,452.5	2,304.7	3,276.8	4,396.1	5,694.7	7,205.8	8,955.6	10,858.3	13,007.8	15,402.1	18,031.6	20,857.1	23,852.1	26,711.5	29,696.5	32,793.1	36,004.3	39,339.2	42,551.4	45,862.0
Water Heating	3,896.2	7,905.1	12,074.9	16,442.2	21,026.1	25,859.6	30,983.1	33,861.8	37,032.0	40,427.8	44,106.8	47,000.7	49,922.6	53,038.7	56,350.4	59,832.3	63,485.5	67,237.7	71,240.5	75,425.8	79,806.0
Grocery	1,225.8	2,537.0	3,963.8	5,539.9	7,296.2	9,270.2	11,502.2	13,717.1	16,229.9	19,039.0	22,143.9	25,406.9	28,905.1	32,601.0	35,834.8	39,223.2	42,750.5	46,418.1	50,244.0	54,021.4	57,925.5
Cooking	48.7	117.3	212.6	343.2	518.7	749.5	1,046.0	1,416.6	1,864.9	2,390.7	2,992.4	3,666.2	4,400.4	5,186.7	5,949.7	6,750.4	7,584.3	8,453.7	9,360.5	10,292.1	11,252.1
Space Heating	744.6	1,544.4	2,418.6	3,389.0	4,476.1	5,704.3	7,099.8	8,682.4	10,458.2	12,426.7	14,587.4	16,933.8	19,434.7	22,069.3	24,245.9	26,522.7	28,888.6	31,344.5	33,898.5	36,361.3	38,903.9
Water Heating	432.5	875.3	1,332.6	1,807.6	2,301.4	2,816.4	3,356.4	3,618.1	3,906.8	4,221.6	4,564.1	4,806.8	5,070.0	5,345.0	5,639.2	5,950.2	6,277.6	6,619.9	6,985.1	7,367.9	7,769.5
Healthcare	1,528.2	3,110.8	4,769.8	6,524.0	8,385.9	10,373.8	12,506.9	14,001.9	15,650.2	17,266.5	19,032.0	20,612.2	22,249.7	23,980.6	25,691.3	27,487.0	29,365.0	31,300.7	33,347.0	35,429.9	37,600.4
Cooking	3.5	8.5	15.5	25.0	37.8	54.6	76.2	103.2	135.9	174.2	218.1	267.2	320.7	378.0	433.7	492.0	552.8	616.2	682.3	750.3	820.3
Space Heating	146.2	306.7	486.5	691.3	927.0	1,200.2	1,518.0	1,885.6	2,305.3	2,776.6	3,299.2	3,871.0	4,483.8	5,132.2	5,697.8	6,289.6	6,904.8	7,544.0	8,209.0	8,847.9	9,507.4
Water Heating	1,378.4	2,795.5	4,267.8	5,807.7	7,421.1	9,118.9	10,912.7	12,013.0	13,209.0	14,315.7	15,514.8	16,474.0	17,445.1	18,470.4	19,559.8	20,705.4	21,903.3	23,140.5	24,455.6	25,831.8	27,272.7
Lodging	3,589.5	7,320.6	11,245.9	15,412.0	19,847.6	24,593.2	29,692.6	34,098.4	38,864.3	43,640.3	48,757.1	53,594.0	57,608.4	61,834.6	66,182.2	70,614.8	75,224.0	79,728.8	84,450.8	89,340.4	94,415.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	103.0	209.0	319.2	434.5	555.4	682.8	817.9	961.4	1,111.1	1,269.1	1,435.7	1,611.2	1,793.7	1,982.6	2,080.0	2,182.5	2,289.6	2,400.8	2,516.8	2,630.7	2,749.1
Water Heating	3,486.5	7,111.6	10,926.7	14,977.5	19,292.2	23,910.4	28,874.7	33,137.0	37,753.2	42,371.2	47,321.4	51,980.2	55,814.7	59,851.9	64,102.2	68,432.3	72,934.4	77,328.0	81,934.0	86,709.7	91,666.6
Misc.	133.1	304.9	528.5	820.7	1,199.5	1,685.0	2,297.2	3,052.4	3,957.3	5,011.2	6,211.5	7,518.8	8,942.5	10,464.5	12,074.6	13,757.5	15,505.0	17,320.8	19,209.2	21,015.2	22,876.5
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	99.0	236.3	424.7	680.9	1,023.0	1,471.1	2,045.2	2,761.2	3,626.3	4,639.6	5,798.5	7,095.6	8,508.6	10,021.1	11,620.9	13,292.7	15,028.5	16,832.2	18,707.7	20,500.1	22,346.9
Water Heating	34.0	68.6	103.8	139.8	176.5	213.9	252.1	291.1	331.0	371.6	413.0	423.2	433.9	443.4	453.7	464.8	476.5	488.6	501.5	515.2	529.6
Office	3,096.7	6,254.9	9,499.4	12,845.6	16,295.4	19,859.6	23,557.3	27,093.8	30,643.9	34,332.1	38,169.7	41,751.3	45,383.2	49,110.4	50,936.0	52,860.9	54,877.4	56,969.1	59,160.2	61,384.4	63,707.6
Space Heating	2,296.5	4,639.6	7,047.8	9,532.8	12,096.3	14,746.7	17,498.5	20,359.7	23,200.8	26,147.0	29,206.2	32,385.1	35,659.5	39,019.9	40,450.4	41,955.2	43,527.5	45,154.7	46,850.9	48,554.5	50,329.6
Water Heating	800.2	1,615.3	2,451.6	3,312.9	4,199.1	5,112.9	6,058.9	6,734.1	7,443.0	8,185.1	8,963.5	9,366.2	9,723.7	10,090.5	10,485.6	10,905.6	11,349.9	11,814.4	12,309.3	12,830.0	13,378.0
Restaurant	3,427.8	7,106.4	11,124.9	15,578.1	20,546.7	26,125.6	32,404.6	37,345.3	43,045.3	49,446.2	56,562.9	63,738.6	71,465.2	79,617.5	87,955.4	96,531.6	105,446.5	114,694.2	124,353.9	134,237.6	144,448.0
Cooking	178.9	430.4	778.5	1,255.1	1,894.0	2,732.8	3,808.8	5,151.7	6,773.9	8,673.3	10,844.4	13,273.2	15,917.4	18,746.7	21,486.7	24,360.7	27,353.4	30,472.1	33,724.5	37,066.1	40,509.1
Space Heating	157.7	338.4	549.8	801.6	1,103.7	1,467.4	1,904.3	2,423.4	3,028.4	3,718.9	4,493.7	5,349.2	6,272.0	7,253.0	8,285.2	9,360.1	10,472.7	11,624.8	12,819.0	13,968.2	15,150.3
Water Heating	3,091.2	6,337.6	9,796.6	13,521.4	17,549.1	21,925.4	26,691.5	29,770.2	33,243.0	37,053.9	41,224.7	45,116.2	49,275.8	53,617.8	58,183.5	62,810.9	67,620.4	72,597.3	77,810.3	83,203.3	88,788.6
Retail	3,074.3	6,397.5	10,056.2	14,150.4	18,774.6	24,041.6	30,070.7	36,944.7	44,658.7	53,253.5	62,724.7	72,823.7	83,624.1	95,021.4	104,754.1	114,941.5	125,534.6	136,540.0	147,996.7	159,041.6	170,448.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	2,838.1	5,919.6	9,329.0	13,164.3	17,519.8	22,506.5	28,241.9	34,816.5	42,216.2	50,482.3	59,609.3	69,566.2	80,213.7	91,458.9	101,028.1	111,042.3	121,452.4	132,266.0	143,517.5	154,347.5	165,528.9
Water Heating	236.2	477.8	727.3	986.1	1,254.9	1,535.1	1,828.8	2,128.2	2,442.4	2,771.2	3,115.4	3,257.5	3,410.4	3,562.5	3,726.0	3,899.3	4,082.2	4,274.1	4,479.1	4,694.1	4,919.7
Warehouse	158.1	325.3	504.5	699.3	912.7	1,148.2	1,410.1	1,700.5	2,017.6	2,364.7	2,742.1	3,127.4	3,536.9	3,966.0	4,312.1	4,674.4	5,051.2	5,442.4	5,849.7	6,245.0	6,653.5
Space Heating	134.4	277.3	431.5	600.4	786.8	994.3	1,226.8	1,487.2	1,772.8	2,087.0	2,430.0	2,800.8	3,194.7	3,608.6	3,938.6	4,283.7	4,642.3	5,014.4	5,401.5	5,775.4	6,161.6
Water Heating	23.7	48.0	73.0	98.9	125.9	154.0	183.4	213.4	244.8	277.7	312.1	326.7	342.3	357.4	373.6	390.8	408.9	427.9	448.3	469.6	492.0
Grand Total	21,355.2	43,802.5	67,744.1	93,581.7	121,637.8	152,323.7	186,078.8	216,063.3	249,162.2	284,975.8	324,091.5	362,962.4	403,033.2	445,254.3	483,819.5	523,926.1	565,666.3	608,653.9	653,603.3	698,553.8	745,091.9

C-34: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #34)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	5,325.7	10,856.2	16,673.1	22,848.9	29,435.3	36,505.7	44,143.6	49,847.5	56,069.3	62,836.2	70,205.7	77,100.4	84,280.5	91,879.0	99,561.5	107,583.5	115,929.9	124,529.6	133,556.9	142,682.8	152,144.5
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	514.6	1,042.6	1,590.0	2,161.0	2,757.9	3,384.7	4,046.9	4,748.3	5,489.2	6,269.2	7,090.1	7,952.9	8,849.5	9,776.9	10,733.5	11,715.4	12,722.4	13,753.1	14,819.3	15,910.5	17,029.1
Space Heating	895.8	1,862.5	2,924.8	4,111.0	5,447.9	6,967.4	8,703.4	10,681.8	12,816.7	15,201.5	17,835.2	20,709.1	23,782.7	27,029.4	30,144.4	33,388.7	36,748.0	40,223.9	43,826.7	47,310.7	50,897.3
Water Heating	3,896.2	7,905.1	12,074.9	16,442.2	21,026.1	25,859.6	30,983.1	33,861.8	37,032.0	40,427.8	44,106.8	47,000.7	49,922.6	53,038.7	56,350.4	59,832.3	63,485.5	67,237.7	71,240.5	75,425.8	79,806.0
Grocery	1,227.9	2,541.2	3,970.1	5,548.4	7,307.0	9,283.3	11,517.6	13,734.9	16,250.0	19,061.6	22,169.0	25,434.5	28,935.3	32,633.8	35,868.2	39,257.1	42,785.0	46,453.2	50,279.8	54,057.8	57,962.8
Cooking	50.7	121.5	218.9	351.8	529.5	762.5	1,061.4	1,434.3	1,885.1	2,413.3	3,017.5	3,693.8	4,430.7	5,219.5	5,983.0	6,784.3	7,618.8	8,488.8	9,396.2	10,328.6	11,289.3
Space Heating	744.6	1,544.4	2,418.6	3,389.0	4,476.1	5,704.3	7,099.8	8,682.4	10,458.2	12,426.7	14,587.4	16,933.8	19,434.7	22,069.3	24,245.9	26,522.7	28,888.6	31,344.5	33,898.5	36,361.3	38,903.9
Water Heating	432.5	875.3	1,332.6	1,807.6	2,301.4	2,816.4	3,356.4	3,618.1	3,906.8	4,221.6	4,564.1	4,806.8	5,070.0	5,345.0	5,639.2	5,950.2	6,277.6	6,619.9	6,985.1	7,367.9	7,769.5
Healthcare	1,615.9	3,287.4	5,037.2	6,884.2	8,840.6	10,924.9	13,156.5	14,752.1	16,502.9	18,223.7	20,096.0	21,785.6	23,534.4	25,378.6	27,204.1	29,116.6	31,113.0	33,083.5	35,166.1	37,287.4	39,498.1
Cooking	3.8	9.2	16.7	27.0	40.7	58.9	82.2	111.3	146.5	187.8	235.1	288.1	345.8	407.6	467.6	530.5	596.1	664.4	735.7	808.9	884.4
Space Heating	150.0	314.3	498.1	707.0	946.8	1,224.3	1,546.5	1,918.7	2,343.1	2,819.3	3,346.8	3,923.8	4,542.0	5,195.7	5,766.8	6,364.4	6,985.3	7,630.4	8,301.4	8,946.3	9,612.0
Water Heating	1,462.1	2,963.9	4,522.5	6,150.3	7,853.1	9,641.7	11,527.8	12,722.0	14,013.3	15,216.6	16,514.0	17,573.7	18,646.6	19,775.2	20,969.7	22,221.7	23,531.6	24,788.7	26,129.1	27,532.1	29,001.7
Lodging	3,626.8	7,395.7	11,359.6	15,564.9	20,040.5	24,826.6	29,967.3	34,415.0	39,223.5	44,042.7	49,203.5	54,082.6	58,145.2	62,417.5	66,812.1	71,289.3	75,943.8	80,494.1	85,262.4	90,198.9	95,321.9
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	137.5	278.4	424.1	575.6	733.3	898.1	1,071.2	1,253.4	1,442.3	1,640.1	1,847.2	2,064.0	2,288.5	2,519.9	2,660.6	2,807.0	2,958.5	3,114.4	3,275.7	3,435.6	3,600.7
Water Heating	3,489.3	7,117.3	10,935.5	14,989.4	19,307.2	23,928.6	28,896.1	33,161.7	37,781.2	42,402.6	47,356.3	52,018.6	55,856.7	59,897.5	64,151.5	68,482.4	72,985.3	77,379.7	81,986.7	86,763.3	91,721.2
Misc.	134.8	308.5	533.8	827.9	1,208.6	1,696.0	2,310.3	3,067.4	3,974.4	5,030.3	6,232.8	7,542.1	8,968.0	10,492.2	12,104.5	13,789.7	15,539.5	17,357.7	19,248.4	21,056.4	22,919.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	100.8	239.9	430.1	688.2	1,032.2	1,482.2	2,058.2	2,776.3	3,643.4	4,658.8	5,819.7	7,119.0	8,534.1	10,048.8	11,650.8	13,325.0	15,063.0	16,869.0	18,746.9	20,541.3	22,390.1
Water Heating	34.0	68.6	103.8	139.8	176.5	213.9	252.1	291.1	331.0	371.6	413.0	423.2	433.9	443.4	453.7	464.8	476.5	488.6	501.5	515.2	529.6
Office	3,608.1	7,456.8	11,631.0	16,224.9	21,324.0	27,032.9	33,464.3	40,398.3	48,042.1	56,516.6	65,820.8	75,515.2	85,801.4	96,648.6	106,002.3	115,792.8	125,974.2	136,548.3	147,558.6	158,216.8	169,229.3
Space Heating	2,807.9	5,841.5	9,179.4	12,912.0	17,124.9	21,920.0	27,405.5	33,664.2	40,599.0	48,331.4	56,857.3	66,149.0	76,077.7	86,558.1	95,516.8	104,887.2	114,624.3	124,733.9	135,249.3	145,386.8	155,851.4
Water Heating	800.2	1,615.3	2,451.6	3,312.9	4,199.1	5,112.9	6,058.9	6,734.1	7,443.0	8,185.1	8,963.5	9,366.2	9,723.7	10,090.5	10,485.6	10,905.6	11,349.9	11,814.4	12,309.3	12,830.0	13,378.0
Restaurant	3,486.3	7,238.0	11,349.6	15,920.7	21,031.1	26,771.0	33,228.8	38,364.5	44,265.9	50,869.0	58,186.9	65,561.8	73,484.2	81,829.8	90,358.8	99,122.4	108,226.2	117,599.8	127,393.3	137,416.1	147,770.4
Cooking	179.7	432.0	781.0	1,258.4	1,898.2	2,737.8	3,814.8	5,158.5	6,781.7	8,682.0	10,854.1	13,283.8	15,929.0	18,759.4	21,499.5	24,373.7	27,366.7	30,485.6	33,738.3	37,080.2	40,523.5
Space Heating	167.8	358.7	580.6	843.0	1,156.0	1,530.7	1,978.7	2,509.2	3,125.8	3,828.0	4,614.7	5,482.3	6,417.5	7,410.9	8,455.9	9,543.6	10,669.3	11,834.6	13,042.1	14,204.7	15,400.4
Water Heating	3,138.7	6,447.3	9,988.1	13,819.2	17,976.9	22,502.5	27,435.3	30,696.8	34,358.4	38,359.0	42,718.1	46,795.7	51,137.7	55,659.5	60,403.4	65,205.1	70,190.2	75,279.6	80,612.9	86,131.2	91,846.6
Retail	3,804.2	7,868.7	12,285.1	17,155.5	22,573.5	28,652.6	35,515.1	43,084.3	51,514.2	60,845.2	71,075.7	81,959.8	93,565.4	105,786.5	116,363.3	127,412.3	138,883.6	150,779.6	163,145.5	175,118.5	187,473.0
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	3,411.4	7,073.6	11,074.1	15,512.1	20,480.0	26,088.7	32,456.9	39,675.2	47,728.1	56,656.5	66,457.3	77,101.9	88,447.5	100,401.0	110,690.5	121,435.2	132,585.3	144,144.7	156,150.8	167,746.6	179,705.5
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	4,858.0	5,117.9	5,385.6	5,672.8	5,977.2	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5
Warehouse	163.3	335.7	520.3	720.5	939.4	1,180.5	1,448.1	1,744.3	2,067.3	2,420.4	2,803.8	3,195.3	3,611.1	4,046.6	4,399.2	4,768.1	5,151.5	5,549.4	5,963.5	6,365.7	6,781.2
Space Heating	139.6	287.7	447.3	621.6	813.5	1,026.6	1,264.7	1,530.9	1,822.4	2,142.7	2,491.7	2,868.7	3,268.9	3,689.2	4,025.7	4,377.3	4,742.6	5,121.5	5,515.3	5,896.1	6,289.3
Water Heating	23.7	48.0	73.0	98.9	125.9	154.0	183.4	213.4	244.8	277.7	312.1	326.7	342.3	357.4	373.6	390.8	408.9	427.9	448.3	469.6	492.0
Grand Total	22,993.0	47,288.2	73,359.8	101,695.9	132,700.1	166,873.6	204,751.6	239,408.3	277,909.6	319,845.8	365,794.2	412,177.4	460,325.4	511,112.5	558,674.1	608,131.9	659,546.7	712,395.2	767,574.5	822,400.4	879,100.9

C-35: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #35)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	6,251.0	12,718.5	19,489.3	26,637.7	34,212.5	42,286.5	50,945.7	57,690.9	64,969.2	72,807.5	81,266.9	89,277.5	97,591.2	106,339.4	115,189.8	124,396.3	133,942.4	142,809.7	152,118.6	161,544.5	171,324.8
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	514.6	1,042.6	1,590.0	2,161.0	2,757.9	3,384.7	4,046.9	4,748.3	5,489.2	6,269.2	7,090.1	7,952.9	8,849.5	9,776.9	10,733.5	11,715.4	12,722.4	13,753.1	14,819.3	15,910.5	17,029.1
Space Heating	898.2	1,867.4	2,932.3	4,121.1	5,460.6	6,982.8	8,721.5	10,702.7	12,840.4	15,228.1	17,864.6	20,741.4	23,818.1	27,067.8	30,186.0	33,433.4	36,795.8	40,274.9	43,881.0	47,368.3	50,958.2
Water Heating	4,819.0	9,762.4	14,883.7	20,221.0	25,790.6	31,625.1	37,767.1	41,684.3	45,908.2	50,372.6	55,138.6	59,145.4	63,197.9	67,460.7	71,937.2	76,600.4	81,450.2	85,466.8	89,747.9	94,229.9	98,925.4
Grocery	1,234.4	2,555.9	3,995.7	5,588.2	7,365.1	9,364.7	11,627.9	13,880.7	16,436.3	19,292.1	22,446.9	25,762.6	29,316.6	33,071.1	36,363.9	39,813.3	43,404.0	47,137.4	51,033.3	54,883.0	58,862.2
Cooking	50.7	121.5	218.9	351.8	529.5	762.5	1,061.4	1,434.3	1,885.1	2,413.3	3,017.5	3,693.8	4,430.7	5,219.5	5,983.0	6,784.3	7,618.8	8,488.8	9,396.2	10,328.6	11,289.3
Space Heating	746.3	1,547.8	2,423.8	3,396.1	4,485.0	5,715.1	7,112.4	8,697.0	10,474.7	12,445.3	14,607.9	16,956.5	19,459.4	22,096.1	24,274.9	26,553.9	28,922.0	31,380.2	33,936.4	36,401.5	38,946.4
Water Heating	437.3	886.6	1,353.0	1,840.4	2,350.6	2,887.0	3,454.1	3,749.4	4,076.5	4,433.5	4,821.4	5,112.2	5,426.5	5,755.5	6,106.0	6,475.2	6,863.2	7,268.4	7,700.7	8,152.9	8,626.5
Healthcare	1,647.4	3,351.0	5,133.6	7,014.1	9,004.9	11,124.2	13,391.8	15,024.4	16,813.2	18,572.8	20,484.8	22,215.3	24,005.9	25,892.6	27,761.2	29,717.4	31,758.3	33,773.8	35,902.1	38,069.7	40,327.6
Cooking	4.1	9.8	17.7	28.7	43.3	62.6	87.4	118.3	155.8	199.7	250.0	306.3	367.6	433.3	497.0	563.9	633.6	706.2	782.0	859.8	940.0
Space Heating	181.3	377.4	593.4	835.2	1,108.5	1,419.9	1,776.7	2,184.1	2,644.1	3,156.4	3,720.8	4,335.3	4,991.6	5,684.0	6,294.4	6,931.8	7,593.1	8,278.8	8,991.0	9,677.8	10,385.8
Water Heating	1,462.1	2,963.9	4,522.5	6,150.3	7,853.1	9,641.7	11,527.8	12,722.0	14,013.3	15,216.6	16,514.0	17,573.7	18,646.6	19,775.2	20,969.7	22,221.7	23,531.6	24,788.7	26,129.1	27,532.1	29,001.7
Lodging	3,740.7	7,630.2	11,723.6	16,070.0	20,700.2	25,657.5	30,988.8	35,649.3	40,693.0	45,769.8	51,210.5	56,391.6	60,774.6	65,383.0	70,127.8	74,967.2	79,994.3	84,927.9	90,090.9	95,412.5	100,930.2
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	174.2	357.4	553.0	764.3	994.2	1,246.3	1,524.7	1,832.5	2,168.1	2,533.7	2,929.3	3,354.4	3,803.9	4,274.5	4,667.0	5,075.7	5,498.8	5,936.1	6,389.0	6,829.3	7,283.0
Water Heating	3,566.6	7,272.8	11,170.6	15,305.7	19,706.0	24,411.2	29,464.0	33,816.8	38,524.9	43,236.2	48,281.2	53,037.1	56,970.7	61,108.5	65,460.8	69,891.5	74,495.5	78,991.8	83,701.9	88,583.2	93,647.3
Misc.	472.2	987.4	1,560.6	2,209.2	2,950.2	3,803.5	4,790.1	5,925.9	7,217.2	8,662.7	10,261.5	11,975.5	13,812.1	15,753.1	17,468.0	19,261.9	21,126.0	23,061.9	25,075.4	27,013.0	29,012.6
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	438.1	918.8	1,456.8	2,069.4	2,773.8	3,589.7	4,538.0	5,634.8	6,886.2	8,291.2	9,848.5	11,552.4	13,378.2	15,309.6	17,014.3	18,797.2	20,649.6	22,573.3	24,573.9	26,497.8	28,483.0
Water Heating	34.0	68.6	103.8	139.8	176.5	213.9	252.1	291.1	331.0	371.6	413.0	423.2	433.9	443.4	453.7	464.8	476.5	488.6	501.5	515.2	529.6
Office	3,696.0	7,633.6	11,898.4	16,584.6	21,777.5	27,581.7	34,110.1	41,142.6	48,886.5	57,462.4	66,869.8	76,669.6	87,062.8	98,018.5	107,482.6	117,385.0	127,679.6	138,368.0	149,493.8	160,269.4	171,401.0
Space Heating	2,895.7	6,018.3	9,446.8	13,271.7	17,578.4	22,468.8	28,051.2	34,408.5	41,443.4	49,277.3	57,906.3	67,303.4	77,339.1	87,928.0	96,997.0	106,479.3	116,329.8	126,553.6	137,184.5	147,439.4	158,023.0
Water Heating	800.2	1,615.3	2,451.6	3,312.9	4,199.1	5,112.9	6,058.9	6,734.1	7,443.0	8,185.1	8,963.5	9,366.2	9,723.7	10,090.5	10,485.6	10,905.6	11,349.9	11,814.4	12,309.3	12,830.0	13,378.0
Restaurant	3,780.0	7,829.3	12,243.8	17,123.6	22,547.7	28,606.4	35,388.3	40,853.9	47,089.5	54,031.5	61,694.1	69,420.9	77,700.6	86,408.6	95,044.2	103,919.7	113,140.2	122,633.5	132,551.0	142,703.7	153,193.8
Cooking	179.7	432.0	781.0	1,258.4	1,898.2	2,737.8	3,814.8	5,158.5	6,781.7	8,682.0	10,854.1	13,283.8	15,929.0	18,759.4	21,499.5	24,373.7	27,366.7	30,485.6	33,738.3	37,080.2	40,523.5
Space Heating	461.6	950.0	1,474.7	2,045.9	2,672.7	3,366.0	4,138.3	4,998.6	5,949.4	6,990.5	8,121.9	9,341.5	10,633.9	11,989.8	13,141.3	14,340.9	15,583.3	16,868.2	18,199.8	19,492.4	20,823.8
Water Heating	3,138.7	6,447.3	9,988.1	13,819.2	17,976.9	22,502.5	27,435.3	30,696.8	34,358.4	38,359.0	42,718.1	46,795.7	51,137.7	55,659.5	60,403.4	65,205.1	70,190.2	75,279.6	80,612.9	86,131.2	91,846.6
Retail	4,853.6	9,980.9	15,479.3	21,452.8	27,991.8	35,209.2	43,230.0	51,977.4	61,602.9	72,146.1	83,609.8	95,752.6	108,636.2	122,153.7	134,047.4	146,432.2	159,256.6	172,516.3	186,261.9	199,635.2	213,411.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,460.8	9,185.9	14,268.4	19,809.4	25,898.3	32,645.3	40,171.7	48,568.3	57,816.8	67,957.4	78,991.3	90,894.6	103,518.3	116,768.1	128,374.5	140,455.0	152,958.3	165,881.4	179,267.1	192,263.4	205,644.0
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	4,858.0	5,117.9	5,385.6	5,672.8	5,977.2	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5
Warehouse	167.7	344.5	533.8	738.9	962.8	1,209.2	1,482.4	1,784.5	2,113.7	2,473.3	2,863.6	3,262.3	3,685.6	4,128.7	4,489.3	4,866.3	5,258.1	5,664.5	6,087.5	6,498.6	6,923.5
Space Heating	144.0	296.6	460.8	639.9	836.9	1,055.3	1,299.0	1,571.1	1,868.8	2,195.6	2,551.5	2,935.6	3,343.3	3,771.4	4,115.7	4,475.6	4,849.2	5,236.6	5,639.2	6,029.0	6,431.5
Water Heating	23.7	48.0	73.0	98.9	125.9	154.0	183.4	213.4	244.8	277.7	312.1	326.7	342.3	357.4	373.6	390.8	408.9	427.9	448.3	469.6	492.0
Grand Total	25,842.9	53,031.5	82,058.1	113,419.1	147,512.7	184,843.0	225,955.0	263,929.6	305,821.4	351,218.2	400,708.0	450,727.9	502,585.5	557,148.6	607,974.2	660,759.3	715,559.6	770,892.9	828,614.5	886,029.7	945,387.2

C-36: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #36)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	4,811.3	9,762.5	14,913.0	20,308.1	25,972.4	31,947.4	38,284.6	42,456.9	46,906.2	51,661.0	56,781.9	61,201.1	65,716.5	70,487.0	75,198.4	80,129.0	85,277.4	90,576.8	96,185.0	102,014.3	108,086.2
Cooking	18.1	43.5	78.9	127.3	192.5	278.1	388.2	525.8	692.3	887.5	1,111.0	1,361.2	1,633.9	1,925.8	2,209.3	2,506.6	2,816.4	3,139.3	3,476.1	3,822.1	4,178.7
Other	514.6	1,042.6	1,590.0	2,161.0	2,757.9	3,384.7	4,046.9	4,748.3	5,489.2	6,269.2	7,090.1	7,952.9	8,849.5	9,776.9	10,733.5	11,715.4	12,722.4	13,753.1	14,819.3	15,910.5	17,029.1
Space Heating	390.8	788.2	1,194.8	1,612.0	2,039.3	2,477.5	2,928.2	3,392.2	3,773.4	4,166.9	4,574.2	4,996.7	5,431.2	5,876.5	6,046.7	6,226.9	6,416.2	6,612.2	6,817.2	7,026.5	7,246.0
Water Heating	3,887.9	7,888.2	12,049.3	16,407.8	20,982.8	25,807.1	30,921.4	33,790.7	36,951.2	40,337.4	44,006.5	46,890.3	49,801.9	52,907.7	56,208.9	59,680.0	63,322.4	67,072.2	71,072.5	75,255.1	79,632.4
Grocery	1,109.5	2,261.2	3,471.2	4,754.1	6,120.7	7,586.0	9,167.5	10,572.5	12,107.9	13,773.1	15,570.6	17,370.7	19,275.9	21,266.8	22,697.7	24,201.9	25,773.4	27,408.8	29,121.9	30,880.1	32,703.9
Cooking	48.7	117.3	212.6	343.2	518.7	749.5	1,046.0	1,416.6	1,864.9	2,390.7	2,992.4	3,666.2	4,400.4	5,186.7	5,949.7	6,750.4	7,584.3	8,453.7	9,360.5	10,292.1	11,252.1
Space Heating	628.2	1,268.6	1,926.0	2,603.3	3,300.6	4,020.0	4,765.1	5,537.8	6,336.2	7,160.9	8,014.0	8,897.6	9,805.5	10,735.1	11,108.7	11,501.4	11,911.5	12,335.2	12,776.4	13,220.0	13,682.2
Water Heating	432.5	875.3	1,332.6	1,807.6	2,301.4	2,816.4	3,356.4	3,618.1	3,906.8	4,221.6	4,564.1	4,806.8	5,070.0	5,345.0	5,639.2	5,950.2	6,277.6	6,619.9	6,985.1	7,367.9	7,769.5
Healthcare	1,311.0	2,660.3	4,063.8	5,533.8	7,077.2	8,705.3	10,432.4	11,472.8	12,614.8	13,844.9	15,174.5	16,270.2	17,384.0	18,557.0	19,679.0	20,860.1	22,099.4	23,387.6	24,756.3	26,174.6	27,657.5
Cooking	3.5	8.5	15.5	25.0	37.8	54.6	76.2	103.2	135.9	174.2	218.1	267.2	320.7	378.0	433.7	492.0	552.8	616.2	682.3	750.3	820.3
Space Heating	120.7	245.9	377.2	516.2	664.1	822.2	992.6	1,176.5	1,374.2	1,585.6	1,810.8	2,049.9	2,300.3	2,560.6	2,715.8	2,878.8	3,048.8	3,225.4	3,409.4	3,588.6	3,774.5
Water Heating	1,186.8	2,405.9	3,671.1	4,992.6	6,375.4	7,828.5	9,363.5	10,193.0	11,104.6	12,085.1	13,145.6	13,953.1	14,763.0	15,618.3	16,529.5	17,489.2	18,497.8	19,546.0	20,664.7	21,835.8	23,062.7
Lodging	3,352.7	6,779.4	10,310.9	13,967.1	17,751.7	21,678.3	25,767.5	28,959.8	32,314.4	35,490.3	38,828.8	41,720.0	43,660.6	45,698.4	47,759.3	49,926.3	52,197.7	54,387.9	56,715.7	59,151.8	61,708.6
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	100.7	204.3	312.1	424.9	543.3	668.2	800.7	941.5	1,090.8	1,248.5	1,414.7	1,589.7	1,771.8	1,960.1	2,056.9	2,158.7	2,265.1	2,375.6	2,490.8	2,604.0	2,721.6
Water Heating	3,252.1	6,575.1	9,998.9	13,542.2	17,208.4	21,010.1	24,966.8	28,018.3	31,223.6	34,241.8	37,414.1	40,130.4	41,888.9	43,738.3	45,702.4	47,767.6	49,932.6	52,012.3	54,224.8	56,547.9	58,987.1
Misc.	44.4	92.6	145.9	206.0	274.4	352.6	442.7	546.1	663.2	794.0	938.3	1,063.5	1,199.5	1,343.0	1,494.9	1,653.8	1,819.0	1,990.5	2,169.0	2,340.9	2,518.3
Space Heating	10.5	24.3	42.7	67.2	99.2	140.7	193.4	258.6	337.1	428.7	533.2	650.1	777.1	913.1	1,056.8	1,206.9	1,362.7	1,524.5	1,692.7	1,853.7	2,019.5
Water Heating	33.9	68.3	103.2	138.9	175.1	211.9	249.3	287.4	326.1	365.2	405.1	413.4	422.4	429.9	438.1	446.9	456.3	466.0	476.3	487.2	498.8
Office	586.5	1,198.1	1,843.8	2,532.7	3,271.6	4,070.0	4,938.6	5,885.3	6,911.9	8,017.8	9,204.0	10,054.9	10,895.0	11,773.1	12,703.6	13,678.3	14,692.9	15,746.1	16,843.5	17,915.0	19,024.3
Space Heating	83.9	185.9	312.0	470.0	668.0	915.2	1,220.9	1,592.5	2,033.2	2,542.4	3,119.2	3,760.4	4,455.5	5,197.0	5,979.3	6,795.5	7,641.9	8,520.1	9,432.5	10,307.8	11,209.2
Water Heating	502.6	1,012.2	1,531.8	2,062.7	2,603.7	3,154.8	3,717.7	4,292.7	4,878.7	5,475.4	6,084.8	6,294.5	6,439.5	6,576.1	6,724.2	6,882.8	7,051.0	7,226.0	7,411.0	7,607.2	7,815.1
Restaurant	2,635.5	5,477.9	8,602.5	12,090.0	16,013.4	20,457.2	25,501.7	29,705.4	34,572.7	40,082.3	46,226.4	52,352.4	58,970.7	65,965.3	73,119.2	80,471.3	88,127.9	96,090.2	104,432.8	112,965.8	121,790.5
Cooking	164.1	395.6	716.8	1,157.2	1,748.7	2,526.1	3,524.5	4,771.7	6,279.6	8,046.6	10,067.7	12,329.8	14,793.7	17,431.1	19,988.9	22,672.3	25,466.8	28,379.4	31,417.2	34,538.2	37,754.1
Space Heating	69.6	161.0	281.5	440.7	648.7	916.8	1,256.4	1,676.6	2,181.2	2,769.9	3,441.2	4,191.0	5,006.5	5,878.5	6,800.2	7,762.9	8,761.9	9,799.5	10,877.9	11,909.5	12,972.1
Water Heating	2,401.7	4,921.3	7,604.2	10,492.0	13,616.1	17,014.4	20,720.8	23,257.1	26,111.9	29,265.8	32,717.5	35,831.6	39,170.5	42,655.6	46,330.0	50,036.2	53,899.2	57,911.2	62,137.8	66,518.2	71,064.3
Retail	380.7	801.0	1,274.1	1,816.4	2,443.9	3,175.0	4,029.2	5,021.5	6,157.8	7,437.0	8,858.0	10,197.0	11,649.5	13,187.5	14,812.6	16,510.3	18,272.7	20,101.6	22,002.6	23,829.9	25,714.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	152.9	342.4	580.7	883.5	1,267.5	1,751.3	2,353.9	3,090.2	3,966.5	4,982.2	6,135.0	7,418.3	8,810.8	10,297.5	11,866.8	13,504.6	15,203.1	16,965.9	18,797.4	20,550.4	22,355.8
Water Heating	227.8	458.5	693.4	933.0	1,176.4	1,423.7	1,675.3	1,931.4	2,191.3	2,454.8	2,723.0	2,778.7	2,838.6	2,890.0	2,945.8	3,005.8	3,069.6	3,135.7	3,205.3	3,279.5	3,358.3
Warehouse	47.0	101.3	165.4	242.3	335.3	448.0	584.0	746.2	935.9	1,152.9	1,396.8	1,645.0	1,914.6	2,201.2	2,504.1	2,820.6	3,149.1	3,490.3	3,845.1	4,185.7	4,536.8
Space Heating	24.1	55.3	95.8	148.6	217.2	305.0	415.7	552.2	715.8	906.3	1,123.3	1,365.5	1,628.7	1,910.1	2,207.4	2,517.9	2,840.0	3,174.6	3,522.4	3,855.5	4,198.7
Water Heating	22.9	46.1	69.6	93.7	118.2	143.0	168.3	194.0	220.1	246.5	273.5	279.5	285.9	291.1	296.7	302.7	309.1	315.7	322.7	330.2	338.1
Grand Total	14,278.6	29,134.2	44,790.6	61,450.7	79,260.6	98,419.8	119,148.1	135,366.5	153,184.8	172,253.3	192,979.2	211,874.8	230,666.3	250,479.2	269,968.6	290,251.7	311,409.5	333,179.8	356,072.1	379,458.2	403,740.2

C-37: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #37)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	4,072.9	8,256.3	12,597.0	17,129.9	21,872.3	26,855.4	32,119.6	35,143.6	38,472.7	42,081.1	45,980.9	49,105.3	52,267.5	55,632.4	58,889.7	62,323.6	65,931.6	69,697.3	73,704.6	77,887.6	82,264.4
Cooking	17.4	41.8	75.8	122.4	185.0	267.4	373.2	505.5	665.5	853.2	1,068.0	1,308.5	1,570.6	1,851.3	2,123.8	2,409.6	2,707.4	3,017.8	3,341.6	3,674.2	4,017.0
Space Heating	292.5	590.4	895.6	1,209.4	1,531.7	1,863.3	2,205.5	2,559.1	2,923.7	3,299.1	3,686.3	4,086.3	4,496.4	4,915.7	5,058.0	5,208.4	5,366.3	5,530.0	5,701.2	5,874.8	6,056.5
Water Heating	3,763.0	7,624.1	11,625.6	15,798.1	20,155.5	24,724.7	29,541.0	32,079.0	34,883.5	37,928.8	41,226.6	43,710.5	46,200.5	48,865.4	51,708.0	54,705.6	57,857.9	61,149.5	64,661.9	68,338.7	72,190.9
Grocery	298.1	628.1	1,001.5	1,431.6	1,931.5	2,516.6	3,202.7	3,894.0	4,703.4	5,629.8	6,672.2	7,696.8	8,811.5	9,997.8	11,185.9	12,432.9	13,733.6	15,090.2	16,512.1	17,963.0	19,463.1
Cooking	48.7	117.3	212.6	343.2	518.7	749.5	1,046.0	1,416.6	1,864.9	2,390.7	2,992.4	3,666.2	4,400.4	5,186.7	5,949.7	6,750.4	7,584.3	8,453.7	9,360.5	10,292.1	11,252.1
Space Heating	11.0	26.2	47.1	75.6	113.6	163.4	227.3	306.9	403.0	515.7	644.5	788.8	945.9	1,114.0	1,291.9	1,477.8	1,670.8	1,871.4	2,079.9	2,278.7	2,483.6
Water Heating	238.4	484.6	741.8	1,012.8	1,299.2	1,603.7	1,929.5	2,170.6	2,435.5	2,723.4	3,035.3	3,241.8	3,465.2	3,697.1	3,944.3	4,204.7	4,478.5	4,765.1	5,071.8	5,392.2	5,727.4
Healthcare	1,197.9	2,432.5	3,719.3	5,070.4	6,492.8	7,998.2	9,600.3	10,513.7	11,526.7	12,626.1	13,822.7	14,782.7	15,758.6	16,791.8	17,886.0	19,037.4	20,245.2	21,500.5	22,834.9	24,216.7	25,660.9
Cooking	3.5	8.5	15.5	25.0	37.8	54.6	76.2	103.2	135.9	174.2	218.1	267.2	320.7	378.0	433.7	492.0	552.8	616.2	682.3	750.3	820.3
Space Heating	7.5	18.1	32.7	52.8	79.7	115.1	160.6	217.4	286.2	366.8	459.0	562.3	674.9	795.4	922.9	1,056.2	1,194.5	1,338.3	1,487.9	1,630.7	1,779.9
Water Heating	1,186.8	2,405.9	3,671.1	4,992.6	6,375.4	7,828.5	9,363.5	10,193.0	11,104.6	12,085.1	13,145.6	13,953.1	14,763.0	15,618.3	16,529.5	17,489.2	18,497.8	19,546.0	20,664.7	21,835.8	23,062.7
Lodging	3,256.4	6,585.5	10,017.6	13,572.5	17,254.2	21,076.3	25,059.1	28,143.3	31,388.1	34,452.7	37,678.0	40,453.7	42,276.9	44,195.7	46,233.0	48,374.8	50,619.4	52,781.8	55,080.3	57,485.5	60,009.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4.3	10.4	18.8	30.3	45.8	66.2	92.3	125.0	164.5	210.9	263.9	323.3	388.0	457.3	530.6	607.3	686.8	769.5	855.5	937.6	1,022.4
Water Heating	3,252.1	6,575.1	9,998.9	13,542.2	17,208.4	21,010.1	24,966.8	28,018.3	31,223.6	34,241.8	37,414.1	40,130.4	41,888.9	43,738.3	45,702.4	47,767.6	49,932.6	52,012.3	54,224.8	56,547.9	58,987.1
Misc.	11.5	26.4	45.9	71.5	104.6	147.3	201.1	267.5	347.2	440.0	545.8	663.8	792.2	927.5	1,070.5	1,219.9	1,375.1	1,536.3	1,703.9	1,864.2	2,029.4
Space Heating	9.5	22.5	39.9	63.4	94.5	135.0	186.6	250.8	328.2	418.8	522.2	638.0	763.9	898.7	1,041.3	1,190.2	1,344.8	1,505.4	1,672.4	1,832.2	1,996.7
Water Heating	2.0	4.0	6.0	8.1	10.2	12.3	14.5	16.7	18.9	21.2	23.5	25.9	28.3	28.7	29.2	29.7	30.3	30.8	31.4	32.1	32.7
Office	102.9	224.6	371.7	552.1	774.5	1,048.1	1,382.9	1,786.5	2,262.1	2,809.3	3,427.2	4,112.4	4,851.7	5,620.5	6,432.2	7,279.4	8,158.6	9,071.4	10,021.1	10,937.1	11,881.0
Space Heating	82.3	182.6	307.0	463.2	659.4	904.8	1,208.6	1,578.3	2,017.0	2,524.3	3,099.1	3,738.3	4,431.3	5,170.8	5,951.0	6,765.1	7,609.2	8,485.2	9,395.5	10,270.2	11,171.0
Water Heating	20.6	42.0	64.7	89.0	115.1	143.4	174.3	208.2	245.1	285.0	328.0	374.1	420.4	449.7	481.2	514.4	549.3	586.1	625.7	666.9	710.0
Restaurant	2,450.5	5,041.5	7,826.2	10,857.2	14,178.8	17,844.1	21,904.5	24,900.8	28,332.8	32,185.3	36,457.7	40,510.1	44,888.0	49,499.2	54,144.2	59,013.5	64,094.3	69,384.1	74,947.5	80,699.0	86,660.5
Cooking	164.1	395.6	716.8	1,157.2	1,748.7	2,526.1	3,524.5	4,771.7	6,279.6	8,046.6	10,067.7	12,329.8	14,793.7	17,431.1	19,988.9	22,672.3	25,466.8	28,379.4	31,417.2	34,538.2	37,754.1
Space Heating	2.8	6.8	12.3	19.7	29.7	42.8	59.6	80.6	106.0	135.8	169.8	207.9	249.4	293.8	340.8	390.0	441.0	494.0	549.1	601.8	656.0
Water Heating	2,283.5	4,639.2	7,097.2	9,680.2	12,400.4	15,275.2	18,320.4	20,048.5	21,947.2	24,003.0	26,220.3	27,972.5	29,844.9	31,774.3	33,814.4	35,951.3	38,186.6	40,510.7	42,981.3	45,559.0	48,250.5
Retail	351.3	741.6	1,184.3	1,695.5	2,291.4	2,990.4	3,812.0	4,771.1	5,873.7	7,118.8	8,505.0	9,808.6	11,225.0	12,726.5	14,314.5	15,974.6	17,698.8	19,489.3	21,351.5	23,142.7	24,990.4
Space Heating	123.5	283.1	490.8	762.6	1,115.0	1,566.8	2,136.7	2,839.8	3,682.4	4,664.0	5,782.0	7,029.9	8,386.4	9,836.5	11,368.7	12,968.8	14,629.3	16,353.6	18,146.2	19,863.3	21,632.1
Water Heating	227.8	458.5	693.4	933.0	1,176.4	1,423.7	1,675.3	1,931.4	2,191.3	2,454.8	2,723.0	2,778.7	2,838.6	2,890.0	2,945.8	3,005.8	3,069.6	3,135.7	3,205.3	3,279.5	3,358.3
Warehouse	47.0	101.3	165.4	242.3	335.3	447.9	583.9	746.1	935.7	1,152.7	1,396.5	1,644.7	1,914.3	2,200.7	2,503.6	2,820.0	3,148.5	3,489.6	3,844.3	4,184.8	4,535.8
Space Heating	24.1	55.3	95.8	148.6	217.2	305.0	415.7	552.2	715.8	906.3	1,123.3	1,365.5	1,628.7	1,910.1	2,207.4	2,517.9	2,840.0	3,174.6	3,522.4	3,855.5	4,198.7
Water Heating	22.9	46.0	69.6	93.7	118.1	142.9	168.2	193.9	219.9	246.3	273.2	279.2	285.5	290.6	296.2	302.1	308.4	315.0	321.9	329.2	337.1
Grand Total	11,788.5	24,037.9	36,928.9	50,623.1	65,235.3	80,924.2	97,866.1	110,166.6	123,842.5	138,495.9	154,486.0	168,778.0	182,785.8	197,592.0	212,659.6	228,476.2	245,005.1	262,040.5	280,000.2	298,380.6	317,494.9

C-38: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #38)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	8,492.0	17,350.2	26,712.2	36,706.3	47,423.4	58,986.8	71,530.9	82,588.0	94,390.4	107,144.1	120,898.6	134,569.1	148,833.3	163,103.2	177,703.3	192,680.7	208,172.4	222,793.8	238,056.7	253,587.3	269,638.9
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	710.9	1,440.3	2,196.4	2,985.2	3,809.5	4,675.0	5,589.0	6,556.8	7,377.2	8,250.9	9,180.6	10,167.2	11,199.9	12,274.5	13,388.9	14,537.9	15,721.0	16,936.4	18,200.2	19,498.3	20,833.7
Space Heating	1,997.7	4,090.2	6,312.2	8,698.6	11,277.9	14,087.2	17,168.4	20,552.2	24,151.9	28,058.8	32,275.4	36,795.7	41,566.2	45,877.1	50,101.7	54,495.0	59,041.9	63,437.0	68,009.8	72,498.2	77,129.1
Water Heating	5,764.3	11,773.6	18,120.2	24,887.9	32,132.6	39,930.6	48,363.3	54,923.4	62,129.8	69,896.7	78,269.1	86,168.5	94,341.4	102,917.6	111,879.5	121,000.7	130,435.5	139,105.5	148,176.3	157,555.1	167,264.0
Grocery	2,182.3	4,473.5	6,912.7	9,540.1	12,388.2	15,499.2	18,919.3	22,377.5	26,184.9	30,336.8	34,834.6	39,541.9	44,525.8	49,744.3	54,514.4	59,470.8	64,595.5	69,828.4	75,250.0	80,648.8	86,195.9
Cooking	66.8	160.2	288.9	464.4	699.1	1,006.5	1,400.1	1,890.4	2,481.7	3,173.1	3,962.4	4,844.4	5,803.9	6,829.9	7,822.7	8,863.6	9,947.2	11,076.0	12,251.0	13,458.2	14,702.0
Space Heating	1,660.4	3,390.8	5,216.0	7,160.8	9,243.6	11,489.4	13,926.3	16,575.3	19,439.7	22,517.6	25,811.3	29,318.0	32,999.4	36,833.5	40,230.1	43,745.4	47,367.0	51,033.7	54,814.9	58,520.6	62,315.9
Water Heating	455.1	922.6	1,407.9	1,914.9	2,445.5	3,003.4	3,592.9	3,911.7	4,263.5	4,646.2	5,060.8	5,379.5	5,722.5	6,080.9	6,461.6	6,861.8	7,281.3	7,718.6	8,184.0	8,670.0	9,178.1
Healthcare	2,560.5	5,225.5	8,033.9	11,021.4	14,211.6	17,637.4	21,332.8	24,205.4	27,307.3	30,496.7	33,951.0	37,333.1	40,861.4	44,559.7	48,307.9	52,146.5	56,121.5	59,740.5	63,526.5	67,398.3	71,404.7
Cooking	4.2	10.2	18.5	29.8	45.1	65.1	90.9	123.1	162.0	207.7	260.0	318.5	382.2	450.5	516.7	586.2	658.6	734.1	812.8	893.6	977.0
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	404.8	829.1	1,279.6	1,763.4	2,286.3	2,855.7	3,480.0	4,165.4	4,862.2	5,619.7	6,437.7	7,314.7	8,240.1	9,207.7	10,099.5	11,023.7	11,977.1	12,888.7	13,832.0	14,754.6	15,698.2
Water Heating	2,151.5	4,386.2	6,735.9	9,228.2	11,880.2	14,716.6	17,761.9	19,916.9	22,283.1	24,669.3	27,253.4	29,700.0	32,239.1	34,901.5	37,691.7	40,536.6	43,485.8	46,117.7	48,881.7	51,750.0	54,729.6
Lodging	3,945.2	8,043.5	12,351.7	16,920.1	21,779.7	26,974.6	32,553.0	37,471.2	42,782.5	48,136.2	53,863.3	59,340.5	64,027.5	68,946.8	74,009.5	79,172.9	84,529.9	89,798.0	95,302.5	100,972.0	106,840.6
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	52.0	105.4	160.7	218.4	278.7	342.0	408.9	479.8	554.7	633.5	716.5	803.6	894.3	988.0	1,084.6	1,183.9	1,285.6	1,389.8	1,497.5	1,607.8	1,720.8
Space Heating	326.6	665.3	1,020.3	1,395.9	1,794.8	2,221.1	2,679.8	3,174.2	3,702.6	4,266.1	4,865.1	5,499.2	6,162.0	6,849.8	7,463.4	8,096.9	8,748.1	9,415.7	10,102.4	10,780.3	11,471.7
Water Heating	3,566.6	7,272.9	11,170.7	15,305.9	19,706.2	24,411.5	29,464.3	33,817.1	38,525.3	43,236.6	48,281.7	53,037.7	56,971.3	61,109.1	65,461.5	69,892.2	74,496.2	78,992.5	83,702.6	88,583.9	93,648.0
Misc.	929.8	1,911.0	2,962.0	4,101.7	5,346.7	6,717.5	8,236.7	9,895.7	11,704.1	13,680.0	15,823.6	18,098.3	20,502.0	23,021.1	25,326.0	27,720.2	30,194.5	32,688.4	35,270.6	37,784.4	40,365.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	865.9	1,781.7	2,765.1	3,834.6	5,006.5	6,301.0	7,740.1	9,340.0	11,085.1	12,993.7	15,065.7	17,296.7	19,659.1	22,135.6	24,394.8	26,740.6	29,163.9	31,604.2	34,129.2	36,583.1	39,101.1
Water Heating	63.9	129.3	196.9	267.1	340.2	416.5	496.6	555.7	619.0	686.3	757.9	801.6	842.9	885.5	931.2	979.6	1,030.7	1,084.2	1,141.4	1,201.4	1,264.3
Office	4,871.8	10,017.0	15,532.1	21,520.6	28,069.7	35,289.6	43,301.1	51,870.3	61,217.5	71,458.8	82,595.4	94,189.4	106,427.0	119,271.9	130,669.7	142,544.5	154,848.6	167,576.2	180,786.1	193,666.4	206,902.5
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,059.2	8,372.4	13,027.6	18,122.4	23,741.6	29,990.3	36,982.0	44,800.8	53,344.4	62,730.2	72,956.3	83,997.8	95,713.4	108,014.1	118,827.8	130,084.0	141,735.3	153,778.8	166,257.2	178,371.2	190,803.1
Water Heating	812.6	1,644.6	2,504.5	3,398.2	4,328.1	5,299.3	6,319.0	7,069.5	7,873.1	8,728.6	9,639.1	10,191.6	10,713.6	11,257.8	11,841.8	12,460.5	13,113.3	13,797.5	14,528.9	15,295.3	16,099.4
Restaurant	5,501.4	11,297.8	17,495.4	24,199.0	31,483.8	39,440.9	48,164.7	55,621.4	63,888.8	72,901.6	82,680.3	92,579.7	103,071.8	114,029.6	124,950.0	136,146.0	147,720.0	158,295.7	169,316.9	180,608.7	192,274.5
Cooking	191.4	458.5	826.2	1,327.5	1,997.5	2,875.2	3,999.2	5,400.0	7,090.3	9,067.8	11,326.6	13,852.0	16,600.3	19,540.2	22,390.6	25,379.6	28,491.4	31,733.6	35,104.1	38,567.1	42,135.2
Space Heating	956.7	1,947.3	2,984.0	4,078.4	5,238.0	6,474.2	7,800.7	9,226.9	10,754.1	12,381.2	14,110.1	15,940.3	17,853.5	19,839.5	21,631.6	23,481.2	25,382.4	27,279.0	29,230.5	31,151.1	33,118.8
Water Heating	4,353.4	8,892.0	13,685.2	18,793.1	24,248.3	30,091.5	36,364.8	40,994.5	46,044.4	51,452.6	57,243.7	62,787.4	68,618.0	74,649.9	80,927.8	87,285.2	93,846.1	99,283.1	104,982.2	110,890.6	117,020.6
Retail	7,114.1	14,551.4	22,427.1	30,857.6	39,935.8	49,783.5	60,540.0	72,136.2	84,720.2	98,314.1	112,918.9	128,297.4	144,487.8	161,375.6	176,705.5	192,584.3	208,956.2	225,273.1	242,131.3	258,658.9	275,578.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	6,721.3	13,756.4	21,216.1	29,214.3	37,842.3	47,219.6	57,481.8	68,727.1	80,934.1	94,125.4	108,300.4	123,439.5	139,370.0	155,990.0	171,032.7	186,607.1	202,657.9	218,638.2	235,136.5	251,287.0	267,810.6
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	4,858.0	5,117.9	5,385.6	5,672.8	5,977.2	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5
Warehouse	271.0	569.9	906.1	1,291.2	1,736.3	2,254.6	2,859.7	3,545.6	4,329.3	5,213.9	6,198.4	7,257.5	8,396.5	9,603.0	10,769.0	11,986.3	13,249.2	14,559.3	15,920.9	17,233.7	18,587.0
Space Heating	231.9	490.7	785.5	1,127.5	1,527.7	1,999.2	2,555.2	3,206.0	3,952.0	4,796.4	5,738.1	6,773.1	7,886.0	9,066.0	10,203.6	11,390.7	12,621.9	13,898.7	15,224.7	16,500.2	17,814.4
Water Heating	39.1	79.2	120.6	163.7	208.5	255.4	304.5	339.6	377.2	417.4	460.3	484.4	510.5	537.0	565.4	595.5	627.3	660.6	696.2	733.5	772.6
Grand Total	35,868.1	73,439.8	113,333.3	156,158.0	202,375.2	252,584.0	307,438.2	359,711.2	416,525.0	477,682.3	543,764.1	611,207.2	681,133.1	753,655.3	822,955.3	894,452.2	968,387.9	1,040,553.4	1,115,561.3	1,190,558.6	1,267,787.7

C-39: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #39)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	8,492.0	17,350.2	26,712.2	36,706.3	47,423.4	58,986.8	71,530.9	82,588.0	94,390.4	107,144.1	120,898.6	134,569.1	148,833.3	163,103.2	177,703.3	192,680.7	208,172.4	222,793.8	238,056.7	253,587.3	269,638.9
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	710.9	1,440.3	2,196.4	2,985.2	3,809.5	4,675.0	5,589.0	6,556.8	7,377.2	8,250.9	9,180.6	10,167.2	11,199.9	12,274.5	13,388.9	14,537.9	15,721.0	16,936.4	18,200.2	19,498.3	20,833.7
Space Heating	1,997.7	4,090.2	6,312.2	8,698.6	11,277.9	14,087.2	17,168.4	20,552.2	24,151.9	28,058.8	32,275.4	36,795.7	41,566.2	45,877.1	50,101.7	54,495.0	59,041.9	63,437.0	68,009.8	72,498.2	77,129.1
Water Heating	5,764.3	11,773.6	18,120.2	24,887.9	32,132.6	39,930.6	48,363.3	54,923.4	62,129.8	69,896.7	78,269.1	86,168.5	94,341.4	102,917.6	111,879.5	121,000.7	130,435.5	139,105.5	148,176.3	157,555.1	167,264.0
Grocery	2,933.7	5,999.9	9,246.6	12,721.5	16,461.7	20,516.4	24,939.1	29,463.8	34,402.2	39,748.6	45,506.0	51,536.5	57,894.5	64,532.2	70,764.0	77,218.7	83,875.2	90,658.5	97,667.6	104,685.2	111,885.0
Cooking	66.8	160.2	288.9	464.4	699.1	1,006.5	1,400.1	1,890.4	2,481.7	3,173.1	3,962.4	4,844.4	5,803.9	6,829.9	7,822.7	8,863.6	9,947.2	11,076.0	12,251.0	13,458.2	14,702.0
Space Heating	2,405.7	4,902.5	7,523.6	10,300.1	13,254.0	16,416.3	19,823.4	23,501.3	27,453.6	31,677.8	36,178.4	40,953.1	45,952.5	51,148.7	55,949.0	60,903.7	65,996.8	71,161.5	76,474.2	81,740.7	87,128.6
Water Heating	461.3	937.2	1,434.2	1,957.1	2,508.7	3,093.6	3,715.6	4,072.1	4,466.9	4,897.7	5,365.3	5,739.0	6,138.1	6,553.6	6,992.3	7,451.3	7,931.1	8,421.0	8,942.3	9,486.4	10,054.5
Healthcare	2,563.2	5,231.0	8,042.3	11,032.6	14,225.8	17,654.6	21,353.1	24,228.7	27,333.7	30,526.3	33,983.9	37,369.4	40,901.0	44,602.7	48,354.4	52,194.9	56,171.8	59,792.8	63,580.9	67,454.8	71,463.4
Cooking	4.2	10.2	18.5	29.8	45.1	65.1	90.9	123.1	162.0	207.7	260.0	318.5	382.2	450.5	516.7	586.2	658.6	734.1	812.8	893.6	977.0
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	406.0	831.5	1,283.2	1,768.2	2,292.4	2,863.0	3,488.7	4,175.4	4,873.5	5,632.4	6,451.7	7,330.2	8,257.1	9,226.1	10,119.4	11,045.1	12,000.0	12,913.1	13,858.0	14,782.2	15,727.3
Water Heating	2,153.0	4,389.3	6,740.6	9,234.6	11,888.3	14,726.4	17,773.5	19,930.2	22,298.2	24,686.2	27,272.2	29,720.7	32,261.7	34,926.1	37,718.3	40,563.6	43,513.3	46,145.6	48,910.1	51,778.9	54,759.1
Lodging	4,067.1	8,290.1	12,727.1	17,429.1	22,427.4	27,766.4	33,495.0	38,570.1	44,044.5	49,566.9	55,468.6	61,126.9	65,891.7	70,893.2	76,042.7	81,296.7	86,748.4	92,098.0	97,689.4	103,449.5	109,413.2
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	52.0	105.4	160.7	218.4	278.7	342.0	408.9	479.8	554.7	633.5	716.5	803.6	894.3	988.0	1,084.6	1,183.9	1,285.6	1,389.8	1,497.5	1,607.8	1,720.8
Space Heating	343.4	699.1	1,071.4	1,464.7	1,881.5	2,326.1	2,803.3	3,316.6	3,864.1	4,447.1	5,065.8	5,720.1	6,403.3	7,111.9	7,746.7	8,401.5	9,074.4	9,747.4	10,439.7	11,123.0	11,820.1
Water Heating	3,671.7	7,485.7	11,495.0	15,746.1	20,267.1	25,098.2	30,282.7	34,773.7	39,625.7	44,486.3	49,686.3	54,603.2	58,594.1	62,793.4	67,211.4	71,711.4	76,388.3	80,960.9	85,752.2	90,718.7	95,872.3
Misc.	929.8	1,911.0	2,962.0	4,101.7	5,346.7	6,717.5	8,236.7	9,895.7	11,704.1	13,680.0	15,823.6	18,098.3	20,502.0	23,021.1	25,326.0	27,720.2	30,194.5	32,688.4	35,270.6	37,844.4	40,365.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	865.9	1,781.7	2,765.1	3,834.6	5,006.5	6,301.0	7,740.1	9,340.0	11,085.1	12,993.7	15,065.7	17,296.7	19,659.1	22,135.6	24,394.8	26,740.6	29,163.9	31,604.2	34,129.2	36,583.1	39,101.1
Water Heating	63.9	129.3	196.9	267.1	340.2	416.5	496.6	555.7	619.0	686.3	757.9	801.6	842.9	885.5	931.2	979.6	1,030.7	1,084.2	1,141.4	1,201.4	1,264.3
Office	6,887.8	14,074.7	21,668.4	29,776.0	38,478.6	47,885.4	58,121.9	68,954.7	80,598.7	93,168.8	106,674.4	120,686.5	135,379.2	150,714.5	164,643.0	179,084.6	193,989.0	208,546.1	223,615.9	238,396.4	253,573.3
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	6,075.2	12,430.1	19,163.9	26,377.8	34,150.5	42,586.1	51,802.9	61,885.2	72,725.6	84,440.2	97,035.2	110,494.8	124,665.6	139,456.7	152,801.1	166,624.1	180,875.7	194,748.6	209,087.1	223,101.1	237,473.9
Water Heating	812.6	1,644.6	2,504.5	3,398.2	4,328.1	5,299.3	6,319.0	7,069.5	7,873.1	8,728.6	9,639.1	10,191.6	10,713.6	11,257.8	11,841.8	12,460.5	13,113.3	13,797.5	14,528.9	15,295.3	16,099.4
Restaurant	6,190.3	12,693.4	19,623.6	27,090.9	35,173.5	43,967.5	53,574.0	61,270.7	69,828.3	79,180.3	89,349.5	99,691.8	110,668.8	122,149.7	133,630.8	145,419.3	157,617.1	168,828.5	180,529.9	192,534.4	204,947.3
Cooking	191.4	458.5	826.2	1,327.5	1,997.5	2,875.2	3,999.2	5,400.0	7,090.3	9,067.8	11,326.6	13,852.0	16,600.3	19,540.2	22,390.6	25,379.6	28,491.4	31,733.6	35,104.1	38,567.1	42,135.2
Space Heating	1,628.7	3,308.8	5,060.1	6,899.7	8,837.9	10,891.0	13,079.4	14,723.9	16,518.7	18,461.6	20,556.9	22,805.1	25,177.7	27,660.7	29,986.8	32,401.5	34,898.7	37,420.1	40,040.3	42,661.1	45,363.2
Water Heating	4,370.2	8,926.2	13,737.2	18,863.7	24,338.1	30,201.3	36,495.5	41,146.9	46,219.3	51,650.9	57,466.0	63,034.7	68,890.8	74,948.9	81,253.5	87,638.2	94,227.0	99,674.8	105,385.6	111,306.1	117,449.0
Retail	7,114.1	14,551.4	22,427.1	30,857.6	39,935.8	49,783.5	60,540.0	72,136.2	84,720.2	98,314.1	112,918.9	128,297.4	144,487.8	161,375.6	176,705.5	192,584.3	208,956.2	225,273.1	242,131.3	258,658.9	275,578.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	6,721.3	13,756.4	21,216.1	29,214.3	37,842.3	47,219.6	57,481.8	68,727.1	80,934.1	94,125.4	108,300.4	123,439.5	139,370.0	155,990.0	171,032.7	186,607.1	202,657.9	218,638.2	235,136.5	251,287.0	267,810.6
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	5,058.0	5,117.9	5,385.6	5,672.8	5,977.2	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5
Warehouse	325.5	683.1	1,083.8	1,540.3	2,064.8	2,671.3	3,374.0	4,166.9	5,066.1	6,073.2	7,186.5	8,380.0	9,657.3	11,005.3	12,315.9	13,680.2	15,092.7	16,554.2	18,070.4	19,540.7	21,041.0
Space Heating	286.3	603.9	963.2	1,376.6	1,856.3	2,415.9	3,069.5	3,827.3	4,688.9	5,655.8	6,726.3	7,895.7	9,146.8	10,468.3	11,750.4	13,084.7	14,465.5	15,893.7	17,374.2	18,807.3	20,268.4
Water Heating	39.1	79.2	120.6	163.7	208.5	255.4	304.5	339.6	377.2	417.4	460.3	484.4	510.5	537.0	565.4	595.5	627.3	660.6	696.2	733.5	772.6
Grand Total	39,503.4	80,784.9	124,493.1	171,256.3	221,537.8	275,949.3	335,164.7	391,274.9	452,088.2	517,402.3	587,810.1	659,756.0	734,215.7	811,397.6	885,485.5	961,879.6	1,040,817.3	1,117,233.5	1,196,612.6	1,276,091.6	1,357,905.6

C-40: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #40)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	9,053.6	18,483.2	28,430.8	39,026.8	50,361.7	62,560.3	75,709.6	87,393.4	99,843.0	113,263.6	127,707.1	142,090.5	157,086.2	172,105.6	187,462.4	203,212.2	219,491.2	234,912.1	250,992.8	267,357.5	284,260.7
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	710.9	1,440.3	2,196.4	2,985.2	3,809.5	4,675.0	5,589.0	6,556.8	7,377.2	8,250.9	9,180.6	10,167.2	11,199.9	12,274.5	13,388.9	14,537.9	15,721.0	16,936.4	18,200.2	19,498.3	20,833.7
Space Heating	2,559.2	5,223.1	8,030.6	11,018.8	14,215.9	17,660.3	21,346.6	25,357.1	29,603.8	34,177.6	39,083.1	44,316.2	49,818.2	54,878.5	59,859.7	65,025.3	70,359.5	75,554.1	80,944.8	86,267.3	91,749.7
Water Heating	5,764.4	11,773.7	18,120.4	24,888.2	32,132.9	39,931.0	48,363.7	54,923.9	62,130.4	69,897.4	78,269.9	86,169.3	94,342.3	102,918.6	111,880.5	121,001.8	130,436.6	139,106.6	148,177.4	157,556.3	167,265.2
Grocery	3,038.7	6,212.7	9,571.0	13,162.4	17,024.3	21,206.6	25,763.8	30,430.8	35,519.1	41,022.9	46,945.5	53,149.2	59,686.7	66,509.7	72,932.5	79,582.8	86,439.8	93,428.1	100,648.8	107,883.0	115,304.6
Cooking	66.8	160.2	288.9	464.4	699.1	1,006.5	1,400.1	1,890.4	2,481.7	3,173.1	3,962.4	4,844.4	5,803.9	6,829.9	7,822.7	8,863.6	9,947.2	11,076.0	12,251.0	13,458.2	14,702.0
Space Heating	2,510.7	5,115.3	7,848.0	10,741.0	13,816.5	17,106.5	20,648.1	24,468.3	28,570.5	32,952.1	37,617.9	42,565.7	47,744.7	53,126.2	58,117.4	63,267.9	68,561.4	73,931.0	79,455.4	84,938.5	90,548.2
Water Heating	461.3	937.2	1,434.2	1,957.1	2,508.7	3,093.6	3,715.6	4,072.1	4,466.9	4,897.7	5,365.3	5,739.0	6,138.1	6,553.6	6,992.3	7,451.3	7,931.1	8,421.0	8,942.3	9,486.4	10,054.5
Healthcare	2,764.1	5,635.3	8,653.7	11,855.2	15,263.0	18,909.6	22,829.8	25,932.0	29,267.0	32,692.8	36,387.7	40,015.6	43,793.5	47,744.9	51,750.3	55,848.1	60,085.7	63,850.3	67,785.1	71,809.7	75,973.0
Cooking	4.2	10.2	18.5	29.8	45.1	65.1	90.9	123.1	162.0	207.7	260.0	318.5	382.2	450.5	516.7	586.2	658.6	734.1	812.8	893.6	977.0
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	523.7	1,068.4	1,641.5	2,250.3	2,900.3	3,598.7	4,354.2	5,173.1	6,005.4	6,900.3	7,858.1	8,877.8	9,948.1	11,062.6	12,103.6	13,179.3	14,286.0	15,232.8	16,213.1	17,175.2	18,160.5
Water Heating	2,236.1	4,556.7	6,993.7	9,575.0	12,317.6	15,245.8	18,384.7	20,635.8	23,099.5	25,584.8	28,269.7	30,819.4	33,463.2	36,231.9	39,130.0	42,082.7	45,141.1	47,883.5	50,759.2	53,740.9	56,835.6
Lodging	4,073.0	8,302.1	12,745.2	17,453.5	22,458.0	27,803.4	33,538.6	38,620.4	44,101.5	49,630.8	55,539.5	61,205.0	65,976.9	70,985.8	76,142.7	81,404.3	86,863.6	92,215.6	97,809.3	103,572.0	109,538.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	52.0	105.4	160.7	218.4	278.7	342.0	408.9	479.8	554.7	633.5	716.5	803.6	894.3	988.0	1,084.6	1,183.9	1,285.6	1,389.8	1,497.5	1,607.8	1,720.8
Space Heating	349.3	711.0	1,089.5	1,489.0	1,912.2	2,363.2	2,847.0	3,366.9	3,921.2	4,511.0	5,136.7	5,798.1	6,488.6	7,204.5	7,846.7	8,509.1	9,189.7	9,865.0	10,559.7	11,245.5	11,945.3
Water Heating	3,671.7	7,485.7	11,495.0	15,746.1	20,267.1	25,098.2	30,282.7	34,773.7	39,625.7	44,486.3	49,686.3	54,603.2	58,594.1	62,793.4	67,211.4	71,711.4	76,388.3	80,960.9	85,752.2	90,718.7	95,872.3
Misc.	929.8	1,911.0	2,962.0	4,101.7	5,346.7	6,717.5	8,236.7	9,895.7	11,704.1	13,680.0	15,823.6	18,098.3	20,502.0	23,021.1	25,326.0	27,720.2	30,194.5	32,688.4	35,270.6	37,844.4	40,365.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	865.9	1,781.7	2,765.1	3,834.6	5,006.5	6,301.0	7,740.1	9,340.0	11,085.1	12,993.7	15,065.7	17,296.7	19,659.1	22,135.6	24,394.8	26,740.6	29,163.9	31,604.2	34,129.2	36,583.1	39,101.1
Water Heating	63.9	129.3	196.9	267.1	340.2	416.5	496.6	555.7	619.0	686.3	757.9	801.6	842.9	885.5	931.2	979.6	1,030.7	1,084.2	1,141.4	1,201.4	1,264.3
Office	6,887.8	14,074.7	21,668.4	29,776.0	38,478.6	47,885.4	58,121.9	68,954.7	80,598.7	93,168.8	106,674.4	120,686.5	135,379.2	150,714.5	164,643.0	179,084.6	193,989.0	208,546.1	223,615.9	238,396.4	253,573.3
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	6,075.2	12,430.1	19,163.9	26,377.8	34,150.5	42,586.1	51,802.9	61,885.2	72,725.6	84,440.2	97,035.2	110,494.8	124,665.6	139,456.7	152,801.1	166,624.1	180,875.7	194,748.6	209,087.1	223,101.1	237,473.9
Water Heating	812.6	1,644.6	2,504.5	3,398.2	4,328.1	5,299.3	6,319.0	7,069.5	7,873.1	8,728.6	9,639.1	10,191.6	10,713.6	11,257.8	11,841.8	12,460.5	13,113.3	13,797.5	14,528.9	15,295.3	16,099.4
Restaurant	6,190.3	12,693.4	19,623.6	27,090.9	35,173.5	43,967.5	53,574.0	61,270.7	69,828.3	79,180.3	89,349.5	99,691.8	110,668.8	122,149.7	133,630.8	145,419.3	157,617.1	168,828.5	180,529.9	192,534.4	204,947.3
Cooking	191.4	458.5	826.2	1,327.5	1,997.5	2,875.2	3,999.2	5,400.0	7,090.3	9,067.8	11,326.6	13,852.0	16,600.3	19,540.2	22,390.6	25,379.6	28,491.4	31,733.6	35,104.1	38,567.1	42,135.2
Space Heating	1,628.7	3,308.8	5,060.1	6,899.7	8,837.9	10,891.0	13,079.4	14,723.9	16,518.7	18,461.6	20,556.9	22,805.1	25,177.7	27,660.7	29,986.8	32,401.5	34,898.7	37,420.1	40,040.3	42,661.1	45,363.2
Water Heating	4,370.2	8,926.2	13,737.2	18,863.7	24,338.1	30,201.3	36,495.5	41,146.9	46,219.3	51,650.9	57,466.0	63,034.7	68,890.8	74,948.9	81,253.5	87,638.2	94,227.0	99,674.8	105,385.6	111,306.1	117,449.0
Retail	7,114.1	14,551.4	22,427.1	30,857.6	39,935.8	49,783.5	60,540.0	72,136.2	84,720.2	98,314.1	112,918.9	128,297.4	144,487.8	161,375.6	176,705.5	192,584.3	208,956.2	225,273.1	242,131.3	258,658.9	275,578.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	6,721.3	13,756.4	21,216.1	29,214.3	37,842.3	47,219.6	57,481.8	68,727.1	80,934.1	94,125.4	108,300.4	123,439.5	139,370.0	155,990.0	171,032.7	186,607.1	202,657.9	218,638.2	235,136.5	251,287.0	267,810.6
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	4,858.0	5,117.9	5,385.6	5,672.8	5,977.2	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5
Warehouse	359.0	750.6	1,186.0	1,677.9	2,238.3	2,881.2	3,621.1	4,451.7	5,389.2	6,435.1	7,588.0	8,821.8	10,140.0	11,529.6	12,882.3	14,289.4	15,745.3	17,250.5	18,810.8	20,324.2	21,868.2
Space Heating	319.9	671.4	1,065.4	1,514.2	2,029.8	2,625.9	3,316.5	4,112.1	5,011.9	6,017.7	7,127.7	8,337.4	9,629.5	10,992.6	12,316.9	13,693.9	15,118.0	16,589.9	18,114.7	19,590.7	21,095.5
Water Heating	39.1	79.2	120.6	163.7	208.5	255.4	304.5	339.6	377.2	417.4	460.3	484.4	510.5	537.0	565.4	595.5	627.3	660.6	696.2	733.5	772.6
Grand Total	40,410.3	82,614.5	127,267.8	175,002.0	226,279.9	281,715.1	341,935.7	399,085.7	460,971.1	527,388.5	598,934.2	672,056.1	747,721.2	826,136.5	901,475.5	979,145.2	1,059,382.3	1,136,992.6	1,217,594.6	1,298,320.5	1,381,408.9

C- 41: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #41)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	6,756.6	13,847.3	21,396.3	29,524.1	38,321.9	47,908.1	58,407.7	67,342.2	76,952.3	87,446.2	98,867.4	110,123.1	121,909.9	134,324.1	147,010.7	160,028.7	173,511.8	186,384.4	199,838.0	213,512.5	227,655.0
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	710.9	1,440.3	2,196.4	2,985.2	3,809.5	4,675.0	5,589.0	6,556.8	7,377.2	8,250.9	9,180.6	10,167.2	11,199.9	12,274.5	13,388.9	14,537.9	15,721.0	16,936.4	18,200.2	19,498.3	20,833.7
Space Heating	926.9	1,925.2	3,019.6	4,238.6	5,608.8	7,162.1	8,932.5	10,945.9	13,116.3	15,537.2	18,207.4	21,118.7	24,230.3	27,515.5	30,669.7	33,953.6	37,353.1	40,869.5	44,513.3	48,038.9	51,667.5
Water Heating	5,099.7	10,435.7	16,096.8	22,165.7	28,700.2	35,777.1	43,475.9	49,283.9	55,727.3	62,720.5	70,305.8	77,399.4	84,754.0	92,500.2	100,619.0	108,890.1	117,463.7	125,263.6	133,454.2	141,939.6	150,741.7
Grocery	1,842.5	3,783.7	5,858.6	8,104.3	10,551.6	13,239.8	16,212.3	19,195.2	22,499.9	26,122.6	30,063.8	34,187.2	38,565.1	43,158.2	47,305.1	51,622.5	56,094.0	60,716.8	65,512.9	70,272.8	75,166.6
Cooking	52.1	124.8	225.0	361.5	544.2	783.6	1,090.7	1,473.8	1,936.7	2,479.1	3,099.3	3,793.4	4,549.5	5,358.9	6,144.1	6,967.9	7,825.8	8,720.0	9,650.7	10,606.9	11,592.2
Space Heating	1,353.1	2,772.2	4,280.6	5,902.4	7,656.9	9,569.2	11,667.5	13,972.0	16,486.7	19,210.1	22,143.1	25,281.5	28,589.0	32,043.8	35,055.1	38,179.4	41,404.9	44,728.4	48,161.6	51,513.0	54,948.0
Water Heating	437.3	886.6	1,353.0	1,840.4	2,350.6	2,887.0	3,454.1	3,749.4	4,076.5	4,433.5	4,821.4	5,112.2	5,426.5	5,755.5	6,106.0	6,475.2	6,863.2	7,268.4	7,700.7	8,152.9	8,626.5
Healthcare	1,771.7	3,620.0	5,574.7	7,663.1	9,905.3	12,328.6	14,960.3	17,021.3	19,251.4	21,514.0	23,988.3	26,337.0	28,791.4	31,381.1	33,987.1	36,654.1	39,431.8	42,210.3	45,131.6	48,113.5	51,209.1
Cooking	4.2	10.2	18.5	29.8	45.0	65.1	90.8	123.0	161.9	207.6	259.8	318.3	382.0	450.3	516.5	586.0	658.4	733.9	812.6	893.4	976.8
Space Heating	255.1	525.9	818.0	1,137.4	1,489.6	1,881.1	2,319.3	2,809.5	3,302.5	3,848.8	4,448.7	5,100.6	5,795.5	6,527.9	7,179.7	7,859.8	8,565.2	9,295.6	10,053.5	10,787.6	11,544.4
Water Heating	1,512.4	3,083.9	4,738.2	6,495.9	8,370.7	10,382.4	12,550.2	14,088.7	15,787.0	17,457.6	19,279.8	20,918.1	22,613.8	24,402.8	26,290.8	28,208.3	30,208.2	32,180.9	34,265.5	36,432.5	38,687.9
Lodging	3,742.4	7,633.7	11,728.8	16,077.0	20,709.1	25,668.3	31,001.4	35,663.9	40,709.5	45,788.4	51,231.1	56,414.2	60,799.3	65,409.9	70,156.8	74,998.3	80,027.6	84,963.4	90,128.6	95,452.6	100,972.5
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	175.8	360.8	558.1	771.2	1,002.9	1,256.8	1,537.1	1,846.7	2,184.3	2,551.8	2,949.4	3,376.5	3,828.0	4,300.8	4,695.4	5,106.2	5,531.5	5,970.9	6,426.0	6,868.6	7,324.5
Water Heating	3,566.6	7,272.9	11,170.7	15,305.9	19,706.2	24,411.5	29,464.3	33,817.1	38,525.3	43,236.6	48,281.7	53,037.7	56,971.3	61,109.1	65,461.5	69,892.2	74,496.2	78,992.5	83,702.6	88,583.9	93,648.0
Misc.	598.5	1,242.0	1,946.3	2,729.3	3,607.6	4,601.5	5,732.3	7,015.0	8,456.7	10,056.4	11,813.4	13,690.1	15,687.3	17,792.1	19,674.4	21,638.7	23,676.1	25,787.6	27,980.0	30,099.7	32,284.9
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	557.8	1,159.7	1,821.1	2,559.6	3,391.8	4,337.6	5,418.0	6,649.2	8,036.9	9,580.2	11,278.2	13,125.6	15,097.2	17,176.5	19,031.4	20,966.6	22,973.3	25,052.6	27,210.6	29,294.3	31,441.6
Water Heating	40.7	82.3	125.2	169.7	215.8	264.0	314.3	365.8	419.8	476.2	535.2	564.5	590.1	615.6	643.0	672.1	702.8	735.0	769.4	805.5	843.3
Office	4,307.3	8,864.0	13,759.1	19,087.8	24,933.8	31,401.1	38,604.1	46,323.0	54,763.4	64,045.5	74,171.2	84,704.3	95,842.0	107,552.8	117,784.1	128,464.7	139,547.7	151,030.5	162,960.1	174,551.5	186,511.3
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	3,507.0	7,248.7	11,307.5	15,775.0	20,734.7	26,288.2	32,545.3	39,589.0	47,320.3	55,860.3	65,207.7	75,338.1	86,118.2	97,462.3	107,298.5	117,559.0	128,197.8	139,216.1	150,650.8	161,721.5	173,133.3
Water Heating	800.2	1,615.3	2,451.6	3,312.9	4,199.1	5,112.9	6,058.9	7,034.1	8,036.9	9,185.1	10,418.7	11,743.0	13,233.7	14,822.4	16,210.8	17,651.0	19,137.4	20,615.9	22,144.6	23,635.9	25,167.8
Restaurant	3,958.0	8,188.5	12,788.3	17,858.1	23,476.7	29,734.4	36,720.8	42,396.5	48,847.4	56,009.4	63,897.1	71,854.5	80,369.0	89,315.7	98,189.5	107,306.8	116,772.6	126,461.0	136,577.0	146,930.0	157,622.4
Cooking	184.2	441.3	795.2	1,277.6	1,922.4	2,767.2	3,849.4	5,198.5	6,827.0	8,732.9	10,910.5	13,345.9	15,996.9	18,833.1	21,574.5	24,449.9	27,444.2	30,564.5	33,818.7	37,162.1	40,607.1
Space Heating	635.0	1,299.8	2,004.9	2,761.1	3,577.1	4,464.3	5,435.8	6,500.8	7,661.5	8,917.1	10,267.9	11,712.3	13,233.7	14,822.4	16,210.8	17,651.0	19,137.4	20,615.9	22,144.6	23,635.9	25,167.8
Water Heating	3,138.8	6,447.4	9,988.2	13,819.4	17,977.2	22,502.8	27,435.6	30,697.2	34,358.9	38,359.5	42,718.7	46,796.3	51,138.4	55,660.3	60,404.2	65,205.9	70,191.1	75,280.5	80,613.8	86,132.1	91,847.5
Retail	5,084.5	10,445.7	16,182.2	22,398.5	29,184.1	36,652.1	44,927.7	53,934.4	63,823.0	74,633.0	86,368.0	98,787.9	111,952.7	125,755.4	137,939.0	150,617.8	163,740.1	177,300.0	191,349.1	205,030.8	219,119.9
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,691.7	9,650.7	14,971.3	20,755.1	27,090.6	34,088.1	41,869.5	50,525.3	60,036.9	70,444.3	81,749.6	93,929.9	106,834.8	120,369.9	132,266.2	144,640.7	157,441.8	170,665.1	184,354.4	197,658.9	211,352.4
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	5,088.0	5,517.9	5,885.6	6,298.3	6,634.9	6,998.4	7,371.9	7,767.5	8,181.6	8,626.5
Warehouse	246.9	521.3	832.7	1,192.3	1,611.7	2,103.8	2,682.3	3,341.0	4,097.3	4,954.0	5,910.1	6,940.3	8,049.9	9,226.6	10,362.3	11,548.8	12,780.7	14,059.4	15,389.2	16,669.9	17,990.5
Space Heating	207.8	442.1	712.0	1,028.6	1,403.1	1,848.4	2,377.7	3,001.4	3,720.0	4,536.5	5,449.9	6,455.9	7,539.4	8,689.6	9,796.9	10,953.3	12,153.4	13,398.8	14,693.1	15,936.4	17,217.9
Water Heating	39.1	79.2	120.6	163.7	208.5	255.4	304.5	339.6	377.2	417.4	460.3	484.4	510.5	537.0	565.4	595.5	627.3	660.6	696.2	733.5	772.6
Grand Total	28,308.5	58,146.2	90,067.0	124,634.5	162,301.8	203,637.7	249,248.9	292,232.5	339,401.0	390,569.4	446,310.4	503,038.6	561,966.6	623,915.9	682,409.1	742,880.5	805,582.5	868,913.4	934,866.6	1,000,633.2	1,068,532.2

C-42: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #42)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	5,328.2	10,861.2	16,680.6	22,858.9	29,448.1	36,521.0	44,161.7	49,868.4	56,093.0	62,862.7	70,235.1	77,132.8	84,315.9	91,917.4	99,603.0	107,628.2	115,977.7	124,580.7	133,611.2	142,740.4	152,205.4
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	514.6	1,042.6	1,590.0	2,161.0	2,757.9	3,384.7	4,046.9	4,748.3	5,489.2	6,269.2	7,090.1	7,952.9	8,849.5	9,776.9	10,733.5	11,715.4	12,722.4	13,753.1	14,819.3	15,910.5	17,029.1
Space Heating	898.2	1,867.4	2,932.3	4,121.1	5,460.6	6,982.8	8,721.5	10,702.7	12,840.4	15,228.1	17,864.6	20,741.4	23,818.1	27,067.8	30,186.0	33,433.4	36,795.8	40,274.9	43,881.0	47,368.3	50,958.2
Water Heating	3,896.2	7,905.1	12,074.9	16,442.2	21,026.1	25,859.6	30,983.1	33,861.8	37,032.0	40,427.8	44,106.8	47,000.7	49,922.6	53,038.7	56,350.4	59,832.3	63,485.5	67,237.7	71,240.5	75,425.8	79,806.0
Grocery	1,234.4	2,555.9	3,995.7	5,588.2	7,365.1	9,364.7	11,627.9	13,880.7	16,436.3	19,292.1	22,446.9	25,762.6	29,316.6	33,071.1	36,363.9	39,813.3	43,404.0	47,137.4	51,033.3	54,883.0	58,862.2
Cooking	50.7	121.5	218.9	351.8	529.5	762.5	1,061.4	1,434.3	1,885.1	2,413.3	3,017.5	3,693.8	4,430.7	5,219.5	5,983.0	6,784.3	7,618.8	8,488.8	9,396.2	10,328.6	11,289.3
Space Heating	746.3	1,547.8	2,423.8	3,396.1	4,485.0	5,715.1	7,112.4	8,697.0	10,474.7	12,445.3	14,607.9	16,956.5	19,459.4	22,096.1	24,274.9	26,553.9	28,922.0	31,380.2	33,936.4	36,401.5	38,946.4
Water Heating	437.3	886.6	1,353.0	1,840.4	2,350.6	2,887.0	3,454.1	3,749.4	4,076.5	4,433.5	4,821.4	5,112.2	5,426.5	5,755.5	6,106.0	6,475.2	6,863.2	7,268.4	7,700.7	8,152.9	8,626.5
Healthcare	1,616.1	3,288.0	5,038.3	6,885.9	8,843.2	10,928.6	13,161.7	14,759.1	16,512.2	18,235.6	20,110.8	21,803.8	23,556.2	25,404.3	27,233.6	29,150.0	31,150.5	33,125.3	35,212.4	37,338.3	39,553.8
Cooking	4.1	9.8	17.7	28.7	43.3	62.6	87.4	118.3	155.8	199.7	250.0	306.3	367.6	433.3	497.0	563.9	633.6	706.2	782.0	859.8	940.0
Space Heating	150.0	314.3	498.1	707.0	946.8	1,224.3	1,546.5	1,918.7	2,343.1	2,819.3	3,346.8	3,923.8	4,542.0	5,195.7	5,766.8	6,364.4	6,985.3	7,630.4	8,301.4	8,946.3	9,612.0
Water Heating	1,462.1	2,963.9	4,522.5	6,150.3	7,853.1	9,641.7	11,527.8	12,722.0	14,013.3	15,216.6	16,514.0	17,573.7	18,646.6	19,775.2	20,969.7	22,221.7	23,531.6	24,788.7	26,129.1	27,532.1	29,001.7
Lodging	3,726.2	7,601.1	11,679.5	16,010.7	20,625.4	25,567.0	30,882.3	35,526.5	40,553.7	45,613.8	51,037.5	56,201.2	60,566.6	65,157.1	69,883.7	74,704.6	79,713.0	84,627.8	89,771.7	95,074.0	100,572.0
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	159.7	328.3	508.9	705.0	919.4	1,155.8	1,418.2	1,709.7	2,028.8	2,377.6	2,756.3	3,164.0	3,595.8	4,048.6	4,422.9	4,813.1	5,217.5	5,635.9	6,069.8	6,490.8	6,924.8
Water Heating	3,566.6	7,272.8	11,170.6	15,305.7	19,706.0	24,411.2	29,464.0	33,816.8	38,524.9	43,236.2	48,281.2	53,037.1	56,970.7	61,108.5	65,460.8	69,891.5	74,495.5	78,991.8	83,701.9	88,583.2	93,647.3
Misc.	472.2	987.4	1,560.6	2,209.2	2,950.2	3,803.5	4,790.1	5,925.9	7,217.2	8,662.7	10,261.5	11,975.5	13,812.1	15,753.1	17,468.0	19,261.9	21,126.0	23,061.9	25,075.4	27,013.0	29,012.6
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	438.1	918.8	1,456.8	2,069.4	2,773.8	3,589.7	4,538.0	5,634.8	6,886.2	8,291.2	9,848.5	11,552.4	13,378.2	15,309.6	17,014.3	18,797.2	20,649.6	22,573.3	24,573.9	26,497.8	28,483.0
Water Heating	34.0	68.6	103.8	139.8	176.5	213.9	252.1	291.1	331.0	371.6	413.0	423.2	433.9	443.4	453.7	464.8	476.5	488.6	501.5	515.2	529.6
Office	3,696.0	7,633.6	11,898.4	16,584.6	21,777.5	27,581.7	34,110.1	41,142.6	48,886.5	57,462.4	66,869.8	76,669.6	87,062.8	98,018.5	107,482.6	117,385.0	127,679.6	138,368.0	149,493.8	160,269.4	171,401.0
Space Heating	2,895.7	6,018.3	9,446.8	13,271.7	17,578.4	22,468.8	28,051.2	34,408.5	41,443.4	49,277.3	57,906.3	67,303.4	77,339.1	87,928.0	96,997.0	106,479.3	116,329.8	126,553.6	137,184.5	147,439.4	158,023.0
Water Heating	800.2	1,615.3	2,451.6	3,312.9	4,199.1	5,112.9	6,058.9	6,734.1	7,443.0	8,185.1	8,963.5	9,366.2	9,723.7	10,090.5	10,485.6	10,905.6	11,349.9	11,814.4	12,309.3	12,830.0	13,378.0
Restaurant	3,779.9	7,829.0	12,243.4	17,123.1	22,547.2	28,605.7	35,387.5	40,852.9	47,088.4	54,030.3	61,692.8	69,419.4	77,698.9	86,406.9	95,042.3	103,917.6	113,138.0	122,631.1	132,548.5	142,701.0	153,191.1
Cooking	179.7	432.0	781.0	1,258.4	1,898.2	2,737.8	3,814.8	5,158.5	6,781.7	8,682.0	10,854.1	13,283.8	15,929.0	18,759.4	21,499.5	24,373.7	27,366.7	30,485.6	33,738.3	37,080.2	40,523.5
Space Heating	461.5	949.8	1,474.4	2,045.5	2,672.1	3,365.3	4,137.4	4,997.6	5,948.3	6,989.2	8,120.6	9,340.0	10,632.3	11,988.0	13,139.4	14,338.8	15,581.1	16,865.8	18,197.3	19,489.7	20,821.1
Water Heating	3,138.7	6,447.3	9,988.1	13,819.2	17,976.9	22,502.5	27,435.3	30,696.8	34,358.4	38,359.0	42,718.1	46,795.7	51,137.7	55,659.5	60,403.4	65,205.1	70,190.2	75,279.6	80,612.9	86,131.2	91,846.6
Retail	4,853.6	9,980.9	15,479.3	21,452.8	27,991.8	35,209.2	43,230.0	51,977.4	61,602.9	72,146.1	83,609.8	95,752.6	108,636.2	122,153.7	134,047.4	146,432.2	159,256.6	172,516.3	186,261.9	199,635.2	213,411.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,460.8	9,185.9	14,268.4	19,809.4	25,898.3	32,645.3	40,171.7	48,568.3	57,816.8	67,957.4	78,991.3	90,894.6	103,518.3	116,768.1	128,374.5	140,455.0	152,958.3	165,881.4	179,267.1	192,263.4	205,644.0
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	4,858.0	5,117.9	5,385.6	5,672.8	5,977.2	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5
Warehouse	163.5	336.0	520.9	721.5	940.9	1,182.8	1,451.3	1,748.7	2,073.0	2,427.8	2,813.1	3,206.8	3,624.9	4,062.8	4,418.1	4,789.7	5,176.0	5,577.0	5,994.4	6,399.9	6,819.0
Space Heating	139.8	288.1	447.9	622.6	815.0	1,028.8	1,267.9	1,535.3	1,828.2	2,150.1	2,501.0	2,880.1	3,282.6	3,705.4	4,044.5	4,399.0	4,767.1	5,149.0	5,546.1	5,930.3	6,327.0
Water Heating	23.7	48.0	73.0	98.9	125.9	154.0	183.4	213.4	244.8	277.7	312.1	326.7	342.3	357.4	373.6	390.8	408.9	427.9	448.3	469.6	492.0
Grand Total	24,870.0	51,073.2	79,096.7	109,435.0	142,489.4	178,764.3	218,802.5	255,682.3	296,463.2	340,733.5	389,077.4	437,924.2	488,590.2	541,944.6	591,542.5	643,082.5	696,621.5	751,625.3	809,002.6	866,054.2	925,028.5

C-43: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #43)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	5,121.6	10,445.2	16,051.2	22,011.7	28,379.1	35,226.5	42,637.2	48,109.2	54,095.2	60,622.3	67,747.5	74,392.2	81,318.1	88,658.4	96,079.0	103,835.1	111,912.0	120,239.8	128,991.8	137,838.2	147,016.0
Cooking	18.7	45.0	81.5	131.6	199.0	287.5	401.3	543.6	715.7	917.5	1,148.4	1,407.0	1,688.9	1,990.6	2,283.6	2,590.9	2,911.0	3,244.7	3,592.8	3,950.5	4,319.0
Other	514.6	1,042.6	1,590.0	2,161.0	2,757.9	3,384.7	4,046.9	4,748.3	5,489.2	6,269.2	7,090.1	7,952.9	8,849.5	9,776.9	10,733.5	11,715.4	12,722.4	13,753.1	14,819.3	15,910.5	17,029.1
Space Heating	692.1	1,452.5	2,304.7	3,276.8	4,396.1	5,694.7	7,205.8	8,955.6	10,858.3	13,007.8	15,402.1	18,031.6	20,857.1	23,852.1	26,711.5	29,696.5	32,793.1	36,004.3	39,339.2	42,551.4	45,862.0
Water Heating	3,896.2	7,905.1	12,074.9	16,442.2	21,026.1	25,859.6	30,983.1	33,861.8	37,032.0	40,427.8	44,106.8	47,000.7	49,922.6	53,038.7	56,350.4	59,832.3	63,485.5	67,237.7	71,240.5	75,425.8	79,806.0
Grocery	1,225.8	2,537.0	3,963.8	5,539.9	7,296.2	9,270.2	11,502.2	13,717.1	16,229.9	19,039.0	22,143.9	25,406.9	28,905.1	32,601.0	35,834.8	39,223.2	42,750.5	46,418.1	50,244.0	54,021.4	57,925.5
Cooking	48.7	117.3	212.6	343.2	518.7	749.5	1,046.0	1,416.6	1,864.9	2,390.7	2,992.4	3,666.2	4,400.4	5,186.7	5,949.7	6,750.4	7,584.3	8,453.7	9,360.5	10,292.1	11,252.1
Space Heating	744.6	1,544.4	2,418.6	3,389.0	4,476.1	5,704.3	7,099.8	8,682.4	10,458.2	12,426.7	14,587.4	16,933.8	19,434.7	22,069.3	24,245.9	26,522.7	28,888.6	31,344.5	33,898.5	36,361.3	38,903.9
Water Heating	432.5	875.3	1,332.6	1,807.6	2,301.4	2,816.4	3,356.4	3,618.1	3,906.8	4,221.6	4,564.1	4,806.8	5,070.0	5,345.0	5,639.2	5,950.2	6,277.6	6,619.9	6,985.1	7,367.9	7,769.5
Healthcare	1,531.9	3,118.4	4,781.3	6,539.6	8,405.7	10,397.9	12,535.4	14,035.0	15,688.0	17,309.2	19,079.7	20,665.1	22,307.8	24,044.1	25,760.4	27,561.7	29,445.5	31,387.1	33,439.3	35,528.3	37,705.0
Cooking	3.5	8.5	15.5	25.0	37.8	54.6	76.2	103.2	135.9	174.2	218.1	267.2	320.7	378.0	433.7	492.0	552.8	616.2	682.3	750.3	820.3
Space Heating	150.0	314.3	498.1	707.0	946.8	1,224.3	1,546.5	1,918.7	2,343.1	2,819.3	3,346.8	3,923.8	4,542.0	5,195.7	5,766.8	6,364.4	6,985.3	7,630.4	8,301.4	8,946.3	9,612.0
Water Heating	1,378.4	2,795.5	4,267.8	5,807.7	7,421.1	9,118.9	10,912.7	12,013.0	13,209.0	14,315.7	15,514.8	16,474.0	17,445.1	18,470.4	19,559.8	20,705.4	21,907.3	23,140.5	24,455.6	25,831.8	27,272.7
Lodging	3,608.0	7,357.8	11,302.1	15,487.6	19,942.9	24,708.6	29,828.4	34,254.9	39,044.2	43,843.9	48,984.8	53,843.6	57,885.5	62,136.8	66,510.0	70,968.5	75,603.9	80,135.0	84,883.7	89,800.3	94,902.9
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	121.5	246.2	375.4	510.1	650.8	798.2	953.7	1,118.0	1,291.0	1,472.7	1,663.4	1,863.4	2,070.8	2,284.8	2,407.8	2,536.2	2,669.4	2,807.0	2,949.6	3,096.6	3,236.4
Water Heating	3,486.5	7,111.6	10,926.7	14,977.5	19,292.2	23,910.4	28,874.7	33,137.0	37,753.2	42,371.2	47,321.4	51,980.2	55,814.7	59,851.9	64,102.2	68,432.3	72,934.4	77,328.0	81,934.0	86,709.7	91,666.6
Misc.	134.8	308.5	533.8	827.9	1,208.6	1,696.0	2,310.3	3,067.4	3,974.4	5,030.3	6,232.8	7,542.1	8,968.0	10,492.2	12,104.5	13,789.7	15,539.5	17,357.7	19,248.4	21,056.4	22,919.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	100.8	239.9	430.1	688.2	1,032.2	1,482.2	2,058.2	2,776.3	3,643.4	4,658.8	5,819.7	7,119.0	8,534.1	10,048.8	11,650.8	13,325.0	15,063.0	16,869.0	18,746.9	20,541.3	22,390.1
Water Heating	34.0	68.6	103.8	139.8	176.5	213.9	252.1	291.1	331.0	371.6	413.0	423.2	433.9	443.4	453.7	464.8	476.5	488.6	501.5	515.2	529.6
Office	3,173.7	6,409.8	9,733.6	13,160.7	16,692.6	20,340.3	24,122.9	27,745.8	31,383.5	35,160.6	39,088.6	42,762.5	46,488.1	50,310.3	52,232.6	54,255.4	56,371.3	58,563.0	60,855.3	63,182.3	65,609.8
Space Heating	2,373.4	4,794.5	7,281.9	9,847.8	12,493.5	15,227.3	18,064.1	21,011.7	23,940.5	26,975.5	30,125.2	33,396.3	36,764.4	40,219.8	41,747.0	43,349.8	45,021.4	46,748.6	48,546.0	50,352.4	52,231.8
Water Heating	800.2	1,615.3	2,451.6	3,312.9	4,199.1	5,112.9	6,058.9	6,734.1	7,443.0	8,185.1	8,963.5	9,366.2	9,723.7	10,090.5	10,485.6	10,905.6	11,349.9	11,814.4	12,309.3	12,830.0	13,378.0
Restaurant	3,462.3	7,189.6	11,276.4	15,822.1	20,906.7	26,202.5	33,051.6	38,160.1	44,033.9	50,637.0	57,954.3	65,327.9	73,248.6	81,592.1	90,119.3	98,884.5	107,989.4	117,364.0	127,157.9	137,180.7	147,534.6
Cooking	178.9	430.4	778.5	1,255.1	1,894.0	2,732.8	3,808.8	5,151.7	6,773.9	8,673.3	10,844.4	13,273.2	15,917.4	18,746.7	21,486.7	24,360.7	27,353.4	30,472.1	33,724.5	37,066.1	40,509.1
Space Heating	175.6	374.3	604.1	874.7	1,195.9	1,579.0	2,035.6	2,574.8	3,200.2	3,911.3	4,707.1	5,584.1	6,528.6	7,531.6	8,586.3	9,683.9	10,819.6	11,994.9	13,212.6	14,385.5	15,591.7
Water Heating	3,107.8	6,384.9	9,893.7	13,692.2	17,816.8	22,308.7	27,207.1	30,433.6	34,059.8	38,052.3	42,402.7	46,470.7	50,802.6	55,313.7	60,046.3	64,839.9	69,816.5	74,897.0	80,220.8	85,729.1	91,433.9
Retail	4,157.5	8,577.9	13,353.6	18,586.4	24,367.8	30,809.8	38,034.5	46,124.8	55,072.9	64,919.1	75,663.2	87,061.6	99,181.3	111,916.8	123,009.6	134,576.7	146,567.4	158,981.4	171,862.9	184,354.3	197,229.7
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	3,921.3	8,100.0	12,626.3	17,600.3	23,112.9	29,274.7	36,205.7	43,996.6	52,630.5	62,147.9	72,547.9	83,804.1	95,770.8	108,354.2	119,283.7	130,677.5	142,485.2	154,707.3	167,383.8	179,660.2	192,309.9
Water Heating	236.2	477.8	727.3	986.1	1,254.9	1,535.1	1,828.8	2,128.2	2,442.4	2,771.2	3,115.4	3,257.5	3,410.4	3,562.5	3,726.0	3,899.3	4,082.2	4,274.1	4,479.1	4,694.1	4,919.7
Warehouse	162.7	334.1	517.5	716.0	932.6	1,170.7	1,434.4	1,726.5	2,044.3	2,391.2	2,767.4	3,150.6	3,557.3	3,982.8	4,324.9	4,682.7	5,054.4	5,439.9	5,840.8	6,229.1	6,630.3
Space Heating	139.6	287.7	447.3	621.6	813.5	1,026.6	1,264.7	1,530.9	1,822.4	2,142.7	2,491.7	2,868.7	3,268.9	3,689.2	4,025.7	4,377.3	4,742.6	5,121.5	5,515.3	5,896.1	6,289.3
Water Heating	23.1	46.4	70.2	94.5	119.1	144.2	169.6	195.6	221.9	248.6	275.7	282.0	288.4	293.6	299.3	305.3	311.8	318.5	325.5	333.0	341.0
Grand Total	22,578.4	46,278.2	71,513.3	98,692.0	128,132.3	160,240.5	195,456.9	226,940.9	261,566.2	298,952.6	339,662.2	380,152.5	421,859.7	465,734.5	505,975.1	547,777.6	591,233.9	635,885.9	682,524.1	729,191.1	777,473.6

C-44: Commercial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #44)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Education	7,981.8	16,316.5	25,136.0	34,564.3	44,690.3	55,633.4	67,523.0	77,887.9	88,960.5	100,947.3	113,896.3	126,721.9	140,109.5	154,152.7	168,498.5	183,197.9	198,387.9	212,685.4	227,591.1	242,740.3	258,384.7
Cooking	19.1	46.0	83.4	134.6	203.5	294.0	410.3	555.6	731.4	937.6	1,173.6	1,437.8	1,725.7	2,034.0	2,333.2	2,647.1	2,974.1	3,314.9	3,670.4	4,035.7	4,412.1
Other	710.9	1,440.3	2,196.4	2,985.2	3,809.5	4,675.0	5,589.0	6,556.8	7,377.2	8,250.9	9,180.6	10,167.2	11,199.9	12,274.5	13,388.9	14,537.9	15,721.0	16,936.4	18,200.2	19,498.3	20,833.7
Space Heating	1,487.5	3,056.5	4,736.0	6,556.6	8,544.8	10,733.8	13,160.5	15,852.2	18,721.9	21,862.0	25,273.1	28,948.5	32,842.4	36,926.6	40,896.9	45,012.1	49,257.3	53,328.6	57,544.2	61,651.2	65,874.9
Water Heating	5,764.3	11,773.6	18,120.2	24,887.9	32,132.6	39,930.6	48,363.3	54,923.4	62,129.8	69,896.7	78,269.1	86,168.5	94,341.4	102,917.6	111,879.5	121,000.7	130,435.5	139,105.5	148,176.3	157,555.1	167,264.0
Grocery	2,924.5	5,979.2	9,211.1	12,667.0	16,383.0	20,407.3	24,794.7	29,278.9	34,171.3	39,466.5	45,167.9	51,140.1	57,438.7	64,015.9	70,186.3	76,578.6	83,171.4	89,900.8	96,852.6	103,810.8	110,949.0
Cooking	66.8	160.2	288.9	464.4	699.1	1,006.5	1,400.1	1,890.4	2,481.7	3,173.1	3,962.4	4,844.4	5,803.9	6,829.9	7,827.7	8,863.6	9,947.2	11,076.0	12,251.0	13,458.2	14,702.0
Space Heating	2,402.7	4,896.5	7,514.4	10,287.7	13,238.4	16,397.4	19,801.7	23,476.8	27,426.1	31,647.3	36,144.7	40,916.2	45,912.3	51,105.1	55,902.0	60,853.3	65,942.8	71,106.2	76,417.6	81,682.6	87,069.0
Water Heating	455.1	922.6	1,407.9	1,914.9	2,445.5	3,003.4	3,592.9	3,911.7	4,263.5	4,646.2	5,060.8	5,379.5	5,722.5	6,080.9	6,461.6	6,861.8	7,281.3	7,718.6	8,184.0	8,670.0	9,178.1
Healthcare	2,561.7	5,227.9	8,037.5	11,026.2	14,217.7	17,644.8	21,341.5	24,215.4	27,318.6	30,509.4	33,965.1	37,348.6	40,878.3	44,578.1	48,327.8	52,167.9	56,144.4	59,764.9	63,552.5	67,425.8	71,433.9
Cooking	4.2	10.2	18.5	29.8	45.1	65.1	90.9	123.1	162.0	207.7	260.0	318.5	382.2	450.5	516.7	586.2	658.6	734.1	812.8	893.6	977.0
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	406.0	831.5	1,283.2	1,768.2	2,292.4	2,863.0	3,488.7	4,175.4	4,873.5	5,632.4	6,451.7	7,330.2	8,257.1	9,226.1	10,119.4	11,045.1	12,000.0	12,913.1	13,858.0	14,782.2	15,727.3
Water Heating	2,151.5	4,386.2	6,735.9	9,228.2	11,880.2	14,716.6	17,761.9	19,916.9	22,283.1	24,669.3	27,253.4	29,700.0	32,239.1	34,901.5	37,691.7	40,536.6	43,485.8	46,117.7	48,881.7	51,750.0	54,729.6
Lodging	3,945.8	8,044.6	12,353.4	16,922.4	21,782.6	26,978.1	32,557.2	37,475.9	42,788.0	48,142.3	53,870.0	59,348.0	64,035.6	68,955.7	74,019.1	79,183.2	84,540.9	89,809.8	95,315.0	100,984.7	106,853.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	52.0	105.4	160.7	218.4	278.7	342.0	408.9	479.8	554.7	633.5	716.5	803.6	894.3	988.0	1,084.6	1,183.9	1,285.6	1,389.8	1,497.5	1,607.8	1,720.8
Space Heating	327.2	666.4	1,022.0	1,398.2	1,797.7	2,224.6	2,683.9	3,179.0	3,708.0	4,272.2	4,871.9	5,506.7	6,170.1	6,858.6	7,473.0	8,107.2	8,759.1	9,427.5	10,114.9	10,793.0	11,484.6
Water Heating	3,566.6	7,272.9	11,170.7	15,305.9	19,706.2	24,411.5	29,464.3	33,817.1	38,525.3	43,236.6	48,281.7	53,037.7	56,971.3	61,109.1	65,461.5	69,892.2	74,496.2	78,992.5	83,702.6	88,583.9	93,648.0
Misc.	929.8	1,911.0	2,962.0	4,101.7	5,346.7	6,717.5	8,236.7	9,895.7	11,704.1	13,680.0	15,823.6	18,098.3	20,502.0	23,021.1	25,326.0	27,720.2	30,194.5	32,688.4	35,270.6	37,844.0	40,365.4
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	865.9	1,781.7	2,765.1	3,834.6	5,006.5	6,301.0	7,740.1	9,340.0	11,085.1	12,993.7	15,065.7	17,296.7	19,659.1	22,135.6	24,394.8	26,740.6	29,163.9	31,604.2	34,129.2	36,583.1	39,101.1
Water Heating	63.9	129.3	196.9	267.1	340.2	416.5	496.6	555.7	619.0	686.3	757.9	801.6	842.9	885.5	931.2	979.6	1,030.7	1,084.2	1,141.4	1,201.4	1,264.3
Office	4,871.8	10,017.0	15,532.1	21,520.6	28,069.7	35,289.6	43,301.1	51,870.3	61,217.5	71,458.8	82,595.4	94,189.4	106,427.0	119,271.9	130,669.7	142,544.5	154,848.6	167,576.2	180,786.1	193,666.4	206,902.5
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	4,059.2	8,372.4	13,027.6	18,122.4	23,741.6	29,990.3	36,982.0	44,800.8	53,344.4	62,730.2	72,956.3	83,997.8	95,713.4	108,014.1	118,827.8	130,084.0	141,735.3	153,778.8	166,257.2	178,371.2	190,803.1
Water Heating	812.6	1,644.6	2,504.5	3,398.2	4,328.1	5,299.3	6,319.0	7,069.5	7,873.1	8,728.6	9,639.1	10,191.6	10,713.6	11,257.8	11,841.8	12,460.5	13,113.3	13,797.5	14,528.9	15,295.3	16,099.4
Restaurant	5,501.4	11,297.8	17,495.4	24,199.0	31,483.8	39,440.9	48,164.7	55,621.4	63,888.8	72,901.6	82,680.3	92,579.7	103,071.8	114,029.6	124,950.0	136,146.0	147,720.0	158,295.7	169,316.9	180,608.7	192,274.5
Cooking	191.4	458.5	826.2	1,327.5	1,997.5	2,875.2	3,999.2	5,400.0	7,090.3	9,067.8	11,326.6	13,852.0	16,600.3	19,540.2	22,390.6	25,379.6	28,491.4	31,733.6	35,104.1	38,567.1	42,135.2
Space Heating	956.7	1,947.3	2,984.0	4,078.4	5,238.0	6,474.2	7,800.7	9,226.9	10,754.1	12,381.2	14,110.1	15,940.3	17,853.5	19,839.5	21,631.6	23,481.2	25,382.4	27,279.0	29,230.5	31,151.1	33,118.8
Water Heating	4,353.4	8,892.0	13,685.2	18,793.1	24,248.3	30,091.5	36,364.8	40,994.5	46,044.4	51,452.6	57,243.7	62,787.4	68,618.0	74,649.9	80,927.8	87,285.2	93,846.1	99,283.1	104,982.2	110,890.6	117,020.6
Retail	7,114.1	14,551.4	22,427.1	30,857.6	39,935.8	49,783.5	60,540.0	72,136.2	84,720.2	98,314.1	112,918.9	128,297.4	144,487.8	161,375.6	176,705.5	192,584.3	208,956.2	225,273.1	242,131.3	258,658.9	275,578.1
Cooking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heating	6,721.3	13,756.4	21,216.1	29,214.3	37,842.3	47,219.6	57,481.8	68,727.1	80,934.1	94,125.4	108,300.4	123,439.5	139,370.0	155,990.0	171,032.7	186,607.1	202,657.9	218,638.2	235,136.5	251,287.0	267,810.6
Water Heating	392.8	795.1	1,210.9	1,643.4	2,093.5	2,564.0	3,058.2	3,409.1	3,786.1	4,188.7	4,618.4	5,079.9	5,385.6	5,672.8	5,977.2	6,298.3	6,634.9	6,994.8	7,371.9	7,767.5	8,182.5
Warehouse	307.9	644.0	1,018.2	1,441.9	1,926.3	2,484.6	3,130.3	3,857.5	4,683.2	5,610.3	6,638.1	7,741.4	8,925.2	10,177.2	11,389.4	12,653.4	13,963.9	15,321.8	16,731.8	18,093.7	19,496.9
Space Heating	268.7	564.8	897.5	1,278.2	1,717.8	2,229.2	2,825.8	3,517.9	4,306.0	5,192.9	6,177.8	7,257.0	8,414.6	9,640.2	10,823.9	12,057.9	13,336.6	14,661.2	16,035.6	17,360.2	18,724.3
Water Heating	39.1	79.2	120.6	163.7	208.5	255.4	304.5	339.6	377.2	417.4	460.3	484.4	510.5	537.0	565.4	595.5	627.3	660.6	696.2	733.5	772.6
Grand Total	36,138.7	73,989.4	114,172.8	157,300.7	203,835.9	254,379.6	309,589.1	362,239.3	419,452.1	481,030.4	547,555.6	615,464.9	685,876.0	759,577.7	830,072.2	902,776.0	977,927.7	1,051,316.1	1,127,547.7	1,203,773.9	1,282,238.5

c.3 Industrial Sector Scenario Findings

C-45: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #45)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	10,837.9	21,740.9	32,830.8	44,128.7	55,230.2	66,504.0	77,671.3	89,039.3	100,574.3	112,010.7	123,657.7	135,559.9	147,655.0	159,562.4	171,089.5	182,805.2	194,693.8	204,405.5	214,372.8	221,048.7	227,932.9
Process Heating	7,811.7	15,660.5	23,644.7	31,779.5	40,041.9	48,429.1	56,655.2	65,026.7	73,523.0	82,137.9	90,905.1	99,856.7	108,948.0	118,171.4	127,543.6	137,052.1	146,685.7	154,157.3	161,812.9	166,632.2	171,612.6
Space Heating	3,026.2	6,080.4	9,186.1	12,349.2	15,188.3	18,074.9	21,016.0	24,012.6	27,051.4	29,872.9	32,752.6	35,703.2	38,707.0	41,391.0	43,546.0	45,753.1	48,008.1	50,248.2	52,560.0	54,416.5	56,320.2
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LumberWood	1,125.8	2,257.0	3,407.7	4,580.1	5,731.4	6,900.8	8,052.9	9,225.9	10,416.3	11,596.0	12,797.7	14,025.9	15,274.3	16,502.5	17,689.9	18,897.1	20,122.2	21,243.2	22,390.7	23,134.0	23,898.8
Process Heating	805.1	1,612.6	2,434.1	3,271.3	4,121.7	4,985.1	5,825.5	6,680.9	7,549.3	8,430.0	9,326.4	10,242.0	11,172.0	12,115.6	13,074.7	14,047.9	15,034.1	15,917.7	16,820.2	17,366.7	17,929.8
Space Heating	320.7	644.4	973.6	1,308.8	1,609.7	1,915.7	2,227.4	2,545.0	2,867.0	3,166.1	3,471.3	3,784.0	4,102.4	4,386.8	4,615.2	4,849.1	5,088.1	5,325.5	5,570.5	5,767.3	5,969.1
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MetalsFab	6,635.4	13,305.3	20,090.0	27,002.4	33,867.8	40,839.0	47,709.6	54,703.4	61,800.8	68,889.4	76,107.3	83,481.6	90,974.4	98,424.9	105,757.4	113,205.6	120,759.9	127,055.9	133,508.3	137,695.1	142,012.4
Process Heating	5,374.1	10,771.0	16,261.1	21,855.2	27,537.1	33,305.2	38,949.9	44,694.7	50,525.5	56,438.2	62,455.7	68,600.2	74,841.0	81,172.8	87,607.1	94,135.3	100,749.7	106,112.0	111,600.9	115,013.9	118,537.8
Space Heating	1,261.4	2,534.4	3,828.9	5,147.2	6,330.6	7,533.8	8,759.7	10,008.7	11,275.2	12,451.3	13,651.6	14,881.4	16,133.4	17,252.1	18,150.3	19,070.3	20,010.1	20,943.8	21,907.4	22,681.2	23,474.7
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	11,712.0	23,480.1	35,451.1	47,647.9	59,778.6	72,096.5	84,212.8	96,546.9	109,064.4	121,578.3	134,320.5	147,339.3	160,567.3	173,737.4	186,725.4	199,917.9	213,298.0	224,771.6	236,521.2	244,057.2	251,824.0
Process Heating	9,619.4	19,275.5	29,098.8	39,108.4	49,275.7	59,597.4	69,679.8	79,941.7	90,357.8	100,920.4	111,671.2	122,649.4	133,800.1	145,113.9	156,611.4	168,277.2	180,097.5	190,022.5	200,173.9	206,426.4	212,877.1
Space Heating	2,091.8	4,202.9	6,349.6	8,536.0	10,498.5	12,493.7	14,526.7	16,598.0	18,698.4	20,648.7	22,639.2	24,678.7	26,755.0	28,610.3	30,099.8	31,625.4	33,184.1	34,732.4	36,330.4	37,613.6	38,929.5
Water Heating	0.9	1.7	2.6	3.5	4.4	5.3	6.3	7.2	8.2	9.1	10.1	11.1	12.2	13.2	14.3	15.3	16.4	16.7	16.9	17.2	17.5
PaperMfg	989.4	1,984.8	2,997.2	4,028.6	5,051.9	6,090.9	7,118.7	8,164.9	9,226.5	10,285.9	11,364.6	12,466.6	13,586.2	14,698.3	15,791.2	16,901.3	18,027.1	18,901.6	19,799.5	20,396.4	21,012.7
Process Heating	792.7	1,589.4	2,399.9	3,225.7	4,064.4	4,915.7	5,752.3	6,603.6	7,467.6	8,343.6	9,235.1	10,145.2	11,069.5	12,007.2	12,959.9	13,926.5	14,905.8	15,634.6	16,382.1	16,858.3	17,350.9
Space Heating	196.8	395.3	597.3	802.9	987.5	1,175.2	1,366.4	1,561.2	1,758.8	1,942.3	2,129.5	2,321.3	2,516.6	2,691.2	2,831.3	2,974.8	3,121.4	3,267.0	3,417.3	3,538.0	3,661.8
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
StoneClayGlass	3,264.8	6,543.7	9,879.2	13,277.8	16,681.8	20,138.1	23,527.8	26,978.4	30,480.5	33,998.4	37,580.0	41,238.8	44,956.0	48,680.7	52,392.0	56,160.4	59,981.1	63,272.3	66,640.3	68,764.1	70,953.2
Process Heating	2,874.3	5,759.1	8,693.9	11,684.4	14,722.1	17,805.9	20,816.2	23,880.1	26,990.1	30,144.0	33,354.1	36,632.1	39,961.7	43,340.1	46,773.4	50,257.0	53,786.8	56,788.9	59,858.7	61,742.9	63,686.4
Space Heating	390.5	784.5	1,185.3	1,593.4	1,959.7	2,332.2	2,711.6	3,098.3	3,490.4	3,854.4	4,226.0	4,606.7	4,994.3	5,340.6	5,618.6	5,903.4	6,194.3	6,483.4	6,781.6	7,021.2	7,266.8
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total	34,565.4	69,311.8	104,655.9	140,665.5	176,341.8	212,569.2	248,293.0	284,658.8	321,562.8	358,358.8	395,827.8	434,112.1	473,013.3	511,606.2	549,445.5	587,887.5	626,882.1	659,650.1	693,232.8	715,095.5	737,634.1

C-46: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #46)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	4,108.4	8,266.0	12,492.9	16,796.7	21,165.2	25,597.4	30,102.8	34,682.9	39,327.0	44,032.0	48,815.4	53,694.4	58,645.1	63,663.9	68,759.5	73,925.5	79,155.9	82,180.3	85,302.3	86,603.0	87,988.6
Process Heating	3,791.7	7,634.1	11,540.0	15,516.5	19,552.4	23,646.5	27,808.0	32,038.2	36,327.1	40,671.8	45,088.6	49,593.5	54,164.2	58,797.6	63,501.6	68,270.2	73,098.1	75,716.2	78,424.5	79,619.7	80,893.2
Space Heating	316.7	632.0	952.9	1,280.2	1,612.9	1,950.8	2,294.8	2,644.8	3,000.0	3,360.2	3,726.7	4,100.9	4,480.8	4,866.3	5,258.0	5,655.3	6,057.8	6,464.1	6,877.8	6,983.3	7,095.4
LumberWood	339.4	682.7	1,031.7	1,387.2	1,747.9	2,114.0	2,486.1	2,864.3	3,247.9	3,636.5	4,031.6	4,434.6	4,843.5	5,258.1	5,679.0	6,105.7	6,537.7	6,861.7	7,193.7	7,301.3	7,415.9
Process Heating	305.8	615.7	930.8	1,251.5	1,577.0	1,907.2	2,242.8	2,584.0	2,929.9	3,280.4	3,636.6	3,999.9	4,368.6	4,742.3	5,121.7	5,506.3	5,895.7	6,176.6	6,464.7	6,561.1	6,663.9
Space Heating	33.6	67.0	101.0	135.7	170.9	206.8	243.2	280.3	318.0	356.1	395.0	434.6	474.9	515.8	557.3	599.4	642.0	685.1	729.0	740.1	752.0
MetalsFab	2,574.3	5,180.7	7,830.3	10,528.0	13,266.3	16,044.3	18,868.1	21,738.7	24,649.3	27,598.0	30,595.8	33,653.4	36,755.8	39,900.9	43,094.1	46,331.3	49,608.7	51,601.0	53,654.4	54,468.2	55,335.2
Process Heating	2,442.3	4,917.2	7,433.1	9,994.4	12,594.0	15,231.1	17,911.6	20,636.3	23,398.9	26,197.4	29,042.4	31,944.0	34,888.1	37,872.6	40,902.5	43,974.0	47,083.8	48,906.6	50,787.6	51,557.4	52,377.7
Space Heating	132.0	263.4	397.2	533.6	672.3	813.1	956.5	1,102.4	1,250.4	1,400.6	1,553.4	1,709.3	1,867.7	2,028.4	2,191.6	2,357.2	2,525.0	2,694.3	2,866.8	2,910.8	2,957.5
Other	4,346.0	8,746.3	13,219.6	17,774.1	22,397.0	27,087.0	31,854.4	36,700.7	41,614.5	46,592.6	51,653.6	56,815.6	62,053.4	67,363.1	72,753.9	78,219.1	83,752.3	87,327.8	91,006.5	92,380.4	93,844.1
Process Heating	4,127.1	8,309.5	12,560.9	16,889.2	21,282.1	25,738.5	30,268.2	34,872.5	39,540.9	44,270.0	49,077.6	53,981.0	58,956.1	63,999.3	69,119.5	74,310.0	79,564.9	82,859.6	86,252.4	87,553.3	88,939.5
Space Heating	218.9	436.8	658.7	884.9	1,114.9	1,348.5	1,586.2	1,828.1	2,073.7	2,322.7	2,576.0	2,834.7	3,097.3	3,363.8	3,634.5	3,909.1	4,187.3	4,468.2	4,754.1	4,827.1	4,904.6
PaperMfg	427.3	859.9	1,299.6	1,747.4	2,201.9	2,663.0	3,131.7	3,608.1	4,091.2	4,580.6	5,078.2	5,585.7	6,100.6	6,622.6	7,152.6	7,689.9	8,233.8	8,523.1	8,822.5	8,957.5	9,101.4
Process Heating	406.7	818.8	1,237.7	1,664.2	2,097.0	2,536.2	2,982.5	3,436.2	3,896.2	4,362.2	4,835.9	5,319.0	5,809.3	6,306.2	6,810.7	7,322.2	7,840.0	8,102.8	8,375.3	8,503.5	8,640.1
Space Heating	20.6	41.1	62.0	83.2	104.9	126.8	149.2	172.0	195.1	218.5	242.3	266.6	291.3	316.4	341.9	367.7	393.9	420.3	447.2	454.1	461.3
StoneClayGlass	1,246.8	2,509.5	3,793.1	5,100.0	6,426.5	7,772.2	9,140.0	10,530.5	11,940.4	13,368.7	14,820.7	16,301.6	17,804.3	19,327.6	20,874.2	22,442.1	24,029.4	25,069.9	26,139.9	26,533.7	26,953.1
Process Heating	1,205.9	2,427.9	3,670.1	4,934.8	6,218.4	7,520.4	8,844.0	10,189.3	11,553.3	12,935.1	14,339.8	15,772.5	17,226.2	18,699.7	20,195.8	21,712.4	23,247.8	24,235.8	25,252.5	25,632.6	26,037.6
Space Heating	40.9	81.5	123.0	165.2	208.1	251.7	296.1	341.3	387.1	433.6	480.9	529.1	578.2	627.9	678.4	729.7	781.6	834.1	887.4	901.1	915.5
Grand Total	13,042.1	26,245.0	39,667.3	53,333.4	67,204.8	81,277.7	95,583.1	110,125.3	124,870.5	139,808.4	154,995.1	170,485.2	186,202.7	202,136.2	218,313.3	234,713.4	251,317.9	261,563.6	272,119.3	276,244.1	280,638.3

C-47: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #47)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,606.0	3,237.4	4,901.2	6,602.3	8,337.9	10,109.9	11,924.2	13,783.0	15,682.9	17,622.6	19,608.5	21,646.5	23,725.0	25,840.4	27,994.9	30,184.2	32,404.7	33,703.7	35,046.9	35,741.1	36,472.9
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	12.1	28.3	50.2	79.7	118.8	169.7	234.6	315.2	412.2	525.5	654.8	799.1	956.1	1,123.8	1,300.9	1,485.6	1,676.6	1,874.3	2,078.2	2,270.0	2,466.5
LumberWood	129.8	261.7	396.4	534.3	675.3	819.4	967.4	1,119.3	1,274.9	1,434.2	1,597.6	1,765.6	1,937.1	2,111.9	2,290.1	2,471.4	2,655.2	2,794.2	2,937.0	2,997.8	3,061.8
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	1.3	3.0	5.3	8.4	12.6	18.0	24.9	33.4	43.7	55.7	69.4	84.7	101.3	119.1	137.9	157.5	177.7	198.7	220.3	240.6	261.4
MetalsFab	1,031.6	2,078.7	3,145.3	4,234.2	5,343.2	6,472.9	7,626.6	8,805.5	10,007.1	11,230.7	12,480.4	13,760.2	15,063.1	16,387.5	17,734.9	19,103.0	20,489.7	21,338.7	22,214.8	22,618.3	23,045.0
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	5.1	11.8	20.9	33.2	49.5	70.7	97.8	131.4	171.8	219.0	272.9	333.1	398.5	468.4	542.2	619.2	698.9	781.2	866.2	946.2	1,028.1
Other	1,743.0	3,512.0	5,314.0	7,153.6	9,027.0	10,935.2	12,883.9	14,874.8	16,903.9	18,969.9	21,079.9	23,240.6	25,440.1	27,675.8	29,950.2	32,259.4	34,600.1	36,122.1	37,689.6	38,369.0	39,087.4
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	8.4	19.5	34.7	55.1	82.1	117.3	162.2	217.9	284.9	363.2	452.6	552.4	660.9	776.8	899.2	1,026.9	1,158.9	1,295.6	1,436.5	1,569.1	1,704.9
PaperMfg	171.7	346.0	523.6	704.8	889.3	1,077.2	1,269.1	1,465.0	1,664.7	1,868.0	2,075.5	2,288.0	2,504.3	2,724.2	2,947.8	3,174.8	3,404.9	3,528.3	3,656.2	3,722.6	3,792.8
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	0.8	1.8	3.3	5.2	7.7	11.0	15.3	20.5	26.8	34.2	42.6	52.0	62.2	73.1	84.6	96.6	109.0	121.9	135.1	147.6	160.4
StoneClayGlass	508.4	1,024.1	1,549.0	2,084.3	2,628.8	3,182.6	3,747.3	4,323.1	4,908.9	5,504.3	6,111.3	6,732.1	7,363.3	8,004.3	8,655.9	9,317.1	9,987.1	10,428.0	10,881.8	11,066.3	11,261.8
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	1.6	3.6	6.5	10.3	15.3	21.9	30.3	40.7	53.2	67.8	84.5	103.1	123.4	145.0	167.9	191.7	216.3	241.8	268.1	292.9	318.2
Grand Total	5,190.6	10,459.9	15,829.5	21,313.5	26,901.5	32,597.3	38,418.4	44,370.7	50,442.5	56,629.6	62,953.3	69,433.0	76,033.0	82,744.0	89,573.7	96,509.8	103,541.6	107,915.1	112,426.3	114,515.1	116,721.7

C-48: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #48)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,015.9	4,066.0	6,160.2	8,305.0	10,497.5	12,739.7	15,038.7	17,396.3	19,807.1	22,268.2	24,786.8	27,370.0	30,002.5	32,680.4	35,406.2	38,175.0	40,982.3	42,635.0	44,343.7	45,231.5	46,166.5
Process Heating	1,992.1	4,010.8	6,062.8	8,152.0	10,272.3	12,423.3	14,609.7	16,832.1	19,085.3	21,368.0	23,688.5	26,055.2	28,456.6	30,890.8	33,362.2	35,867.5	38,403.9	39,780.3	41,204.0	41,831.9	42,501.0
Space Heating	23.8	55.2	97.4	153.1	225.2	316.4	429.0	564.3	721.7	900.2	1,098.4	1,314.8	1,546.0	1,789.6	2,044.1	2,307.5	2,578.4	2,854.7	3,139.7	3,399.6	3,665.5
LumberWood	163.1	329.3	499.2	673.5	852.2	1,035.3	1,223.5	1,417.0	1,615.4	1,818.4	2,026.5	2,240.2	2,458.4	2,680.5	2,906.7	3,136.6	3,369.9	3,546.7	3,728.3	3,806.5	3,888.6
Process Heating	160.6	323.4	488.9	657.3	828.3	1,001.7	1,178.0	1,357.2	1,538.9	1,723.0	1,910.1	2,100.9	2,294.5	2,490.8	2,690.1	2,892.1	3,096.6	3,244.2	3,395.5	3,446.2	3,500.1
Space Heating	2.5	5.9	10.3	16.2	23.9	33.5	45.5	59.8	76.5	95.4	116.4	139.3	163.9	189.7	216.6	244.6	273.3	302.6	332.8	360.3	388.5
MetalsFab	1,293.0	2,606.3	3,945.5	5,314.3	6,710.0	8,133.4	9,588.5	11,076.3	12,593.2	14,137.8	15,715.0	17,329.5	18,972.5	20,641.9	22,339.7	24,063.1	25,809.7	26,882.9	27,990.3	28,503.1	29,044.8
Process Heating	1,283.0	2,583.2	3,904.9	5,250.5	6,616.1	8,001.5	9,409.7	10,841.1	12,292.4	13,762.6	15,257.1	16,781.5	18,328.1	19,896.0	21,487.7	23,101.3	24,735.0	25,693.1	26,681.7	27,086.1	27,517.0
Space Heating	9.9	23.0	40.6	63.8	93.9	131.9	178.8	235.2	300.8	375.2	457.8	548.0	644.4	745.9	852.0	961.8	1,074.7	1,189.9	1,308.7	1,417.0	1,527.8
Other	2,184.5	4,403.2	6,665.6	8,977.8	11,335.3	13,739.3	16,196.7	18,708.8	21,270.0	23,877.6	26,540.0	29,265.4	32,038.7	34,856.3	37,721.9	40,630.6	43,578.3	45,500.6	47,480.5	48,343.5	49,255.5
Process Heating	2,168.0	4,365.0	6,598.3	8,872.0	11,179.7	13,520.6	15,900.1	18,318.8	20,771.1	23,255.3	25,780.8	28,356.6	30,970.1	33,619.3	36,309.0	39,035.6	41,796.1	43,527.4	45,310.3	45,993.6	46,721.8
Space Heating	16.4	38.2	67.3	105.8	155.7	218.7	296.6	390.0	498.9	622.2	759.2	908.8	1,068.6	1,237.0	1,412.9	1,595.0	1,782.2	1,973.2	2,170.2	2,349.9	2,533.7
PaperMfg	215.2	433.8	656.6	884.3	1,116.4	1,353.1	1,594.9	1,842.1	2,094.0	2,350.4	2,612.2	2,880.1	3,152.7	3,429.7	3,711.3	3,997.1	4,286.8	4,442.9	4,604.8	4,689.0	4,778.1
Process Heating	213.7	430.2	650.3	874.4	1,101.8	1,332.5	1,567.0	1,805.4	2,047.1	2,291.9	2,540.8	2,794.6	3,052.2	3,313.3	3,578.4	3,847.1	4,119.1	4,257.3	4,400.6	4,468.0	4,539.7
Space Heating	1.5	3.6	6.3	10.0	14.6	20.6	27.9	36.7	46.9	58.5	71.4	85.5	100.5	116.4	132.9	150.0	167.6	185.6	204.1	221.0	238.3
StoneClayGlass	636.5	1,282.5	1,940.5	2,612.0	3,295.5	3,991.3	4,701.0	5,425.2	6,162.0	6,910.9	7,674.3	8,454.8	9,248.3	10,053.8	10,872.5	11,703.1	12,544.6	13,099.4	13,670.4	13,903.6	14,150.7
Process Heating	633.4	1,275.4	1,927.9	2,592.2	3,266.5	3,950.4	4,645.7	5,352.4	6,068.9	6,794.7	7,532.6	8,285.2	9,048.8	9,822.9	10,608.7	11,405.4	12,211.9	12,731.1	13,265.3	13,465.0	13,677.7
Space Heating	3.1	7.1	12.6	19.8	29.1	40.8	55.4	72.8	93.1	116.2	141.7	169.6	199.5	230.9	263.7	297.7	332.7	368.3	405.1	438.6	473.0
Grand Total	6,508.1	13,121.0	19,867.6	26,767.0	33,807.0	40,992.1	48,343.3	55,865.7	63,541.7	71,363.2	79,354.8	87,540.1	95,873.1	104,342.5	112,958.3	121,705.7	130,571.6	136,107.6	141,818.0	144,477.2	147,284.1

C-49: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #49)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,685.2	5,415.1	8,202.1	11,054.4	13,967.2	16,942.5	19,989.1	23,109.1	26,295.0	29,543.2	32,863.9	36,266.6	39,732.0	43,255.2	46,840.3	50,480.9	54,171.4	56,321.4	58,545.9	59,678.1	60,871.2
Process Heating	2,655.4	5,346.3	8,081.6	10,866.4	13,692.8	16,560.1	19,474.4	22,436.8	25,440.4	28,483.1	31,576.3	34,731.1	37,932.1	41,176.9	44,471.2	47,810.7	51,191.8	53,026.0	54,923.4	55,760.4	56,652.2
Space Heating	29.8	68.8	120.5	187.9	274.3	382.5	514.7	672.3	854.5	1,060.1	1,287.6	1,535.4	1,799.9	2,078.3	2,369.1	2,670.1	2,979.6	3,295.4	3,622.5	3,917.7	4,218.9
LumberWood	217.3	438.4	664.5	896.2	1,133.3	1,375.9	1,625.0	1,880.6	2,142.1	2,409.3	2,682.8	2,963.5	3,249.6	3,540.8	3,837.3	4,138.5	4,443.9	4,674.1	4,910.6	5,009.3	5,113.2
Process Heating	214.1	431.1	651.7	876.3	1,104.2	1,335.4	1,570.4	1,809.3	2,051.5	2,296.9	2,546.3	2,800.7	3,058.9	3,320.5	3,586.2	3,855.5	4,128.1	4,324.8	4,526.6	4,594.1	4,666.0
Space Heating	3.2	7.3	12.8	19.9	29.1	40.5	54.6	71.2	90.6	112.4	136.5	162.7	190.8	220.3	251.1	283.0	315.8	349.3	383.9	415.2	447.2
MetalsFab	1,722.7	3,472.2	5,255.5	7,077.3	8,933.8	10,825.6	12,757.8	14,731.6	16,742.1	18,787.6	20,874.7	23,010.0	25,181.9	27,387.9	29,631.0	31,907.4	34,214.1	35,622.6	37,076.6	37,738.7	38,438.7
Process Heating	1,710.3	3,443.5	5,205.3	6,999.0	8,819.4	10,666.2	12,543.3	14,451.4	16,385.9	18,345.7	20,338.0	22,370.0	24,431.7	26,521.6	28,643.5	30,794.4	32,972.1	34,249.0	35,566.6	36,105.7	36,680.2
Space Heating	12.4	28.7	50.2	78.3	114.3	159.4	214.5	280.2	356.2	441.9	536.7	640.0	750.2	866.3	987.5	1,113.0	1,242.0	1,373.6	1,509.9	1,633.0	1,758.5
Other	2,910.7	5,866.4	8,879.1	11,956.7	15,092.6	18,288.0	21,551.3	24,884.5	28,279.5	31,733.2	35,257.0	38,862.0	42,528.7	46,252.7	50,039.1	53,881.9	57,775.7	60,301.5	62,904.1	64,019.1	65,198.0
Process Heating	2,890.1	5,818.8	8,795.9	11,826.8	14,903.0	18,023.6	21,195.6	24,419.8	27,688.8	31,000.4	34,367.0	37,800.6	41,284.5	44,816.1	48,401.5	52,036.2	55,716.1	58,023.7	60,400.0	61,311.0	62,281.7
Space Heating	20.6	47.6	83.3	129.9	189.6	264.4	355.8	464.7	590.7	732.8	890.0	1,061.3	1,244.2	1,436.6	1,637.6	1,845.7	2,059.6	2,277.9	2,504.0	2,708.0	2,916.3
PaperMfg	286.7	577.9	874.6	1,177.7	1,486.5	1,801.0	2,122.2	2,450.2	2,784.2	3,123.9	3,470.5	3,825.0	4,185.5	4,551.6	4,923.8	5,301.6	5,684.4	5,889.1	6,101.3	6,210.2	6,325.5
Process Heating	284.8	573.4	866.8	1,165.5	1,468.6	1,776.2	2,088.8	2,406.5	2,728.6	3,055.0	3,386.8	3,725.1	4,068.5	4,416.5	4,769.8	5,128.0	5,490.6	5,674.8	5,865.7	5,955.5	6,051.2
Space Heating	1.9	4.5	7.8	12.2	17.8	24.9	33.5	43.7	55.6	68.9	83.7	99.8	117.0	135.1	154.0	173.6	193.7	214.3	235.5	254.7	274.3
StoneClayGlass	848.3	1,709.0	2,585.5	3,479.8	4,389.8	5,315.5	6,259.4	7,221.8	8,200.4	9,194.6	10,207.6	11,242.8	12,294.8	13,362.6	14,447.7	15,548.6	16,663.7	17,396.4	18,150.7	18,454.9	18,777.4
Process Heating	844.4	1,700.1	2,570.0	3,455.6	4,354.4	5,266.2	6,193.0	7,135.0	8,090.2	9,057.8	10,041.4	11,044.7	12,062.6	13,094.4	14,142.0	15,204.0	16,279.2	16,971.2	17,683.3	17,949.4	18,233.1
Space Heating	3.9	8.9	15.5	24.2	35.4	49.3	66.4	86.7	110.3	136.8	166.1	198.1	232.2	268.2	305.7	344.5	384.5	425.2	467.4	505.5	544.4
Grand Total	8,671.0	17,479.0	26,461.4	35,642.1	45,003.1	54,548.6	64,304.9	74,277.7	84,443.3	94,791.7	105,356.4	116,169.7	127,172.5	138,350.9	149,719.3	161,258.8	172,953.1	180,205.1	187,689.0	191,110.4	194,723.9

C-50: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #50)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	10,837.9	21,740.9	32,830.8	44,128.7	55,230.2	66,504.0	77,671.3	89,039.3	100,574.3	112,010.7	123,657.7	135,559.9	147,655.0	159,562.4	171,089.5	182,805.2	194,693.8	204,405.5	214,372.8	221,048.7	227,932.9
Process Heating	7,811.7	15,660.5	23,644.7	31,779.5	40,041.9	48,429.1	56,655.2	65,026.7	73,523.0	82,137.9	90,905.1	99,856.7	108,948.0	118,171.4	127,543.6	137,052.1	146,685.7	154,157.3	161,812.9	166,632.2	171,612.6
Space Heating	3,026.2	6,080.4	9,186.1	12,349.2	15,188.3	18,074.9	21,016.0	24,012.6	27,051.4	29,872.9	32,752.6	35,703.2	38,707.0	41,391.0	43,546.0	45,753.1	48,008.1	50,248.2	52,560.0	54,416.5	56,320.2
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LumberWood	1,125.8	2,257.0	3,407.7	4,580.1	5,731.4	6,900.8	8,052.9	9,225.9	10,416.3	11,596.0	12,797.7	14,025.9	15,274.3	16,502.5	17,689.9	18,897.1	20,122.2	21,243.2	22,390.7	23,134.0	23,898.8
Process Heating	805.1	1,612.6	2,434.1	3,271.3	4,121.7	4,985.1	5,825.5	6,680.9	7,549.3	8,430.0	9,326.4	10,242.0	11,172.0	12,115.6	13,074.7	14,047.9	15,034.1	15,917.7	16,820.2	17,366.7	17,929.8
Space Heating	320.7	644.4	973.6	1,308.8	1,609.7	1,915.7	2,227.4	2,545.0	2,867.0	3,166.1	3,471.3	3,784.0	4,102.4	4,386.8	4,615.2	4,849.1	5,088.1	5,325.5	5,570.5	5,767.3	5,969.1
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MetalsFab	6,635.4	13,305.3	20,090.0	27,002.4	33,867.8	40,839.0	47,709.6	54,703.4	61,800.8	68,889.4	76,107.3	83,481.6	90,974.4	98,424.9	105,757.4	113,205.6	120,759.9	127,055.9	133,508.3	137,695.1	142,012.4
Process Heating	5,374.1	10,771.0	16,261.1	21,855.2	27,537.1	33,305.2	38,949.9	44,694.7	50,525.5	56,438.2	62,455.7	68,600.2	74,841.0	81,172.8	87,607.1	94,135.3	100,749.7	106,112.0	111,600.9	115,013.9	118,537.8
Space Heating	1,261.4	2,534.4	3,828.9	5,147.2	6,330.6	7,533.8	8,759.7	10,008.7	11,275.2	12,451.3	13,651.6	14,881.4	16,133.4	17,252.1	18,150.3	19,070.3	20,010.1	20,943.8	21,907.4	22,681.2	23,474.7
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	11,712.0	23,480.1	35,451.1	47,647.9	59,778.6	72,096.5	84,212.8	96,546.9	109,064.4	121,578.3	134,320.5	147,339.3	160,567.3	173,737.4	186,725.4	199,917.9	213,298.0	224,771.6	236,521.2	244,057.2	251,824.0
Process Heating	9,619.4	19,275.5	29,098.8	39,108.4	49,275.7	59,597.4	69,679.8	79,941.7	90,357.8	100,920.4	111,671.2	122,649.4	133,800.1	145,113.9	156,611.4	168,277.2	180,097.5	190,022.5	200,173.9	206,426.4	212,877.1
Space Heating	2,091.8	4,202.9	6,349.6	8,536.0	10,498.5	12,493.7	14,526.7	16,598.0	18,698.4	20,648.7	22,639.2	24,678.7	26,755.0	28,610.3	30,099.8	31,625.4	33,184.1	34,732.4	36,330.4	37,613.6	38,929.5
Water Heating	0.9	1.7	2.6	3.5	4.4	5.3	6.3	7.2	8.2	9.1	10.1	11.1	12.2	13.2	14.3	15.3	16.4	16.7	16.9	17.2	17.5
PaperMfg	989.4	1,984.8	2,997.2	4,028.6	5,051.9	6,090.9	7,118.7	8,164.9	9,226.5	10,285.9	11,364.6	12,466.6	13,586.2	14,698.3	15,791.2	16,901.3	18,027.1	18,901.6	19,799.5	20,396.4	21,012.7
Process Heating	792.7	1,589.4	2,399.9	3,225.7	4,064.4	4,915.7	5,752.3	6,603.6	7,467.6	8,343.6	9,235.1	10,145.2	11,069.5	12,007.2	12,959.9	13,926.5	14,905.8	15,634.6	16,382.1	16,858.3	17,350.9
Space Heating	196.8	395.3	597.3	802.9	987.5	1,175.2	1,366.4	1,561.2	1,758.8	1,942.3	2,129.5	2,321.3	2,516.6	2,691.2	2,831.3	2,974.8	3,121.4	3,267.0	3,417.3	3,538.0	3,661.8
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
StoneClayGlass	3,264.8	6,543.7	9,879.2	13,277.8	16,681.8	20,138.1	23,527.8	26,978.4	30,480.5	33,998.4	37,580.0	41,238.8	44,956.0	48,680.7	52,392.0	56,160.4	59,981.1	63,272.3	66,640.3	68,764.1	70,953.2
Process Heating	2,874.3	5,759.1	8,693.9	11,684.4	14,722.1	17,805.9	20,816.2	23,880.1	26,990.1	30,144.0	33,354.1	36,632.1	39,961.7	43,340.1	46,773.4	50,257.0	53,786.8	56,788.9	59,858.7	61,742.9	63,686.4
Space Heating	390.5	784.5	1,185.3	1,593.4	1,959.7	2,332.2	2,711.6	3,098.3	3,490.4	3,854.4	4,226.0	4,606.7	4,994.3	5,340.6	5,618.6	5,903.4	6,194.3	6,483.4	6,781.6	7,021.2	7,266.8
Water Heating	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total	34,565.4	69,311.8	104,655.9	140,665.5	176,341.8	212,569.2	248,293.0	284,658.8	321,562.8	358,358.8	395,827.8	434,112.1	473,013.3	511,606.2	549,445.5	587,887.5	626,882.1	659,650.1	693,232.8	715,095.5	737,634.1

C-51: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #51)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	6,693.9	13,442.9	20,306.4	27,297.2	34,053.8	40,915.7	47,898.8	55,005.0	62,216.8	69,529.1	76,970.6	84,569.0	92,285.8	100,114.7	107,504.2	115,009.5	122,620.9	128,056.0	133,649.5	135,885.7	138,260.0
Process Heating	5,175.1	10,394.3	15,701.9	21,107.8	26,596.7	32,166.8	37,830.5	43,589.4	49,429.8	55,347.8	61,365.6	67,504.7	73,735.1	80,052.1	86,466.8	92,970.9	99,557.0	103,949.8	108,465.1	110,108.1	111,857.9
Space Heating	1,518.8	3,048.6	4,604.5	6,189.4	7,457.1	8,748.9	10,068.2	11,415.6	12,787.0	14,181.3	15,605.0	17,064.4	18,550.7	20,062.5	21,037.4	22,038.6	23,063.9	24,106.2	25,184.4	25,777.6	26,402.0
LumberWood	638.5	1,281.5	1,935.5	2,601.6	3,241.9	3,892.3	4,554.3	5,228.0	5,911.9	6,605.4	7,311.3	8,032.2	8,764.5	9,507.4	10,202.5	10,908.7	11,625.1	12,236.8	12,863.5	13,078.4	13,306.4
Process Heating	477.6	958.4	1,447.5	1,945.6	2,451.5	2,965.0	3,487.2	4,018.1	4,556.7	5,102.4	5,657.4	6,223.6	6,798.3	7,381.1	7,972.9	8,572.9	9,180.6	9,681.8	10,194.3	10,346.3	10,508.2
Space Heating	161.0	323.1	488.0	656.0	790.4	927.3	1,067.1	1,209.9	1,355.3	1,503.0	1,653.9	1,808.6	1,966.1	2,126.4	2,229.7	2,335.8	2,444.5	2,554.9	2,669.2	2,732.1	2,798.3
MetalsFab	4,084.0	8,200.5	12,386.9	16,651.0	20,838.4	25,090.2	29,415.9	33,816.8	38,282.3	42,809.0	47,414.7	52,116.2	56,889.9	61,732.1	66,415.7	71,169.9	75,988.9	79,540.3	83,188.1	84,531.8	85,959.6
Process Heating	3,450.9	6,929.8	10,467.6	14,071.2	17,730.2	21,443.5	25,219.3	29,058.6	32,952.4	36,898.0	40,910.3	45,003.5	49,157.7	53,369.7	57,646.9	61,983.9	66,375.5	69,492.4	72,690.8	73,787.2	74,954.8
Space Heating	633.1	1,270.7	1,919.2	2,579.8	3,108.3	3,646.7	4,196.6	4,758.2	5,329.9	5,911.0	6,504.4	7,112.7	7,732.3	8,362.4	8,768.7	9,186.1	9,613.4	10,047.9	10,497.3	10,744.5	11,004.8
Other	7,066.5	14,186.8	21,428.2	28,804.3	36,058.1	43,423.4	50,916.8	58,540.5	66,275.9	74,117.6	82,096.0	90,240.2	98,509.6	106,897.5	115,028.1	123,281.0	131,646.1	138,085.2	144,691.4	147,014.0	149,482.4
Process Heating	6,016.6	12,079.5	18,245.4	24,526.0	30,903.5	37,375.9	43,957.3	50,649.6	57,437.1	64,315.0	71,309.3	78,444.7	85,686.7	93,029.6	100,486.3	108,047.2	115,703.6	121,422.2	127,283.0	129,195.7	131,232.4
Space Heating	1,049.9	2,107.3	3,182.8	4,278.3	5,154.6	6,047.5	6,959.5	7,890.8	8,838.8	9,802.6	10,786.7	11,795.5	12,822.9	13,867.9	14,541.7	15,233.8	15,942.5	16,663.0	17,408.3	17,818.3	18,250.0
PaperMfg	638.2	1,282.0	1,936.6	2,603.4	3,258.2	3,923.0	4,599.3	5,287.4	5,985.5	6,693.1	7,413.1	8,148.1	8,894.3	9,651.1	10,383.3	11,126.4	11,879.7	12,380.7	12,896.7	13,106.5	13,329.4
Process Heating	539.5	1,083.8	1,637.2	2,201.0	2,773.3	3,354.1	3,944.7	4,545.1	5,154.1	5,771.1	6,398.5	7,038.5	7,688.1	8,346.7	9,015.4	9,693.5	10,380.1	10,813.3	11,259.3	11,430.4	11,612.8
Space Heating	98.8	198.2	299.4	402.4	484.9	568.8	654.6	742.2	831.4	922.1	1,014.6	1,109.5	1,206.2	1,304.4	1,367.8	1,432.9	1,499.6	1,567.4	1,637.5	1,676.0	1,716.6
StoneClayGlass	1,975.8	3,966.5	5,991.0	8,053.3	10,103.2	12,184.4	14,301.4	16,454.9	18,639.6	20,854.0	23,106.7	25,405.7	27,739.8	30,107.0	32,438.6	34,804.4	37,201.6	39,060.4	40,965.9	41,608.4	42,291.6
Process Heating	1,779.9	3,573.1	5,396.9	7,254.6	9,141.0	11,055.5	13,002.3	14,981.9	16,989.7	19,024.2	21,093.1	23,203.9	25,346.2	27,518.3	29,724.1	31,960.7	34,225.7	35,950.0	37,716.4	38,282.3	38,885.0
Space Heating	196.0	393.4	594.1	798.6	962.2	1,128.9	1,299.1	1,473.0	1,649.9	1,829.8	2,013.5	2,201.8	2,393.6	2,588.7	2,714.4	2,843.6	2,975.9	3,110.4	3,249.5	3,326.1	3,406.6
Grand Total	21,096.9	42,360.2	63,984.6	86,010.8	107,553.7	129,429.0	151,686.5	174,332.5	197,312.0	220,608.4	244,312.4	268,511.5	293,083.8	318,009.9	341,972.3	366,299.9	390,962.3	409,359.4	428,255.3	435,224.7	442,629.3

C-52: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #52)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,081.8	4,214.8	6,416.2	8,701.0	10,931.5	13,264.3	15,717.5	18,301.9	21,016.8	23,860.0	26,837.9	29,953.6	33,180.9	36,506.4	39,688.1	42,950.5	46,282.1	48,730.6	51,264.3	53,096.6	54,998.8
Process Heating	1,641.8	3,322.4	5,055.1	6,850.8	8,713.8	10,653.3	12,682.8	14,810.1	17,034.4	19,354.1	21,774.4	24,297.9	26,905.0	29,585.6	32,337.0	35,149.3	38,013.9	39,980.0	42,011.1	43,351.9	44,746.2
Space Heating	440.1	892.4	1,361.2	1,850.2	2,217.7	2,611.0	3,034.7	3,491.8	3,982.3	4,505.8	5,063.5	5,655.7	6,276.0	6,920.8	7,351.1	7,801.2	8,268.2	8,750.6	9,253.2	9,744.7	10,252.5
LumberWood	181.1	367.4	560.7	762.7	959.2	1,166.7	1,387.4	1,622.6	1,872.3	2,136.3	2,415.0	2,708.7	3,014.5	3,330.8	3,632.0	3,941.6	4,258.4	4,534.9	4,820.0	5,016.7	5,220.4
Process Heating	134.5	272.8	416.5	566.6	724.1	890.0	1,065.8	1,252.5	1,450.2	1,658.7	1,878.4	2,109.3	2,349.3	2,597.3	2,852.9	3,114.8	3,382.1	3,607.5	3,839.3	3,983.9	4,133.7
Space Heating	46.6	94.6	144.3	196.1	235.0	276.7	321.6	370.1	422.1	477.6	536.7	599.4	665.2	733.5	779.1	826.8	876.3	927.5	980.7	1,032.8	1,086.6
MetalsFab	1,244.9	2,521.5	3,840.5	5,211.5	6,578.7	8,010.4	9,517.9	11,108.3	12,781.2	14,535.4	16,374.6	18,300.3	20,296.3	22,353.9	24,371.2	26,438.8	28,549.5	30,147.6	31,798.4	32,938.2	34,120.9
Process Heating	1,061.5	2,149.5	3,273.1	4,440.3	5,654.4	6,922.1	8,253.0	9,652.8	11,121.3	12,657.3	14,264.0	15,942.9	17,680.4	19,469.2	21,307.1	23,187.1	25,103.2	26,500.2	27,941.5	28,876.4	29,847.5
Space Heating	183.4	372.0	567.4	771.2	924.4	1,088.3	1,264.9	1,455.4	1,659.9	1,878.1	2,110.6	2,357.4	2,615.9	2,884.7	3,064.1	3,251.7	3,446.3	3,647.4	3,856.9	4,061.8	4,273.4
Other	2,104.2	4,264.1	6,498.9	8,825.7	11,153.5	13,596.7	16,176.0	18,904.0	21,780.8	24,804.0	27,979.9	31,310.3	34,766.7	38,333.1	41,839.8	45,435.6	49,107.8	52,007.6	54,999.6	57,031.4	59,138.2
Process Heating	1,800.0	3,647.3	5,558.0	7,546.8	9,620.5	11,791.9	14,078.3	16,490.3	19,028.0	21,689.4	24,479.8	27,401.0	30,428.5	33,549.3	36,758.4	40,043.2	43,392.6	45,958.9	48,603.5	50,295.5	52,051.3
Space Heating	304.2	616.9	940.9	1,278.9	1,532.9	1,804.8	2,097.7	2,413.7	2,752.7	3,114.6	3,500.1	3,909.4	4,338.2	4,783.9	5,081.4	5,392.5	5,715.2	6,048.7	6,396.1	6,735.9	7,086.9
PaperMfg	204.2	413.1	628.4	851.4	1,073.3	1,304.4	1,546.5	1,800.5	2,066.2	2,343.5	2,633.0	2,935.1	3,247.3	3,568.5	3,882.9	4,204.7	4,532.9	4,757.9	4,990.8	5,157.2	5,330.1
Process Heating	175.6	355.1	539.9	731.1	929.1	1,134.6	1,349.2	1,573.4	1,807.3	2,050.5	2,303.8	2,567.3	2,839.3	3,118.5	3,404.9	3,697.5	3,995.3	4,188.9	4,389.2	4,523.6	4,663.5
Space Heating	28.6	58.0	88.5	120.3	144.2	169.8	197.3	227.0	258.9	293.0	329.2	367.7	408.1	450.0	478.0	507.2	537.6	569.0	601.6	633.6	666.6
StoneClayGlass	583.5	1,182.6	1,802.8	2,448.9	3,104.9	3,793.5	4,520.6	5,289.9	6,101.3	6,954.3	7,850.4	8,790.3	9,765.8	10,772.4	11,777.8	12,808.4	13,860.5	14,696.9	15,559.2	16,130.3	16,722.4
Process Heating	526.7	1,067.4	1,627.2	2,210.2	2,818.7	3,456.6	4,129.1	4,839.4	5,587.5	6,372.9	7,197.1	8,060.6	8,956.0	9,879.4	10,829.3	11,801.9	12,793.7	13,567.8	14,365.3	14,872.9	15,399.5
Space Heating	56.8	115.1	175.6	238.7	286.1	336.9	391.6	450.5	513.8	581.4	653.3	729.8	809.8	893.0	948.5	1,006.6	1,066.8	1,129.1	1,193.9	1,257.4	1,322.9
Grand Total	6,399.7	12,963.5	19,747.5	26,801.3	33,801.0	41,136.1	48,866.0	57,027.2	65,618.5	74,633.5	84,090.8	93,998.3	104,271.5	114,865.2	125,191.8	135,779.6	146,591.3	154,875.6	163,432.4	169,370.4	175,530.8

C-53: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #53)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,424.4	4,925.6	7,529.5	10,258.2	13,121.9	16,136.2	19,320.6	22,683.1	26,215.6	29,908.6	33,764.4	37,783.2	41,931.5	46,192.4	50,264.6	54,429.9	58,675.6	61,797.3	65,025.9	67,312.8	69,683.2
Process Heating	2,089.9	4,240.2	6,470.7	8,798.2	11,229.1	13,774.7	16,450.1	19,261.0	22,200.9	25,262.5	28,448.8	31,761.6	35,174.2	38,674.3	42,259.3	45,917.7	49,639.8	52,225.7	54,897.2	56,662.1	58,494.5
Space Heating	334.4	685.4	1,058.8	1,460.0	1,892.8	2,361.5	2,870.6	3,422.1	4,014.7	4,646.1	5,315.5	6,021.7	6,757.3	7,518.1	8,005.3	8,512.2	9,035.8	9,571.6	10,128.7	10,650.7	11,188.7
LumberWood	208.2	424.5	651.7	892.3	1,147.7	1,419.8	1,710.7	2,021.5	2,351.2	2,698.9	3,064.4	3,447.6	3,844.7	4,254.0	4,643.1	5,042.0	5,449.2	5,803.7	6,169.1	6,416.2	6,671.6
Process Heating	172.8	351.9	539.5	737.5	947.1	1,169.5	1,406.5	1,658.8	1,925.7	2,206.5	2,501.1	2,809.3	3,128.5	3,457.1	3,794.7	4,139.8	4,491.5	4,789.3	5,095.6	5,287.3	5,485.7
Space Heating	35.4	72.6	112.2	154.7	200.6	250.3	304.2	362.7	425.5	492.4	563.4	638.2	716.2	796.8	848.5	902.2	957.7	1,014.5	1,073.5	1,128.8	1,185.9
MetalsFab	1,493.8	3,036.2	4,643.6	6,330.2	8,102.7	9,971.2	11,948.1	14,038.5	16,237.4	18,538.7	20,943.6	23,452.1	26,042.7	28,704.8	31,311.5	33,977.2	36,693.6	38,756.9	40,887.5	42,338.5	43,841.9
Process Heating	1,354.4	2,750.5	4,202.3	5,721.6	7,313.7	8,986.9	10,751.6	12,612.1	14,564.0	16,602.1	18,728.0	20,942.1	23,226.1	25,571.1	27,974.8	30,429.2	32,927.3	34,767.3	36,665.7	37,899.1	39,178.2
Space Heating	139.4	285.7	441.3	608.6	789.0	984.3	1,196.5	1,426.4	1,673.4	1,936.6	2,215.6	2,509.9	2,816.6	3,133.7	3,336.7	3,548.0	3,766.3	3,989.6	4,221.8	4,439.4	4,663.7
Other	2,532.9	5,152.2	7,887.3	10,763.8	13,794.8	16,998.8	20,398.0	24,001.8	27,801.5	31,786.2	35,957.0	40,313.0	44,816.2	49,447.1	53,994.5	58,646.5	63,388.3	67,142.0	71,014.3	73,611.4	76,300.4
Process Heating	2,301.7	4,678.4	7,155.4	9,754.6	12,486.4	15,366.5	18,413.8	21,636.4	25,026.4	28,574.6	32,282.7	36,150.6	40,145.3	44,250.3	48,461.0	52,762.6	57,142.4	60,525.8	64,013.0	66,249.2	68,566.3
Space Heating	231.2	473.8	731.9	1,009.2	1,308.4	1,632.3	1,984.2	2,365.5	2,775.1	3,211.5	3,674.3	4,162.4	4,670.9	5,196.8	5,533.5	5,883.9	6,245.9	6,616.2	7,001.3	7,362.1	7,734.0
PaperMfg	244.8	496.8	758.3	1,031.3	1,316.7	1,615.8	1,930.3	2,261.1	2,607.2	2,967.9	3,343.4	3,734.0	4,136.5	4,549.4	4,953.0	5,365.4	5,785.3	6,074.5	6,373.8	6,584.2	6,802.6
Process Heating	223.1	452.2	689.4	936.4	1,193.6	1,462.2	1,743.7	2,038.6	2,346.2	2,665.8	2,997.8	3,342.5	3,697.1	4,060.5	4,432.5	4,811.9	5,197.8	5,452.1	5,715.2	5,891.7	6,075.1
Space Heating	21.7	44.6	68.8	94.9	123.1	153.5	186.6	222.5	261.0	302.1	345.6	391.5	439.4	488.8	520.5	553.5	587.5	622.3	658.6	692.5	727.5
StoneClayGlass	717.2	1,459.0	2,233.7	3,048.7	3,907.7	4,815.9	5,779.7	6,801.7	7,879.5	9,010.0	10,193.6	11,429.8	12,707.9	14,022.3	15,333.1	16,673.6	18,039.6	19,129.7	20,253.6	20,992.3	21,757.1
Process Heating	674.1	1,370.6	2,097.1	2,860.3	3,663.4	4,511.2	5,409.3	6,360.1	7,361.5	8,410.6	9,507.7	10,652.8	11,836.0	13,052.2	14,300.2	15,575.2	16,873.7	17,894.7	18,946.6	19,618.0	20,313.5
Space Heating	43.2	88.4	136.6	188.4	244.2	304.7	370.4	441.6	518.0	599.5	685.9	777.0	871.9	970.1	1,032.9	1,098.3	1,165.9	1,235.0	1,306.9	1,374.3	1,443.7
Grand Total	7,621.2	15,494.3	23,704.2	32,324.5	41,391.5	50,957.7	61,087.5	71,807.7	83,092.5	94,910.2	107,266.4	120,159.6	133,479.4	147,169.8	160,499.8	174,134.5	188,031.6	198,704.2	209,724.1	217,255.3	225,056.8

C-54: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #54)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	3,077.6	6,205.1	9,396.2	12,660.0	15,990.4	19,389.4	22,866.7	26,424.3	30,054.0	33,751.9	37,529.6	41,398.4	45,336.8	49,339.5	53,015.2	56,753.2	60,547.2	62,804.9	65,146.5	66,403.9	67,730.2
Process Heating	2,655.4	5,346.3	8,081.6	10,866.4	13,692.8	16,560.1	19,474.4	22,436.8	25,440.4	28,483.1	31,576.3	34,731.1	37,932.1	41,176.9	44,471.2	47,810.7	51,191.8	53,026.0	54,923.4	55,760.4	56,652.2
Space Heating	422.2	858.8	1,314.6	1,793.6	2,297.6	2,829.4	3,392.2	3,987.5	4,613.6	5,268.7	5,953.3	6,667.3	7,404.7	8,162.6	8,544.1	8,942.4	9,355.4	9,778.9	10,223.1	10,643.5	11,078.0
LumberWood	258.9	522.1	791.0	1,066.4	1,347.7	1,635.3	1,930.0	2,231.9	2,540.5	2,855.3	3,177.3	3,507.4	3,843.7	4,185.7	4,491.7	4,803.3	5,119.7	5,361.3	5,610.1	5,722.2	5,840.2
Process Heating	214.1	431.1	651.7	876.3	1,104.2	1,335.4	1,570.4	1,809.3	2,051.5	2,296.9	2,546.3	2,800.7	3,058.9	3,320.5	3,586.2	3,855.5	4,128.1	4,324.8	4,526.6	4,594.1	4,666.0
Space Heating	44.7	91.0	139.3	190.1	243.5	299.9	359.5	422.6	489.0	558.4	631.0	706.6	784.8	865.1	905.6	947.8	991.6	1,036.4	1,083.5	1,128.1	1,174.1
MetalsFab	1,886.3	3,801.4	5,753.2	7,746.6	9,777.1	11,845.5	13,957.2	16,113.4	18,309.0	20,541.8	22,819.4	25,149.0	27,518.1	29,924.0	32,204.8	34,521.8	36,871.6	38,325.0	39,827.8	40,542.1	41,297.7
Process Heating	1,710.3	3,443.5	5,205.3	6,999.0	8,819.4	10,666.2	12,543.3	14,451.4	16,385.9	18,345.7	20,338.0	22,370.0	24,431.7	26,521.6	28,643.5	30,794.4	32,972.1	34,249.0	35,566.6	36,105.7	36,680.2
Space Heating	176.0	358.0	547.9	747.6	957.7	1,179.3	1,413.9	1,662.1	1,923.0	2,196.1	2,481.4	2,779.0	3,086.4	3,402.3	3,561.3	3,727.4	3,899.5	4,076.0	4,261.2	4,436.4	4,617.5
Other	3,181.9	6,412.4	9,704.6	13,066.6	16,491.2	19,979.4	23,540.4	27,176.1	30,877.9	34,642.4	38,482.1	42,409.3	46,402.9	50,458.4	54,307.5	58,217.5	62,182.8	64,783.2	67,466.6	68,668.1	69,939.2
Process Heating	2,890.1	5,818.8	8,795.9	11,826.8	14,903.0	18,023.6	21,195.6	24,419.8	27,688.8	31,000.4	34,367.0	37,800.6	41,284.5	44,816.1	48,401.5	52,036.2	55,716.1	58,023.7	60,400.0	61,311.0	62,281.7
Space Heating	291.8	593.6	908.7	1,239.8	1,588.2	1,955.7	2,344.8	2,756.3	3,189.1	3,641.9	4,115.1	4,608.6	5,118.4	5,642.3	5,905.9	6,181.3	6,466.8	6,759.5	7,066.5	7,357.1	7,657.5
PaperMfg	312.3	629.3	952.3	1,282.1	1,618.0	1,960.1	2,309.3	2,665.8	3,028.6	3,397.6	3,773.8	4,158.6	4,549.9	4,947.2	5,325.3	5,709.4	6,098.9	6,310.6	6,530.4	6,647.5	6,771.4
Process Heating	284.8	573.4	866.8	1,165.5	1,468.6	1,776.2	2,088.8	2,406.5	2,728.6	3,055.0	3,386.8	3,725.1	4,068.5	4,416.5	4,769.8	5,128.0	5,490.6	5,674.8	5,865.7	5,955.5	6,051.2
Space Heating	27.5	55.8	85.5	116.6	149.4	184.0	220.6	259.3	300.0	342.6	387.1	433.5	481.4	530.7	555.5	581.4	608.3	635.8	664.7	692.0	720.3
StoneClayGlass	898.9	1,810.9	2,739.6	3,687.0	4,650.8	5,631.2	6,630.7	7,649.5	8,685.5	9,737.6	10,809.6	11,904.9	13,018.0	14,147.7	15,244.5	16,357.9	17,486.3	18,233.0	19,002.4	19,322.8	19,662.4
Process Heating	844.4	1,700.1	2,570.0	3,455.6	4,354.4	5,266.2	6,193.0	7,135.0	8,090.2	9,057.8	10,041.4	11,044.7	12,062.6	13,094.4	14,142.0	15,204.0	16,279.2	16,971.2	17,683.3	17,949.4	18,233.1
Space Heating	54.5	110.8	169.6	231.4	296.5	365.1	437.7	514.5	595.3	679.8	768.2	860.3	955.4	1,053.2	1,102.4	1,153.8	1,207.1	1,261.8	1,319.1	1,373.3	1,429.4
Grand Total	9,615.8	19,381.3	29,337.0	39,508.6	49,875.3	60,440.9	71,234.2	82,261.1	93,495.5	104,926.5	116,591.8	128,527.7	140,669.4	153,002.4	164,589.0	176,363.0	188,306.6	195,817.9	203,583.8	207,306.6	211,241.1

C-55: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #55)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,841.4	3,711.4	5,617.7	7,565.7	9,551.9	11,578.1	13,650.7	15,772.1	17,938.3	20,147.8	22,408.0	24,725.7	27,087.9	29,491.0	31,699.9	33,947.6	36,230.2	37,593.9	39,007.3	39,776.6	40,588.4
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	247.5	502.3	766.7	1,043.0	1,332.7	1,637.8	1,961.1	2,304.4	2,667.6	3,050.7	3,454.2	3,878.2	4,319.0	4,774.4	5,005.9	5,249.1	5,502.2	5,764.5	6,038.6	6,305.5	6,582.0
LumberWood	154.7	312.0	472.4	636.5	803.9	975.0	1,150.4	1,330.1	1,514.0	1,701.8	1,894.3	2,091.9	2,293.6	2,498.9	2,682.8	2,870.2	3,060.7	3,206.5	3,356.7	3,425.5	3,498.0
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	26.2	53.2	81.3	110.5	141.3	173.6	207.9	244.2	282.7	323.3	366.1	411.0	457.8	506.0	530.6	556.3	583.2	611.0	640.0	668.3	697.6
MetalsFab	1,129.8	2,276.2	3,443.9	4,635.7	5,849.2	7,084.8	8,346.3	9,634.6	10,947.2	12,283.2	13,647.2	15,043.6	16,464.9	17,909.1	19,279.2	20,671.6	22,084.2	22,960.2	23,865.5	24,300.4	24,760.4
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	103.2	209.4	319.6	434.8	555.5	682.7	817.4	960.5	1,111.9	1,271.6	1,439.8	1,616.5	1,800.2	1,990.1	2,086.6	2,187.9	2,293.4	2,402.7	2,517.0	2,628.2	2,743.5
Other	1,905.7	3,839.6	5,809.3	7,819.5	9,866.1	11,950.0	14,077.3	16,249.8	18,463.0	20,715.4	23,015.0	25,369.0	27,764.7	30,199.2	32,511.2	34,860.8	37,244.4	38,811.1	40,427.2	41,158.5	41,932.2
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	171.1	347.2	529.9	721.0	921.2	1,132.1	1,355.6	1,592.8	1,844.0	2,108.8	2,387.7	2,680.8	2,985.5	3,300.2	3,460.3	3,628.3	3,803.3	3,984.6	4,174.1	4,358.6	4,549.7
PaperMfg	187.1	376.9	570.2	767.4	968.2	1,172.7	1,381.3	1,594.4	1,811.4	2,032.2	2,257.6	2,488.2	2,723.0	2,961.5	3,188.7	3,419.5	3,653.6	3,781.3	3,913.8	3,985.0	4,060.4
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	16.1	32.7	49.8	67.8	86.7	106.5	127.5	149.8	173.4	198.4	224.6	252.2	280.8	310.4	325.5	341.3	357.7	374.8	392.6	410.0	428.0
StoneClayGlass	538.8	1,085.2	1,641.4	2,208.6	2,785.5	3,372.1	3,970.0	4,579.8	5,199.9	5,830.1	6,472.5	7,129.4	7,797.2	8,475.3	9,133.9	9,802.7	10,480.7	10,930.0	11,392.8	11,587.0	11,792.9
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	31.9	64.8	98.9	134.6	172.0	211.3	253.0	297.3	344.2	393.6	445.7	500.4	557.3	616.0	645.9	677.3	709.9	743.8	779.2	813.6	849.3
Grand Total	5,757.5	11,601.3	17,554.9	23,633.4	29,824.8	36,132.7	42,576.0	49,160.8	55,873.8	62,710.5	69,694.6	76,847.9	84,131.2	91,535.0	98,495.7	105,572.5	112,753.9	117,283.0	121,963.3	124,233.0	126,632.2

C-56: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #56)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,841.4	3,711.4	5,617.7	7,565.7	9,551.9	11,578.1	13,650.7	15,772.1	17,938.3	20,147.8	22,408.0	24,725.7	27,087.9	29,491.0	31,699.9	33,947.6	36,230.2	37,593.9	39,007.3	39,776.6	40,588.4
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	247.5	502.3	766.7	1,043.0	1,332.7	1,637.8	1,961.1	2,304.4	2,667.6	3,050.7	3,454.2	3,878.2	4,319.0	4,774.4	5,005.9	5,249.1	5,502.2	5,764.5	6,038.6	6,305.5	6,582.0
LumberWood	154.7	312.0	472.4	636.5	803.9	975.0	1,150.4	1,330.1	1,514.0	1,701.8	1,894.3	2,091.9	2,293.6	2,498.9	2,682.8	2,870.2	3,060.7	3,206.5	3,356.7	3,425.5	3,498.0
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	26.2	53.2	81.3	110.5	141.3	173.6	207.9	244.2	282.7	323.3	366.1	411.0	457.8	506.0	530.6	556.3	583.2	611.0	640.0	668.3	697.6
MetalsFab	1,129.8	2,276.2	3,443.9	4,635.7	5,849.2	7,084.8	8,346.3	9,634.6	10,947.2	12,283.2	13,647.2	15,043.6	16,464.9	17,909.1	19,279.2	20,671.6	22,084.2	22,960.2	23,865.5	24,300.4	24,760.4
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	103.2	209.4	319.6	434.8	555.5	682.7	817.4	960.5	1,111.9	1,271.6	1,439.8	1,616.5	1,800.2	1,990.1	2,086.6	2,187.9	2,293.4	2,402.7	2,517.0	2,628.2	2,743.5
Other	1,905.7	3,839.6	5,809.3	7,819.5	9,866.1	11,950.0	14,077.3	16,249.8	18,463.0	20,715.4	23,015.0	25,369.0	27,764.7	30,199.2	32,511.2	34,860.8	37,244.4	38,811.1	40,427.2	41,158.5	41,932.2
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	171.1	347.2	529.9	721.0	921.2	1,132.1	1,355.6	1,592.8	1,844.0	2,108.8	2,387.7	2,680.8	2,985.5	3,300.2	3,460.3	3,628.3	3,803.3	3,984.6	4,174.1	4,358.6	4,549.7
PaperMfg	187.1	376.9	570.2	767.4	968.2	1,172.7	1,381.3	1,594.4	1,811.4	2,032.2	2,257.6	2,488.2	2,723.0	2,961.5	3,188.7	3,419.5	3,653.6	3,781.3	3,913.8	3,985.0	4,060.4
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	16.1	32.7	49.8	67.8	86.7	106.5	127.5	149.8	173.4	198.4	224.6	252.2	280.8	310.4	325.5	341.3	357.7	374.8	392.6	410.0	428.0
StoneClayGlass	538.8	1,085.2	1,641.4	2,208.6	2,785.5	3,372.1	3,970.0	4,579.8	5,199.9	5,830.1	6,472.5	7,129.4	7,797.2	8,475.3	9,133.9	9,802.7	10,480.7	10,930.0	11,392.8	11,587.0	11,792.9
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	31.9	64.8	98.9	134.6	172.0	211.3	253.0	297.3	344.2	393.6	445.7	500.4	557.3	616.0	645.9	677.3	709.9	743.8	779.2	813.6	849.3
Grand Total	5,757.5	11,601.3	17,554.9	23,633.4	29,824.8	36,132.7	42,576.0	49,160.8	55,873.8	62,710.5	69,694.6	76,847.9	84,131.2	91,535.0	98,495.7	105,572.5	112,753.9	117,283.0	121,963.3	124,233.0	126,632.2

C-57: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #57)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,843.2	3,714.8	5,622.9	7,572.6	9,560.7	11,588.7	13,663.2	15,786.6	17,954.7	20,166.1	22,428.3	24,748.0	27,112.3	29,517.5	31,728.5	33,978.4	36,263.1	37,629.0	39,044.7	39,816.3	40,630.4
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	249.3	505.7	771.9	1,050.0	1,341.5	1,648.5	1,973.7	2,318.8	2,684.0	3,069.0	3,474.5	3,900.6	4,343.4	4,800.9	5,034.5	5,279.8	5,535.1	5,799.6	6,076.0	6,345.2	6,623.9
LumberWood	154.9	312.3	472.9	637.2	804.9	976.2	1,151.7	1,331.6	1,515.7	1,703.8	1,896.5	2,094.3	2,296.1	2,501.7	2,685.9	2,873.5	3,064.2	3,210.3	3,360.7	3,429.7	3,502.4
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	26.4	53.6	81.8	111.3	142.2	174.7	209.2	245.8	284.5	325.3	368.3	413.4	460.3	508.8	533.6	559.6	586.7	614.7	644.0	672.5	702.0
MetalsFab	1,130.5	2,277.7	3,446.1	4,638.7	5,852.9	7,089.3	8,351.5	9,640.6	10,954.1	12,290.9	13,655.7	15,052.9	16,475.0	17,920.2	19,291.1	20,684.4	22,098.0	22,974.9	23,881.1	24,316.9	24,777.9
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	103.9	210.8	321.7	437.7	559.2	687.1	822.7	966.5	1,118.7	1,279.2	1,448.2	1,625.8	1,810.4	2,001.1	2,098.5	2,200.7	2,307.1	2,417.4	2,532.6	2,644.8	2,761.0
Other	1,906.9	3,842.0	5,812.9	7,824.4	9,872.2	11,957.4	14,086.0	16,259.8	18,474.3	20,728.1	23,029.0	25,384.4	27,781.6	30,217.5	32,531.0	34,882.1	37,267.2	38,835.4	40,453.0	41,185.9	41,961.2
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	172.3	349.6	533.5	725.8	927.3	1,139.5	1,364.3	1,602.8	1,855.3	2,121.4	2,401.7	2,696.2	3,002.3	3,318.6	3,480.0	3,649.6	3,826.1	4,008.9	4,199.9	4,386.0	4,578.7
PaperMfg	187.2	377.1	570.5	767.9	968.8	1,173.4	1,382.1	1,595.3	1,812.4	2,033.4	2,258.9	2,489.7	2,724.6	2,963.2	3,190.5	3,421.5	3,655.8	3,783.6	3,916.2	3,987.6	4,063.1
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	16.2	32.9	50.2	68.3	87.2	107.2	128.3	150.8	174.5	199.5	225.9	253.6	282.4	312.2	327.3	343.3	359.9	377.1	395.1	412.6	430.7
StoneClayGlass	539.0	1,085.7	1,642.1	2,209.5	2,786.6	3,373.5	3,971.7	4,581.6	5,202.0	5,832.5	6,475.2	7,132.3	7,800.4	8,478.7	9,137.6	9,806.7	10,485.0	10,934.5	11,397.6	11,592.1	11,798.3
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	32.2	65.3	99.6	135.5	173.1	212.7	254.7	299.2	346.3	396.0	448.3	503.3	560.4	619.5	649.6	681.3	714.2	748.3	784.0	818.7	854.7
Grand Total	5,761.6	11,609.6	17,567.4	23,650.2	29,846.1	36,158.4	42,606.2	49,195.5	55,913.3	62,754.7	69,743.5	76,901.7	84,190.0	91,598.8	98,564.6	105,646.6	112,833.2	117,367.6	122,053.3	124,328.4	126,733.2

C-58: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #58)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,606.0	3,237.4	4,901.2	6,602.2	8,337.9	10,109.8	11,924.1	13,782.9	15,682.8	17,622.5	19,608.4	21,646.4	23,724.8	25,840.2	27,994.7	30,184.0	32,404.4	33,703.5	35,046.6	35,740.9	36,472.7
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	12.1	28.3	50.1	79.6	118.7	169.6	234.5	315.1	412.1	525.4	654.6	798.9	955.9	1,123.7	1,300.7	1,485.4	1,676.4	1,874.1	2,077.9	2,269.7	2,466.2
LumberWood	129.8	261.7	396.4	534.3	675.3	819.4	967.4	1,119.3	1,274.9	1,434.2	1,597.6	1,765.6	1,937.1	2,111.9	2,290.1	2,471.3	2,655.2	2,794.2	2,936.9	2,997.8	3,061.8
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	1.3	3.0	5.3	8.4	12.6	18.0	24.9	33.4	43.7	55.7	69.4	84.7	101.3	119.1	137.9	157.4	177.7	198.6	220.2	240.6	261.4
MetalsFab	1,031.6	2,078.7	3,145.3	4,234.2	5,343.2	6,472.8	7,626.6	8,805.5	10,007.1	11,230.6	12,480.3	13,760.1	15,063.1	16,387.4	17,734.8	19,102.9	20,489.6	21,338.6	22,214.7	22,618.2	23,044.9
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	5.1	11.8	20.9	33.2	49.5	70.7	97.7	131.3	171.8	219.0	272.9	333.0	398.4	468.4	542.2	619.2	698.8	781.1	866.1	946.1	1,027.9
Other	1,743.0	3,512.0	5,314.0	7,153.6	9,026.9	10,935.1	12,883.8	14,874.7	16,903.9	18,969.8	21,079.8	23,240.5	25,440.0	27,675.6	29,950.0	32,259.3	34,600.0	36,121.9	37,689.4	38,368.8	39,087.2
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	8.4	19.5	34.6	55.0	82.1	117.2	162.1	217.8	284.8	363.1	452.5	552.2	660.8	776.7	899.1	1,026.8	1,158.8	1,295.4	1,436.3	1,568.9	1,704.7
PaperMfg	171.7	346.0	523.6	704.8	889.3	1,077.2	1,269.1	1,465.0	1,664.7	1,868.0	2,075.5	2,288.0	2,504.3	2,724.1	2,947.8	3,174.8	3,404.9	3,528.3	3,656.2	3,722.6	3,792.8
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	0.8	1.8	3.3	5.2	7.7	11.0	15.2	20.5	26.8	34.2	42.6	51.9	62.2	73.1	84.6	96.6	109.0	121.9	135.1	147.6	160.3
StoneClayGlass	508.4	1,024.1	1,549.0	2,084.3	2,628.8	3,182.6	3,747.3	4,323.1	4,908.9	5,504.2	6,111.3	6,732.1	7,363.3	8,004.2	8,655.9	9,317.1	9,987.1	10,428.0	10,881.7	11,066.2	11,261.8
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	1.6	3.6	6.5	10.3	15.3	21.9	30.3	40.7	53.2	67.8	84.5	103.1	123.3	145.0	167.8	191.7	216.3	241.8	268.1	292.9	318.2
Grand Total	5,190.6	10,459.9	15,829.4	21,313.4	26,901.4	32,597.1	38,418.2	44,370.4	50,442.2	56,629.3	62,952.9	69,432.6	76,032.6	82,743.6	89,573.2	96,509.3	103,541.1	107,914.5	112,425.7	114,514.4	116,721.1

C-59: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #59)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,606.0	3,237.4	4,901.2	6,602.2	8,337.9	10,109.8	11,924.1	13,782.9	15,682.8	17,622.5	19,608.4	21,646.4	23,724.8	25,840.2	27,994.7	30,184.0	32,404.4	33,703.5	35,046.6	35,740.9	36,472.7
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	12.1	28.3	50.1	79.6	118.7	169.6	234.5	315.1	412.1	525.4	654.6	798.9	955.9	1,123.7	1,300.7	1,485.4	1,676.4	1,874.1	2,077.9	2,269.7	2,466.2
LumberWood	129.8	261.7	396.4	534.3	675.3	819.4	967.4	1,119.3	1,274.9	1,434.2	1,597.6	1,765.6	1,937.1	2,111.9	2,290.1	2,471.3	2,655.2	2,794.2	2,936.9	2,997.8	3,061.8
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	1.3	3.0	5.3	8.4	12.6	18.0	24.9	33.4	43.7	55.7	69.4	84.7	101.3	119.1	137.9	157.4	177.7	198.6	220.2	240.6	261.4
MetalsFab	1,031.6	2,078.7	3,145.3	4,234.2	5,343.2	6,472.8	7,626.6	8,805.5	10,007.1	11,230.6	12,480.3	13,760.1	15,063.1	16,387.4	17,734.8	19,102.9	20,489.6	21,338.6	22,214.7	22,618.2	23,044.9
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	5.1	11.8	20.9	33.2	49.5	70.7	97.7	131.3	171.8	219.0	272.9	333.0	398.4	468.4	542.2	619.2	698.8	781.1	866.1	946.1	1,027.9
Other	1,743.0	3,512.0	5,314.0	7,153.6	9,026.9	10,935.1	12,883.8	14,874.7	16,903.9	18,969.8	21,079.8	23,240.5	25,440.0	27,675.6	29,950.0	32,259.3	34,600.0	36,121.9	37,689.4	38,368.8	39,087.2
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	8.4	19.5	34.6	55.0	82.1	117.2	162.1	217.8	284.8	363.1	452.5	552.2	660.8	776.7	899.1	1,026.8	1,158.8	1,295.4	1,436.3	1,568.9	1,704.7
PaperMfg	171.7	346.0	523.6	704.8	889.3	1,077.2	1,269.1	1,465.0	1,664.7	1,868.0	2,075.5	2,288.0	2,504.3	2,724.1	2,947.8	3,174.8	3,404.9	3,528.3	3,656.2	3,722.6	3,792.8
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	0.8	1.8	3.3	5.2	7.7	11.0	15.2	20.5	26.8	34.2	42.6	51.9	62.2	73.1	84.6	96.6	109.0	121.9	135.1	147.6	160.3
StoneClayGlass	508.4	1,024.1	1,549.0	2,084.3	2,628.8	3,182.6	3,747.3	4,323.1	4,908.9	5,504.2	6,111.3	6,732.1	7,363.3	8,004.2	8,655.9	9,317.1	9,987.1	10,428.0	10,881.7	11,066.2	11,261.8
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	1.6	3.6	6.5	10.3	15.3	21.9	30.3	40.7	53.2	67.8	84.5	103.1	123.3	145.0	167.8	191.7	216.3	241.8	268.1	292.9	318.2
Grand Total	5,190.6	10,459.9	15,829.4	21,313.4	26,901.4	32,597.1	38,418.2	44,370.4	50,442.2	56,629.3	62,952.9	69,432.6	76,032.6	82,743.6	89,573.2	96,509.3	103,541.1	107,914.5	112,425.7	114,514.4	116,721.1

C-60: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #60)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,193.3	4,439.3	6,755.5	9,157.3	11,506.4	13,959.6	16,535.1	19,244.0	22,084.9	24,944.1	27,940.0	31,076.4	34,326.4	37,676.2	40,884.5	44,175.2	47,537.0	50,016.9	52,584.5	54,453.2	56,394.0
Process Heating	1,641.8	3,322.4	5,055.1	6,850.8	8,713.8	10,653.3	12,682.8	14,810.1	17,034.4	19,354.1	21,774.4	24,297.9	26,905.0	29,585.6	32,337.0	35,149.3	38,013.9	39,980.0	42,011.1	43,351.9	44,746.2
Space Heating	551.6	1,116.9	1,700.5	2,306.5	2,792.6	3,306.3	3,852.4	4,433.8	5,050.5	5,589.9	6,165.7	6,778.5	7,421.4	8,090.6	8,547.5	9,026.0	9,523.1	10,036.9	10,573.5	11,101.3	11,647.7
LumberWood	192.9	391.2	596.7	811.1	1,020.1	1,240.4	1,474.1	1,722.5	1,985.5	2,251.2	2,531.9	2,827.7	3,135.9	3,454.8	3,758.8	4,071.4	4,391.4	4,671.3	4,960.0	5,160.5	5,368.2
Process Heating	134.5	272.8	416.5	566.6	724.1	890.0	1,065.8	1,252.5	1,450.2	1,658.7	1,878.4	2,109.3	2,349.3	2,597.3	2,852.9	3,114.8	3,382.1	3,607.5	3,839.3	3,983.9	4,133.7
Space Heating	58.5	118.4	180.2	244.5	296.0	350.4	408.3	469.9	535.3	592.5	653.5	718.4	786.6	857.5	905.9	956.6	1,009.3	1,063.8	1,120.7	1,176.6	1,234.5
MetalsFab	1,291.4	2,615.0	3,981.9	5,401.6	6,818.4	8,300.2	9,858.7	11,501.0	13,226.4	14,987.3	16,834.0	18,768.3	20,773.7	22,841.5	24,869.8	26,949.3	29,072.5	30,683.8	32,348.7	33,503.7	34,702.5
Process Heating	1,061.5	2,149.5	3,273.1	4,440.3	5,654.4	6,922.1	8,253.0	9,652.8	11,121.3	12,657.3	14,264.0	15,942.9	17,680.4	19,469.2	21,307.1	23,187.1	25,103.2	26,500.2	27,941.5	28,876.4	29,847.5
Space Heating	229.9	465.5	708.8	961.4	1,164.0	1,378.1	1,605.7	1,848.1	2,105.1	2,330.0	2,570.0	2,825.4	3,093.4	3,372.3	3,562.7	3,762.2	3,969.4	4,183.5	4,407.2	4,627.2	4,855.0
Other	2,181.3	4,419.3	6,733.4	9,141.1	11,550.9	14,077.3	16,741.2	19,555.2	22,519.1	25,553.4	28,741.7	32,086.5	35,558.4	39,141.8	42,666.7	46,282.2	49,975.3	52,896.7	55,912.2	57,969.1	60,102.6
Process Heating	1,800.0	3,647.3	5,558.0	7,546.8	9,620.5	11,791.9	14,078.3	16,490.3	19,028.0	21,689.4	24,479.8	27,401.0	30,428.5	33,549.3	36,758.4	40,043.2	43,392.6	45,958.9	48,603.5	50,295.5	52,051.3
Space Heating	381.3	772.0	1,175.4	1,594.3	1,930.3	2,285.4	2,662.9	3,064.8	3,491.1	3,864.0	4,261.9	4,685.5	5,129.9	5,592.5	5,908.3	6,239.1	6,582.7	6,937.8	7,308.7	7,673.6	8,051.3
PaperMfg	211.4	427.7	650.5	881.1	1,110.6	1,349.6	1,599.6	1,861.7	2,135.6	2,414.0	2,704.6	3,008.1	3,321.8	3,644.6	3,960.7	4,284.3	4,614.5	4,841.5	5,076.7	5,245.4	5,420.8
Process Heating	175.6	355.1	539.9	731.1	929.1	1,134.6	1,349.2	1,573.4	1,807.3	2,050.5	2,303.8	2,567.3	2,839.3	3,118.5	3,404.9	3,697.5	3,995.3	4,188.9	4,389.2	4,523.6	4,663.5
Space Heating	35.9	72.6	110.6	150.0	181.6	215.0	250.5	288.3	328.4	363.5	400.9	440.7	482.5	526.0	555.8	586.9	619.2	652.6	687.5	721.8	757.3
StoneClayGlass	597.8	1,211.6	1,846.6	2,507.8	3,179.1	3,883.2	4,626.1	5,411.5	6,239.2	7,094.2	7,992.7	8,935.2	9,913.6	10,923.4	11,932.2	12,966.5	14,022.5	14,862.9	15,729.6	16,305.3	16,902.5
Process Heating	526.7	1,067.4	1,627.2	2,210.2	2,818.7	3,456.6	4,129.1	4,839.4	5,587.5	6,372.9	7,197.1	8,060.6	8,956.0	9,879.4	10,829.3	11,801.9	12,793.7	13,567.8	14,365.3	14,872.9	15,399.5
Space Heating	71.2	144.1	219.4	297.6	360.3	426.6	497.1	572.1	651.7	721.3	795.6	874.6	957.6	1,043.9	1,102.9	1,164.6	1,228.8	1,295.1	1,364.3	1,432.4	1,502.9
Grand Total	6,668.2	13,504.1	20,564.6	27,900.0	35,185.5	42,810.4	50,835.0	59,295.7	68,190.7	77,244.0	86,744.9	96,702.1	107,029.8	117,682.3	128,072.7	138,728.9	149,613.2	157,973.1	166,611.7	172,637.2	178,890.6

C-61: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #61)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,237.7	4,530.9	6,898.1	9,355.4	11,765.5	14,285.5	16,934.1	19,722.3	22,648.3	25,597.4	28,687.5	31,922.0	35,272.9	38,725.9	42,039.4	45,437.3	48,907.7	51,497.4	54,177.0	56,159.0	58,206.3
Process Heating	1,641.8	3,322.4	5,055.1	6,850.8	8,713.8	10,653.3	12,682.8	14,810.1	17,034.4	19,354.1	21,774.4	24,297.9	26,905.0	29,585.6	32,337.0	35,149.3	38,013.9	39,980.0	42,011.1	43,351.9	44,746.2
Space Heating	595.9	1,208.4	1,843.0	2,504.6	3,051.7	3,632.1	4,251.3	4,912.2	5,613.9	6,243.2	6,913.2	7,624.1	8,367.9	9,140.3	9,702.5	10,288.1	10,893.8	11,517.4	12,165.9	12,807.1	13,460.0
LumberWood	197.6	400.9	611.8	832.1	1,047.5	1,274.9	1,516.4	1,773.2	2,045.2	2,320.4	2,611.1	2,917.3	3,236.2	3,566.1	3,881.2	4,205.2	4,536.7	4,828.2	5,128.8	5,341.3	5,560.3
Process Heating	134.5	272.8	416.5	566.6	724.1	890.0	1,065.8	1,252.5	1,450.2	1,658.7	1,878.4	2,109.3	2,349.3	2,597.3	2,852.9	3,114.8	3,382.1	3,607.5	3,839.3	3,983.9	4,133.7
Space Heating	63.2	128.1	195.3	265.5	323.4	385.0	450.6	520.6	595.0	661.7	732.7	808.1	886.9	968.8	1,028.3	1,090.4	1,154.6	1,220.7	1,289.4	1,357.4	1,426.6
MetalsFab	1,309.9	2,653.2	4,041.3	5,484.2	6,926.3	8,436.0	10,025.0	11,700.3	13,461.3	15,259.6	17,145.5	19,120.8	21,168.2	23,279.0	25,351.2	27,475.3	29,643.9	31,300.9	33,012.5	34,214.7	35,457.9
Process Heating	1,061.5	2,149.5	3,273.1	4,440.3	5,654.4	6,922.1	8,253.0	9,652.8	11,121.3	12,657.3	14,264.0	15,942.9	17,680.4	19,469.2	21,307.1	23,187.1	25,103.2	26,500.2	27,941.5	28,876.4	29,847.5
Space Heating	248.4	503.7	768.2	1,044.0	1,272.0	1,513.9	1,772.0	2,047.5	2,340.0	2,602.3	2,881.5	3,177.9	3,487.9	3,809.8	4,044.2	4,288.2	4,540.7	4,800.7	5,071.0	5,338.2	5,610.4
Other	2,211.9	4,482.5	6,832.0	9,278.0	11,729.9	14,302.6	17,016.9	19,885.8	22,908.5	26,005.0	29,258.4	32,671.0	36,212.7	39,867.3	43,465.1	47,154.6	50,922.7	53,920.1	57,013.0	59,148.2	61,355.3
Process Heating	1,800.0	3,647.3	5,558.0	7,546.8	9,620.5	11,791.9	14,078.3	16,490.3	19,028.0	21,689.4	24,479.8	27,401.0	30,428.5	33,549.3	36,758.4	40,043.2	43,392.6	45,958.9	48,603.5	50,295.5	52,051.3
Space Heating	411.9	835.3	1,273.9	1,731.3	2,109.4	2,510.6	2,938.7	3,395.5	3,880.5	4,315.5	4,778.6	5,270.0	5,784.2	6,318.1	6,706.7	7,111.5	7,530.2	7,961.2	8,409.5	8,852.7	9,304.0
PaperMfg	214.3	433.7	659.7	894.0	1,127.5	1,370.8	1,625.6	1,892.8	2,172.3	2,456.4	2,753.2	3,063.1	3,383.3	3,712.8	4,035.8	4,366.4	4,703.6	4,937.8	5,180.2	5,356.3	5,538.6
Process Heating	175.6	355.1	539.9	731.1	929.1	1,134.6	1,349.2	1,573.4	1,807.3	2,050.5	2,303.8	2,567.3	2,839.3	3,118.5	3,404.9	3,697.5	3,995.3	4,188.9	4,389.2	4,523.6	4,663.5
Space Heating	38.7	78.6	119.8	162.8	198.4	236.2	276.4	319.4	365.0	405.9	449.5	495.7	544.1	594.3	630.8	668.9	708.3	748.9	791.0	832.7	875.2
StoneClayGlass	603.6	1,223.4	1,865.0	2,533.4	3,212.5	3,925.3	4,677.6	5,473.2	6,311.8	7,178.5	8,089.1	9,044.3	10,035.7	11,058.8	12,081.2	13,129.3	14,199.3	15,053.9	15,935.1	16,525.4	17,136.3
Process Heating	526.7	1,067.4	1,627.2	2,210.2	2,818.7	3,456.6	4,129.1	4,839.4	5,587.5	6,372.9	7,197.1	8,060.6	8,956.0	9,879.4	10,829.3	11,801.9	12,793.7	13,567.8	14,365.3	14,872.9	15,399.5
Space Heating	76.9	155.9	237.8	323.2	393.8	468.7	548.5	633.8	724.4	805.6	892.0	983.7	1,079.7	1,179.4	1,251.9	1,327.5	1,405.6	1,486.1	1,569.8	1,652.5	1,736.7
Grand Total	6,775.0	13,724.5	20,907.8	28,377.1	35,809.3	43,595.1	51,795.7	60,447.6	69,547.4	78,817.2	88,544.9	98,738.5	109,309.1	120,210.0	130,854.0	141,768.1	152,914.0	161,538.3	170,446.5	176,744.9	183,254.7

C-62: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #62)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,264.8	4,585.4	6,980.5	9,466.3	11,905.3	14,454.5	17,132.9	19,951.4	22,908.1	25,888.3	29,010.1	32,276.8	35,660.4	39,146.6	42,493.8	45,925.8	49,430.8	52,055.4	54,770.4	56,788.5	58,872.3
Process Heating	1,641.8	3,322.6	5,055.2	6,851.0	8,714.1	10,653.7	12,683.2	14,810.6	17,035.0	19,354.7	21,775.0	24,298.6	26,905.8	29,586.5	32,337.9	35,150.3	38,015.0	39,981.1	42,012.3	43,353.2	44,747.5
Space Heating	623.0	1,262.9	1,925.3	2,615.3	3,191.2	3,800.8	4,449.8	5,140.8	5,873.1	6,533.5	7,235.1	7,978.2	8,754.6	9,560.1	10,155.9	10,775.6	11,415.8	12,074.2	12,758.2	13,435.3	14,124.8
LumberWood	200.5	406.7	620.5	843.8	1,062.3	1,292.9	1,537.5	1,797.4	2,072.7	2,351.2	2,645.2	2,954.9	3,277.2	3,610.6	3,929.3	4,256.9	4,592.1	4,887.3	5,191.6	5,408.0	5,630.9
Process Heating	134.5	272.8	416.5	566.7	724.1	890.0	1,065.9	1,252.6	1,450.3	1,658.8	1,878.5	2,109.3	2,349.4	2,597.4	2,853.0	3,114.9	3,382.2	3,607.6	3,839.5	3,984.1	4,133.9
Space Heating	66.0	133.8	204.0	277.2	338.2	402.8	471.6	544.8	622.5	692.4	766.8	845.5	927.8	1,013.2	1,076.4	1,142.0	1,209.9	1,279.7	1,352.1	1,423.9	1,497.0
MetalsFab	1,321.2	2,676.0	4,075.7	5,530.5	6,984.6	8,506.5	10,108.0	11,795.9	13,569.6	15,380.9	17,280.1	19,268.7	21,329.9	23,454.5	25,540.8	27,679.1	29,862.0	31,533.6	33,260.0	34,477.2	35,735.6
Process Heating	1,061.5	2,149.6	3,273.3	4,440.4	5,654.6	6,922.3	8,253.3	9,653.2	11,121.7	12,657.7	14,264.5	15,943.4	17,680.9	19,469.8	21,307.8	23,187.8	25,103.9	26,501.1	27,942.4	28,877.3	29,848.4
Space Heating	259.7	526.4	802.5	1,090.1	1,330.1	1,584.2	1,854.7	2,142.7	2,447.9	2,723.2	3,015.6	3,325.3	3,648.9	3,984.7	4,233.0	4,491.3	4,758.1	5,032.5	5,317.6	5,599.8	5,887.2
Other	2,230.7	4,520.3	6,889.0	9,354.8	11,826.7	14,419.5	17,154.5	20,044.4	23,088.3	26,206.3	29,481.6	32,916.5	36,480.9	40,158.5	43,779.5	47,492.7	51,284.7	54,306.2	57,423.7	59,583.7	61,816.1
Process Heating	1,800.1	3,647.4	5,558.3	7,547.1	9,620.9	11,792.4	14,078.8	16,491.0	19,028.8	21,690.3	24,480.7	27,401.9	30,429.6	33,550.4	36,759.7	40,044.5	43,394.0	45,960.5	48,605.2	50,297.2	52,053.0
Space Heating	430.6	872.9	1,330.8	1,807.7	2,205.7	2,627.2	3,075.7	3,553.4	4,059.5	4,516.0	5,000.9	5,514.6	6,051.2	6,608.0	7,019.8	7,448.1	7,890.7	8,345.8	8,818.5	9,286.5	9,763.1
PaperMfg	216.1	437.2	665.1	901.2	1,136.6	1,381.8	1,638.5	1,907.7	2,189.2	2,475.4	2,774.2	3,086.1	3,408.5	3,740.2	4,065.3	4,398.2	4,737.7	4,974.1	5,218.8	5,397.2	5,581.9
Process Heating	175.6	355.1	539.9	731.1	929.1	1,134.7	1,349.2	1,573.5	1,807.3	2,050.6	2,303.8	2,567.4	2,839.3	3,118.6	3,405.0	3,697.6	3,995.4	4,189.1	4,389.3	4,523.7	4,663.6
Space Heating	40.5	82.1	125.2	170.0	207.5	247.1	289.3	334.2	381.9	424.8	470.4	518.7	569.2	621.6	660.3	700.6	742.2	785.0	829.5	873.5	918.3
StoneClayGlass	607.1	1,230.4	1,875.6	2,547.7	3,230.6	3,947.2	4,703.4	5,502.9	6,345.5	7,216.1	8,130.9	9,090.3	10,085.9	11,113.3	12,140.1	13,192.6	14,267.1	15,126.2	16,011.9	16,606.9	17,222.5
Process Heating	526.7	1,067.5	1,627.2	2,210.3	2,818.9	3,456.8	4,129.2	4,839.6	5,587.7	6,373.2	7,197.4	8,060.9	8,956.4	9,879.8	10,829.7	11,802.3	12,794.1	13,568.3	14,365.8	14,873.5	15,400.1
Space Heating	80.4	162.9	248.4	337.4	411.7	490.4	574.1	663.3	757.8	843.0	933.5	1,029.4	1,129.6	1,233.5	1,310.4	1,390.3	1,472.9	1,557.9	1,646.1	1,733.5	1,822.4
Grand Total	6,840.3	13,856.0	21,106.6	28,644.3	36,146.1	44,002.4	52,274.8	60,999.7	70,173.4	79,518.2	89,322.1	99,593.3	110,242.8	121,223.7	131,948.8	142,945.2	154,174.4	162,882.7	171,876.4	178,261.5	184,859.3

C-63: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #63)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,917.2	3,883.3	5,915.1	8,027.2	10,226.4	12,525.4	14,941.8	17,486.6	20,159.1	22,957.6	25,887.7	28,951.8	32,124.6	35,392.8	38,514.3	41,713.5	44,979.5	47,360.5	49,822.8	51,580.4	53,404.3
Process Heating	1,641.8	3,322.4	5,055.1	6,850.8	8,713.8	10,653.3	12,682.8	14,810.1	17,034.4	19,354.1	21,774.4	24,297.9	26,905.0	29,585.6	32,337.0	35,149.3	38,013.9	39,980.0	42,011.1	43,351.9	44,746.2
Space Heating	275.4	560.9	860.0	1,176.4	1,512.6	1,872.1	2,259.1	2,676.4	3,124.7	3,603.5	4,113.4	4,653.9	5,219.6	5,807.2	6,177.3	6,564.3	6,965.5	7,380.5	7,811.7	8,228.4	8,658.1
LumberWood	163.6	332.3	507.6	691.3	884.4	1,088.4	1,305.2	1,536.2	1,781.4	2,040.6	2,314.3	2,602.5	2,902.5	3,212.8	3,507.6	3,810.5	4,120.3	4,389.7	4,667.3	4,856.0	5,051.4
Process Heating	134.5	272.8	416.5	566.6	724.1	890.0	1,065.8	1,252.5	1,450.2	1,658.7	1,878.4	2,109.3	2,349.3	2,597.3	2,852.9	3,114.8	3,382.1	3,607.5	3,839.3	3,983.9	4,133.7
Space Heating	29.2	59.4	91.2	124.7	160.3	198.4	239.4	283.7	331.2	381.9	436.0	493.2	553.2	615.5	654.7	695.7	738.3	782.2	827.9	872.1	917.6
MetalsFab	1,176.3	2,383.3	3,631.6	4,930.6	6,284.8	7,702.4	9,194.6	10,768.4	12,423.7	14,159.3	15,978.5	17,882.7	19,856.0	21,889.7	23,881.9	25,923.2	28,006.5	29,576.6	31,197.6	32,306.2	33,456.4
Process Heating	1,061.5	2,149.5	3,273.1	4,440.3	5,654.4	6,922.1	8,253.0	9,652.8	11,121.3	12,657.3	14,264.0	15,942.9	17,680.4	19,469.2	21,307.1	23,187.1	25,103.2	26,500.2	27,941.5	28,876.4	29,847.5
Space Heating	114.8	233.8	358.5	490.4	630.5	780.3	941.6	1,115.6	1,302.4	1,502.0	1,714.5	1,939.8	2,175.6	2,420.6	2,574.8	2,736.1	2,903.4	3,076.3	3,256.1	3,429.8	3,608.8
Other	1,990.4	4,035.0	6,152.5	8,360.0	10,666.1	13,086.0	15,639.8	18,340.4	21,187.9	24,180.3	27,323.1	30,617.9	34,036.5	37,563.4	41,028.3	44,580.6	48,207.4	51,060.5	54,003.2	55,983.3	58,036.1
Process Heating	1,800.0	3,647.3	5,558.0	7,546.8	9,620.5	11,791.9	14,078.3	16,490.3	19,028.0	21,689.4	24,479.8	27,401.0	30,428.5	33,549.3	36,758.4	40,043.2	43,392.6	45,958.9	48,603.5	50,295.5	52,051.3
Space Heating	190.4	387.7	594.5	813.2	1,045.6	1,294.0	1,561.6	1,850.0	2,159.9	2,490.9	2,843.3	3,216.9	3,608.0	4,014.2	4,269.9	4,537.4	4,814.8	5,101.7	5,399.7	5,687.8	5,984.8
PaperMfg	193.5	391.6	595.8	807.6	1,027.4	1,256.4	1,496.1	1,747.4	2,010.4	2,284.8	2,571.2	2,869.9	3,178.6	3,496.1	3,806.6	4,124.3	4,448.2	4,668.8	4,897.1	5,058.6	5,226.4
Process Heating	175.6	355.1	539.9	731.1	929.1	1,134.6	1,349.2	1,573.4	1,807.3	2,050.5	2,303.8	2,567.3	2,839.3	3,118.5	3,404.9	3,697.5	3,995.3	4,188.9	4,389.2	4,523.6	4,663.5
Space Heating	17.9	36.5	55.9	76.5	98.3	121.7	146.9	174.0	203.2	234.3	267.4	302.6	339.4	377.6	401.6	426.8	452.9	479.9	507.9	535.0	562.9
StoneClayGlass	562.2	1,139.8	1,738.1	2,362.0	3,013.9	3,698.2	4,420.6	5,184.7	5,990.7	6,837.9	7,727.8	8,661.1	9,629.5	10,628.7	11,626.4	12,648.8	13,692.5	14,520.2	15,373.3	15,934.7	16,516.7
Process Heating	526.7	1,067.4	1,627.2	2,210.2	2,818.7	3,456.6	4,129.1	4,839.4	5,587.5	6,372.9	7,197.1	8,060.6	8,956.0	9,879.4	10,829.3	11,801.9	12,793.7	13,567.8	14,365.3	14,872.9	15,399.5
Space Heating	35.5	72.4	111.0	151.8	195.2	241.6	291.5	345.3	403.2	465.0	530.7	600.5	673.5	749.3	797.1	847.0	898.8	952.3	1,007.9	1,061.7	1,117.2
Grand Total	6,003.2	12,165.2	18,540.8	25,178.7	32,103.1	39,356.7	46,998.1	55,063.7	63,553.3	72,460.5	81,802.7	91,585.8	101,727.8	112,183.6	122,365.0	132,800.9	143,454.4	151,576.3	159,961.2	165,719.1	171,691.2

C-64: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #64)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,841.4	3,711.4	5,617.7	7,565.7	9,551.9	11,578.1	13,650.7	15,772.1	17,938.3	20,147.8	22,408.0	24,725.7	27,087.9	29,491.0	31,699.9	33,947.6	36,230.2	37,593.9	39,007.3	39,776.6	40,588.4
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	247.5	502.3	766.7	1,043.0	1,332.7	1,637.8	1,961.1	2,304.4	2,667.6	3,050.7	3,454.2	3,878.2	4,319.0	4,774.4	5,005.9	5,249.1	5,502.2	5,764.5	6,038.6	6,305.5	6,582.0
LumberWood	154.7	312.0	472.4	636.5	803.9	975.0	1,150.4	1,330.1	1,514.0	1,701.8	1,894.3	2,091.9	2,293.6	2,498.9	2,682.8	2,870.2	3,060.7	3,206.5	3,356.7	3,425.5	3,498.0
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	26.2	53.2	81.3	110.5	141.3	173.6	207.9	244.2	282.7	323.3	366.1	411.0	457.8	506.0	530.6	556.3	583.2	611.0	640.0	668.3	697.6
MetalsFab	1,129.8	2,276.2	3,443.9	4,635.7	5,849.2	7,084.8	8,346.3	9,634.6	10,947.2	12,283.2	13,647.2	15,043.6	16,464.9	17,909.1	19,279.2	20,671.6	22,084.2	22,960.2	23,865.5	24,300.4	24,760.4
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	103.2	209.4	319.6	434.8	555.5	682.7	817.4	960.5	1,111.9	1,271.6	1,439.8	1,616.5	1,800.2	1,990.1	2,086.6	2,187.9	2,293.4	2,402.7	2,517.0	2,628.2	2,743.5
Other	1,905.7	3,839.6	5,809.3	7,819.5	9,866.1	11,950.0	14,077.3	16,249.8	18,463.0	20,715.4	23,015.0	25,369.0	27,764.7	30,199.2	32,511.2	34,860.8	37,244.4	38,811.1	40,427.2	41,158.5	41,932.2
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	171.1	347.2	529.9	721.0	921.2	1,132.1	1,355.6	1,592.8	1,844.0	2,108.8	2,387.7	2,680.8	2,985.5	3,300.2	3,460.3	3,628.3	3,803.3	3,984.6	4,174.1	4,358.6	4,549.7
PaperMfg	187.1	376.9	570.2	767.4	968.2	1,172.7	1,381.3	1,594.4	1,811.4	2,032.2	2,257.6	2,488.2	2,723.0	2,961.5	3,188.7	3,419.5	3,653.6	3,781.3	3,913.8	3,985.0	4,060.4
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	16.1	32.7	49.8	67.8	86.7	106.5	127.5	149.8	173.4	198.4	224.6	252.2	280.8	310.4	325.5	341.3	357.7	374.8	392.6	410.0	428.0
StoneClayGlass	538.8	1,085.2	1,641.4	2,208.6	2,785.5	3,372.1	3,970.0	4,579.8	5,199.9	5,830.1	6,472.5	7,129.4	7,797.2	8,475.3	9,133.9	9,802.7	10,480.7	10,930.0	11,392.8	11,587.0	11,792.9
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	31.9	64.8	98.9	134.6	172.0	211.3	253.0	297.3	344.2	393.6	445.7	500.4	557.3	616.0	645.9	677.3	709.9	743.8	779.2	813.6	849.3
Grand Total	5,757.5	11,601.3	17,554.9	23,633.4	29,824.8	36,132.7	42,576.0	49,160.8	55,873.8	62,710.5	69,694.6	76,847.9	84,131.2	91,535.0	98,495.7	105,572.5	112,753.9	117,283.0	121,963.3	124,233.0	126,632.2

C-65: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #65)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	1,841.4	3,711.4	5,617.7	7,565.7	9,551.9	11,578.1	13,650.7	15,772.1	17,938.3	20,147.8	22,408.0	24,725.7	27,087.9	29,491.0	31,699.9	33,947.6	36,230.2	37,593.9	39,007.3	39,776.6	40,588.4
Process Heating	1,593.9	3,209.1	4,851.0	6,522.6	8,219.2	9,940.2	11,689.6	13,467.8	15,270.7	17,097.1	18,953.8	20,847.5	22,768.9	24,716.6	26,694.0	28,698.5	30,728.0	31,829.4	32,968.7	33,471.1	34,006.5
Space Heating	247.5	502.3	766.7	1,043.0	1,332.7	1,637.8	1,961.1	2,304.4	2,667.6	3,050.7	3,454.2	3,878.2	4,319.0	4,774.4	5,005.9	5,249.1	5,502.2	5,764.5	6,038.6	6,305.5	6,582.0
LumberWood	154.7	312.0	472.4	636.5	803.9	975.0	1,150.4	1,330.1	1,514.0	1,701.8	1,894.3	2,091.9	2,293.6	2,498.9	2,682.8	2,870.2	3,060.7	3,206.5	3,356.7	3,425.5	3,498.0
Process Heating	128.5	258.7	391.1	525.9	662.7	801.5	942.5	1,085.9	1,231.2	1,378.5	1,528.2	1,680.9	1,835.8	1,992.8	2,152.3	2,313.9	2,477.5	2,595.6	2,716.7	2,757.2	2,800.4
Space Heating	26.2	53.2	81.3	110.5	141.3	173.6	207.9	244.2	282.7	323.3	366.1	411.0	457.8	506.0	530.6	556.3	583.2	611.0	640.0	668.3	697.6
MetalsFab	1,129.8	2,276.2	3,443.9	4,635.7	5,849.2	7,084.8	8,346.3	9,634.6	10,947.2	12,283.2	13,647.2	15,043.6	16,464.9	17,909.1	19,279.2	20,671.6	22,084.2	22,960.2	23,865.5	24,300.4	24,760.4
Process Heating	1,026.6	2,066.9	3,124.4	4,201.0	5,293.7	6,402.1	7,528.8	8,674.1	9,835.3	11,011.6	12,207.5	13,427.1	14,664.6	15,919.1	17,192.6	18,483.7	19,790.8	20,557.5	21,348.5	21,672.1	22,016.9
Space Heating	103.2	209.4	319.6	434.8	555.5	682.7	817.4	960.5	1,111.9	1,271.6	1,439.8	1,616.5	1,800.2	1,990.1	2,086.6	2,187.9	2,293.4	2,402.7	2,517.0	2,628.2	2,743.5
Other	1,905.7	3,839.6	5,809.3	7,819.5	9,866.1	11,950.0	14,077.3	16,249.8	18,463.0	20,715.4	23,015.0	25,369.0	27,764.7	30,199.2	32,511.2	34,860.8	37,244.4	38,811.1	40,427.2	41,158.5	41,932.2
Process Heating	1,734.6	3,492.5	5,279.4	7,098.5	8,944.9	10,817.9	12,721.7	14,656.9	16,619.0	18,606.7	20,627.3	22,688.2	24,779.3	26,898.9	29,050.9	31,232.5	33,441.2	34,826.5	36,253.1	36,799.9	37,382.5
Space Heating	171.1	347.2	529.9	721.0	921.2	1,132.1	1,355.6	1,592.8	1,844.0	2,108.8	2,387.7	2,680.8	2,985.5	3,300.2	3,460.3	3,628.3	3,803.3	3,984.6	4,174.1	4,358.6	4,549.7
PaperMfg	187.1	376.9	570.2	767.4	968.2	1,172.7	1,381.3	1,594.4	1,811.4	2,032.2	2,257.6	2,488.2	2,723.0	2,961.5	3,188.7	3,419.5	3,653.6	3,781.3	3,913.8	3,985.0	4,060.4
Process Heating	171.0	344.2	520.3	699.6	881.6	1,066.2	1,253.8	1,444.5	1,637.9	1,833.8	2,033.0	2,236.1	2,442.2	2,651.1	2,863.2	3,078.2	3,295.9	3,406.5	3,521.1	3,575.0	3,632.4
Space Heating	16.1	32.7	49.8	67.8	86.7	106.5	127.5	149.8	173.4	198.4	224.6	252.2	280.8	310.4	325.5	341.3	357.7	374.8	392.6	410.0	428.0
StoneClayGlass	538.8	1,085.2	1,641.4	2,208.6	2,785.5	3,372.1	3,970.0	4,579.8	5,199.9	5,830.1	6,472.5	7,129.4	7,797.2	8,475.3	9,133.9	9,802.7	10,480.7	10,930.0	11,392.8	11,587.0	11,792.9
Process Heating	506.8	1,020.4	1,542.5	2,074.0	2,613.5	3,160.7	3,717.0	4,282.4	4,855.7	5,436.5	6,026.8	6,629.0	7,239.9	7,859.3	8,488.0	9,125.4	9,770.8	10,186.2	10,613.6	10,773.4	10,943.6
Space Heating	31.9	64.8	98.9	134.6	172.0	211.3	253.0	297.3	344.2	393.6	445.7	500.4	557.3	616.0	645.9	677.3	709.9	743.8	779.2	813.6	849.3
Grand Total	5,757.5	11,601.3	17,554.9	23,633.4	29,824.8	36,132.7	42,576.0	49,160.8	55,873.8	62,710.5	69,694.6	76,847.9	84,131.2	91,535.0	98,495.7	105,572.5	112,753.9	117,283.0	121,963.3	124,233.0	126,632.2

C-66: Industrial Energy Savings Potential (dth) by Segment, by End Use, by Year (Scenario #66)

Segment/End Use	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FoodMfg	2,114.3	4,280.1	6,514.8	8,833.6	11,098.7	13,466.5	15,955.3	18,575.9	21,327.5	24,207.8	27,223.5	30,377.8	33,644.2	37,009.3	40,231.3	43,534.5	46,907.4	49,397.5	51,973.6	53,849.1	55,795.0
Process Heating	1,641.8	3,322.4	5,055.1	6,850.8	8,713.8	10,653.3	12,682.8	14,810.1	17,034.4	19,354.1	21,774.4	24,297.9	26,905.0	29,585.6	32,337.0	35,149.3	38,013.9	39,980.0	42,011.1	43,351.9	44,746.2
Space Heating	472.5	957.6	1,459.8	1,982.8	2,384.8	2,813.2	3,272.5	3,765.8	4,293.0	4,853.7	5,449.2	6,079.9	6,739.2	7,423.7	7,894.3	8,385.2	8,893.4	9,417.5	9,962.5	10,497.1	11,048.7
LumberWood	184.5	374.3	571.2	776.8	976.9	1,188.2	1,412.7	1,651.7	1,905.2	2,173.1	2,455.9	2,753.6	3,063.6	3,384.1	3,689.6	4,003.5	4,324.7	4,605.6	4,895.2	5,096.5	5,304.8
Process Heating	134.5	272.8	416.5	566.6	724.1	890.0	1,065.8	1,252.5	1,450.2	1,658.7	1,878.4	2,109.3	2,349.3	2,597.3	2,852.9	3,114.8	3,382.1	3,607.5	3,839.3	3,983.9	4,133.7
Space Heating	50.1	101.5	154.7	210.2	252.8	298.2	346.8	399.1	455.0	514.4	577.5	644.4	714.3	786.8	836.7	888.7	942.6	998.1	1,055.9	1,112.6	1,171.0
MetalsFab	1,258.4	2,548.7	3,881.6	5,266.8	6,648.4	8,094.7	9,617.0	11,222.5	12,910.7	14,680.4	16,535.3	18,477.1	20,489.4	22,563.5	24,597.6	26,682.2	28,810.1	30,425.6	32,094.1	33,251.8	34,452.8
Process Heating	1,061.5	2,149.5	3,273.1	4,440.3	5,654.4	6,922.1	8,253.0	9,652.8	11,121.3	12,657.3	14,264.0	15,942.9	17,680.4	19,469.2	21,307.1	23,187.1	25,103.2	26,500.2	27,941.5	28,876.4	29,847.5
Space Heating	196.9	399.2	608.5	826.5	994.0	1,172.6	1,364.0	1,569.6	1,789.4	2,023.1	2,271.3	2,534.2	2,809.0	3,094.3	3,290.5	3,495.1	3,706.9	3,925.4	4,152.6	4,375.4	4,605.3
Other	2,126.6	4,309.2	6,567.1	8,917.4	11,269.0	13,736.5	16,340.3	19,093.4	21,995.5	25,044.5	28,246.4	31,603.6	35,086.9	38,680.8	42,215.2	45,839.3	49,540.0	52,468.6	55,489.9	57,551.5	59,688.5
Process Heating	1,800.0	3,647.3	5,558.0	7,546.8	9,620.5	11,791.9	14,078.3	16,490.3	19,028.0	21,689.4	24,479.8	27,401.0	30,428.5	33,549.3	36,758.4	40,043.2	43,392.6	45,958.9	48,603.5	50,295.5	52,051.3
Space Heating	326.6	662.0	1,009.1	1,370.6	1,648.5	1,944.6	2,262.1	2,603.0	2,967.5	3,355.0	3,766.6	4,202.6	4,658.4	5,131.5	5,456.8	5,796.1	6,147.4	6,509.7	6,886.4	7,256.0	7,637.3
PaperMfg	206.3	417.4	634.8	860.0	1,084.1	1,317.6	1,561.9	1,818.3	2,086.4	2,366.1	2,658.1	2,962.6	3,277.4	3,601.2	3,918.2	4,242.7	4,573.6	4,801.3	5,037.0	5,206.1	5,381.9
Process Heating	175.6	355.1	539.9	731.1	929.1	1,134.6	1,349.2	1,573.4	1,807.3	2,050.5	2,303.8	2,567.3	2,839.3	3,118.5	3,404.9	3,697.5	3,995.3	4,188.9	4,389.2	4,523.6	4,663.5
Space Heating	30.7	62.3	94.9	128.9	155.1	182.9	212.8	244.8	279.1	315.6	354.3	395.3	438.2	482.7	513.3	545.2	578.2	612.3	647.8	682.5	718.4
StoneClayGlass	587.6	1,191.0	1,815.5	2,466.0	3,126.5	3,819.6	4,551.3	5,325.3	6,141.4	6,999.2	7,900.2	8,845.1	9,825.6	10,837.3	11,847.9	12,883.8	13,941.2	14,783.0	15,650.8	16,227.4	16,825.2
Process Heating	526.7	1,067.4	1,627.2	2,210.2	2,818.7	3,456.6	4,129.1	4,839.4	5,587.5	6,372.9	7,197.1	8,060.6	8,956.0	9,879.4	10,829.3	11,801.9	12,793.7	13,567.8	14,365.3	14,872.9	15,399.5
Space Heating	61.0	123.6	188.4	255.8	307.7	363.0	422.3	485.9	553.9	626.3	703.1	784.5	869.6	957.9	1,018.6	1,081.9	1,147.5	1,215.1	1,285.5	1,354.4	1,425.6
Grand Total	6,477.7	13,120.6	19,985.0	27,120.7	34,203.5	41,623.0	49,438.6	57,687.0	66,366.7	75,471.1	85,019.4	95,019.8	105,387.2	116,076.3	126,499.8	137,185.9	148,097.0	156,481.6	165,140.6	171,182.3	177,448.1



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Energy Efficiency Resource Assessment Report

Final Report

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Executive Summary

Introduction and Background

Energy Trust of Oregon (Energy Trust) engaged Navigant Consulting, Inc. (Navigant) to prepare an energy efficiency resource assessment of its service territory in August 2013. The primary purpose of this energy efficiency resource assessment is to enable Energy Trust to support the Integrated Resource Planning (IRP) planning process of its four funding utilities by providing a 20-year forecast of efficiency resource potential of each utility, as well as informing Energy Trust's strategic program planning, including program development. A primary product of this resource assessment is the Energy Trust Resource Assessment Model, which provides a flexible yet robust platform in which to estimate the technical and cost-effective achievable potential for demand-side resources in Energy Trust's service territory across the residential, commercial, and industrial sectors.

Approach

This section provides a high-level summary of the approach detailed in section 2 of this report.

Measure Identification and Characterization

Through a review of the previous Energy Trust potential model to identify high impact measures, the Regional Technical Forum (RTF) measures, and measure lists from other Navigant potential studies, Navigant considered over 530 measures across the residential, commercial, and industrial sectors for this resource assessment. Of these, 159 (68 residential, 49 commercial, and 42 industrial) conventional measures were characterized, which are considered to be commercialized technologies with noticeable market penetration and relatively stable price trajectories. Navigant characterized measures for 27 different customer segments across all three sectors. Additionally, Navigant identified numerous emerging technology measures for this study, and ultimately characterized 32 of the measures (10 residential, 17 commercial, and 5 industrial) considered most likely to become commercially available and cost-effective over the study period, and thus contribute to future savings. For all measures characterized, 33 measure inputs across all three customer segments were estimated using a combination of Energy Trust primary data review and analysis,¹ regional secondary sources, and engineering analysis. Navigant also adjusted cost and savings profiles for several measures that are subject to codes and standards, as well as emerging technology measures that are expected to evolve over time without codes and standards.

Estimation of Technical, Achievable, and Cost-Effective Achievable Potential

The Navigant team built a flexible and robust potential model as part of this resource assessment, which was used to estimate the technical, achievable, and cost-effective achievable potential for electric energy,

¹ Energy Trust measure analyses provide a synthesis of data from the other sources. In many cases, the Energy Trust uses RTF analyses directly. Navigant went to other sources for measure characterization where Energy Trust did not have an analysis or new data, or when an updated analysis had become available since Energy Trust's last update.

peak demand, and gas savings across all sectors. Technical potential was calculated differently depending on whether a measure is a retrofit, end of life replacement, or new construction measure. New construction technical potential is driven by new efficiency opportunities coming into the market due to new building stock and is used to determine the incremental annual addition to technical potential. Technical potential is considered to be “constrained” for Replace-on-Burnout (ROB) measures in that potential is limited by the rate at which baseline measures turn over due to burnout. This view of potential was adopted for consistency with Energy Trust’s existing planning framework and program opportunities. For retrofit measures, technical potential is calculated using the entire building stock and is not constrained by any pre-assumed rate of adoption.² Achievable potential is specified as a percentage of the technical potential. The percentage of technical potential that is deemed “achievable” is by default 85% based on the Northwest Power and Conservation Council (Council) planning assumptions.³

Cost-effective achievable potential was estimated as a subset of achievable potential when limited to only measures that, based on the first-cut analysis incorporated into this study, pass the Total Resource Cost (TRC) test. To account for measures with multiple tiers of efficiency that could compete for the same installation, Navigant employed a tiered “incremental” approach where savings and incremental costs of a competing measure were compared with the measure just below it in ranking, from a TRC perspective. The study also provides an expanded view of emerging technology measures by quantifying the cost, potential, and risks associated with them over the modeling period. Finally, Navigant estimated the risk-adjusted tiered potential by program type, end use, and customer segment, along with cost-effectiveness outputs, including leveled cost of energy and energy efficiency supply curves.⁴

Findings

This section of the executive summary discusses high-level findings of the analysis in addition to providing aggregate electric energy and natural gas savings results. The potential estimates presented in this section and in the main body of the report are estimates of “gross” savings, which represent changes in consumption that result directly from program-related actions taken by consumers that are exposed to the program. Detailed results of the resource assessment including sector level views of potential disaggregated by customer segment, end use, and program type are provided in the main body of this report.

Electric Energy Potential

Cumulative technical, achievable, and cost-effective achievable electric energy savings for all sectors are listed in Figure ES-1. This represents potential from conventional measures only and excludes savings from any emerging technologies. Technical and achievable potential at the end of the 20-year forecast

² The rate of adoption is considered at a later stage in Energy Trust’s planning process.

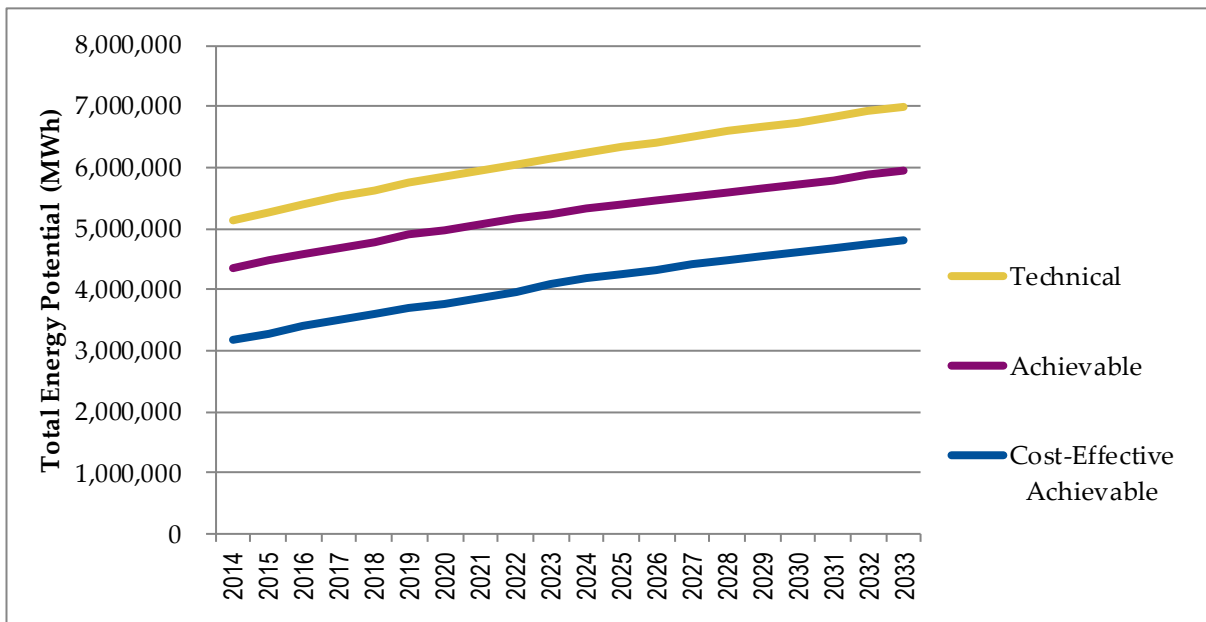
³ Achievable Savings – A Retrospective Look at the Northwest Power and Conservation Council’s Conservation Planning Assumptions - http://www.nwcouncil.org/media/29388/2007_13.pdf

⁴ While tiered potential includes savings from both conventional and emerging technology measures, risk-adjustments were only made to emerging technology measures to account for uncertainty in their ability to reliably produce future savings.

horizon are 6,984,232 and 5,936,598 MWh, respectively. Both forecasts follow similar paths with achievable potential estimated using an 85% achievability factor. Cost-effective achievable potential by 2034 is estimated to be 4,806,536 MWh, which is 80% of achievable potential, thus showing significant cost-effective achievable electric energy potential over the forecast horizon. The overall increase in potential over the time horizon is driven by the projected growth in building stock, lending additional opportunities for savings in new buildings.

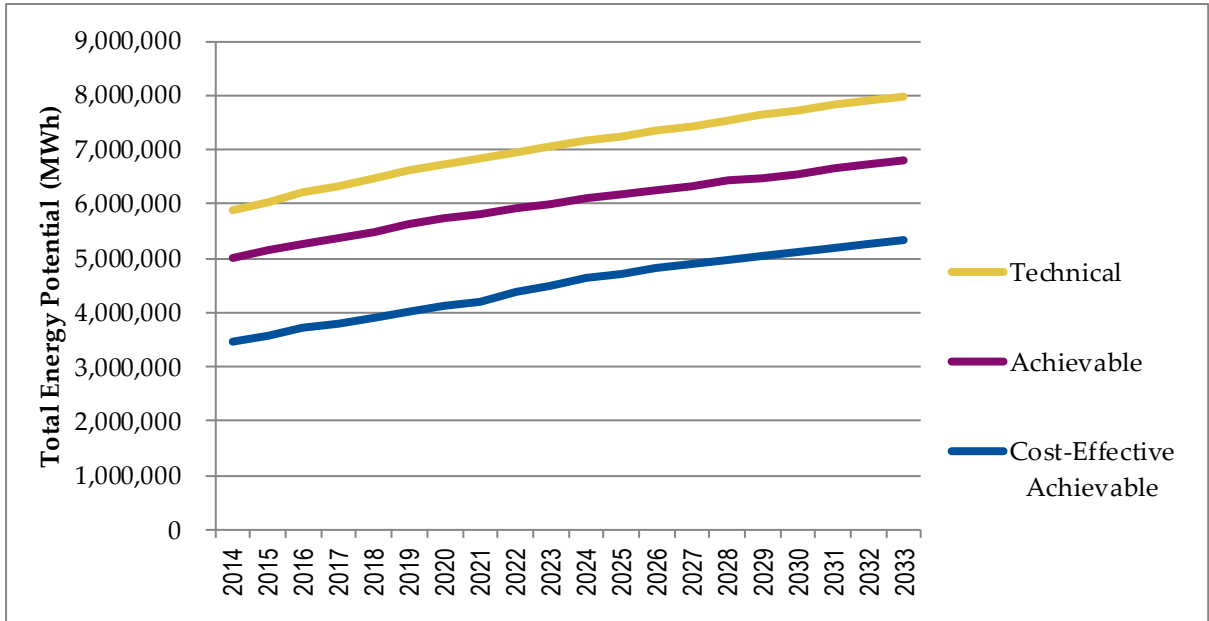
Navigant’s modeling approach includes an emerging technology (ET) overlay that enables the model to capture the range of possible savings from ETs due to cost and efficiency improvements over time. Figure ES-2 shows the technical, achievable, and cost-effective achievable potential with the inclusion of emerging technologies. Technical and achievable potential at the end of the 20-year forecast horizon are 7,994,648 and 6,795,451 MWh, respectively. By 2033, cost-effective achievable potential increases to 5,329,351 MWh, after the addition of emerging technologies. Figure ES-3 shows the contribution of emerging and conventional measures toward cumulative risk-adjusted, cost-effective achievable electric savings potential across all three sectors over the study period. By 2033, emerging technologies constitute about 15% of total cost-effective achievable potential. Cumulative cost-effective achievable electric energy potential as a percentage of baseline forecast energy sales (with emerging technology overlay) in 2033 is 11.9%, as shown in Table ES-2 **Error! Reference source not found.**. More detail on the key drivers of electric energy savings potential, including on emerging technology savings, are provided in sections 3 and 4 of this report. Table ES-1 shows a summary of electric savings potential in 2033 in units of Average Megawatts (aMW).

Figure ES-1. Cumulative Electric Energy Savings Potential (MWh) – without ETs



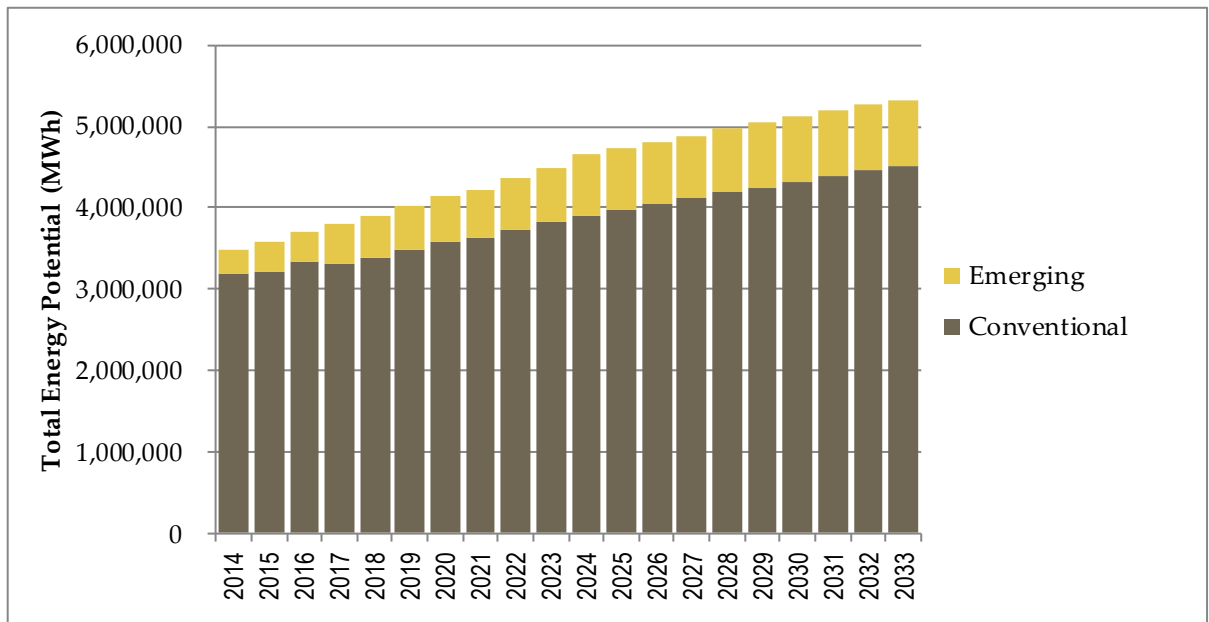
Source: Navigant analysis, 2014

Figure ES-2. Cumulative Electric Energy Savings Potential (MWh) – with ETs



Source: Navigant analysis, 2014

Figure ES-3. Cumulative Cost-effective Electric Energy Savings - Emerging vs. Conventional



Source: Navigant analysis, 2014

Navigant also estimated peak demand (MW) savings for summer and winter periods as part of this resource assessment. The model estimates peak demand savings using peak demand multipliers for each

energy loadshape.⁵ Cumulative cost-effective achievable peak demand savings are projected to be 640 and 801 MW by 2033 for summer and winter periods respectively, as shown in Table ES-2**Error!**

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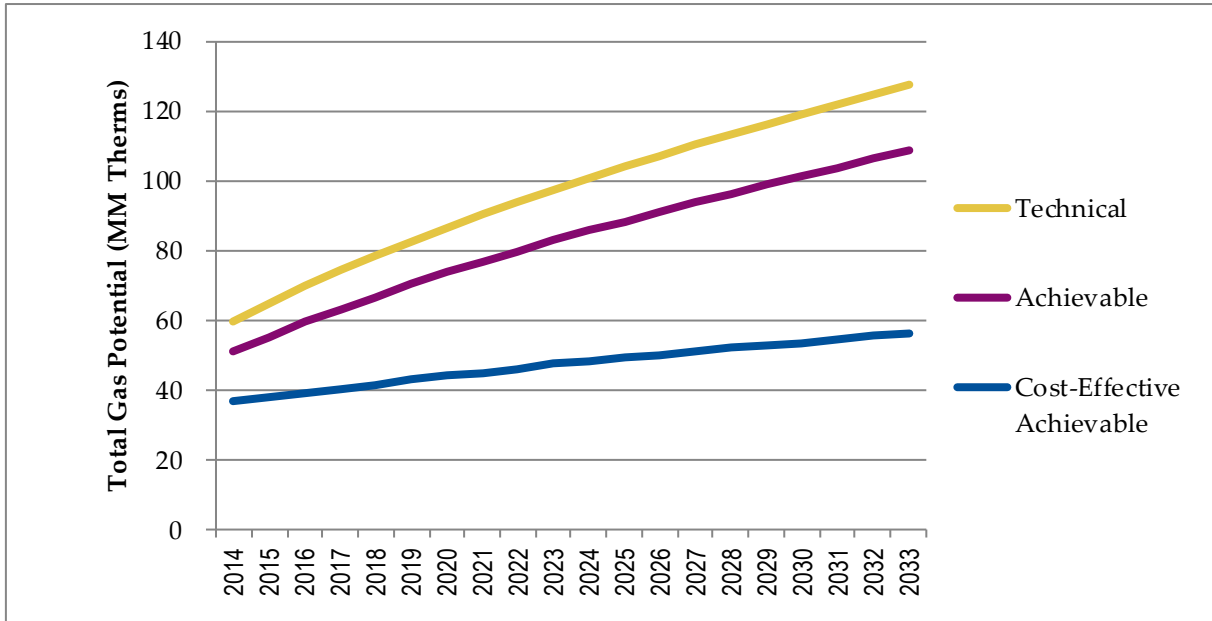
Natural Gas Potential

Cumulative technical, achievable, and cost-effective achievable gas savings potential for conventional measures across all sectors are presented in Figure ES-4. Technical potential increases steadily from 60 MMtherms in 2014 to about 128 MMtherms in 2033. This increase in potential is driven by the forecasted growth in building stock within the Northwest Natural (NWN) and Cascade Natural Gas (CNG) service territories. Similar to electric technical potential, gas technical potential also shows a sharp rise over the 20-year forecast horizon as it is driven by future growth in ROB and new construction measures. Cost-effective achievable potential is 56 MMtherms by 2033, which represents about 51% of achievable potential.

Figure ES-5 presents the cumulative gas savings potential with the inclusion of the emerging technology overlay. In this case, technical potential increases from 84 MMtherms in 2014 to about 157 MMtherms in 2033. Cost-effective achievable gas potential increases to 61 MMtherms by 2033 with addition of the emerging technologies. Similar to electric savings, achievable gas savings potential is also estimated using an 85% achievability factor over the forecast horizon. Cumulative cost-effective achievable gas potential as a percentage of baseline forecast gas sales by 2033 is 5.3% (with emerging technology overlay), as shown in **Error! Reference source not found..** Navigant notes that there is a larger gap between achievable and cost-effective achievable potential for gas savings compared with electric. Low gas cost-effectiveness is driven by low forecasts of future avoided gas costs, which result in relatively low benefits in the TRC calculation. Section 3.1.2 has more details on the drivers of low gas cost-effectiveness. Figure ES-6 shows the contribution of emerging and conventional measures toward cumulative risk-adjusted cost-effective achievable gas savings potential across all three sectors over the study period. By 2033, emerging technology measures contribute up to 19% of total cost-effective gas potential.

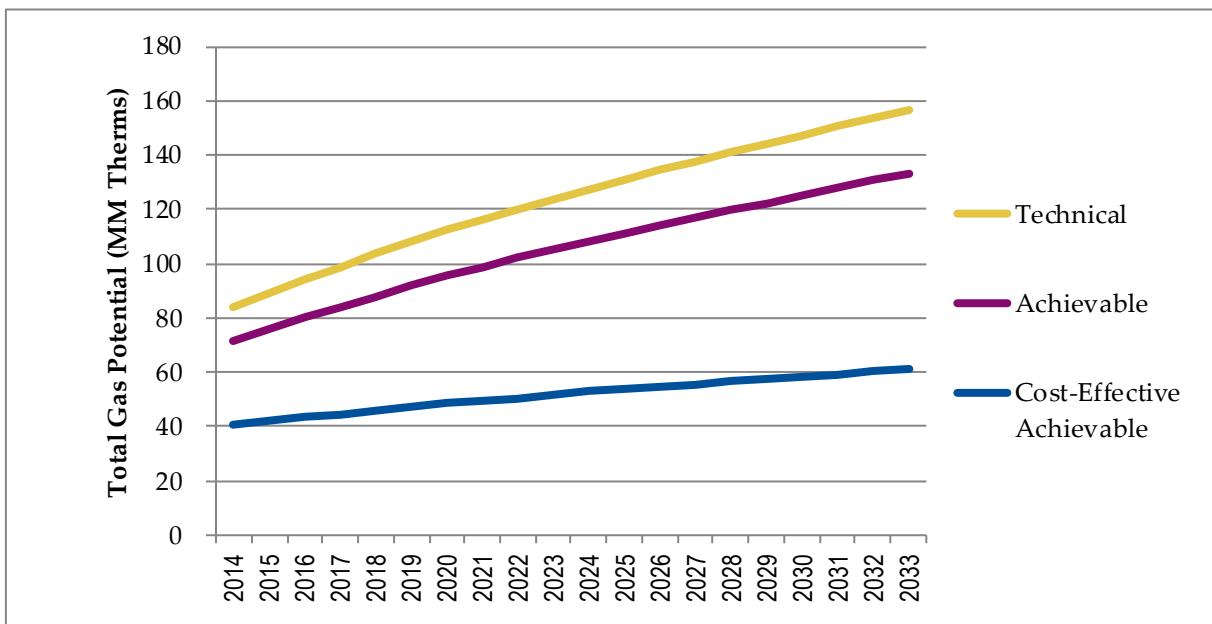
⁵ The peak demand multipliers used in this study were calculated based upon the Northwest Power and Conservation Council loadshapes.

Figure ES-4. Cumulative Gas Savings Potential (MMtherms) – without ETs



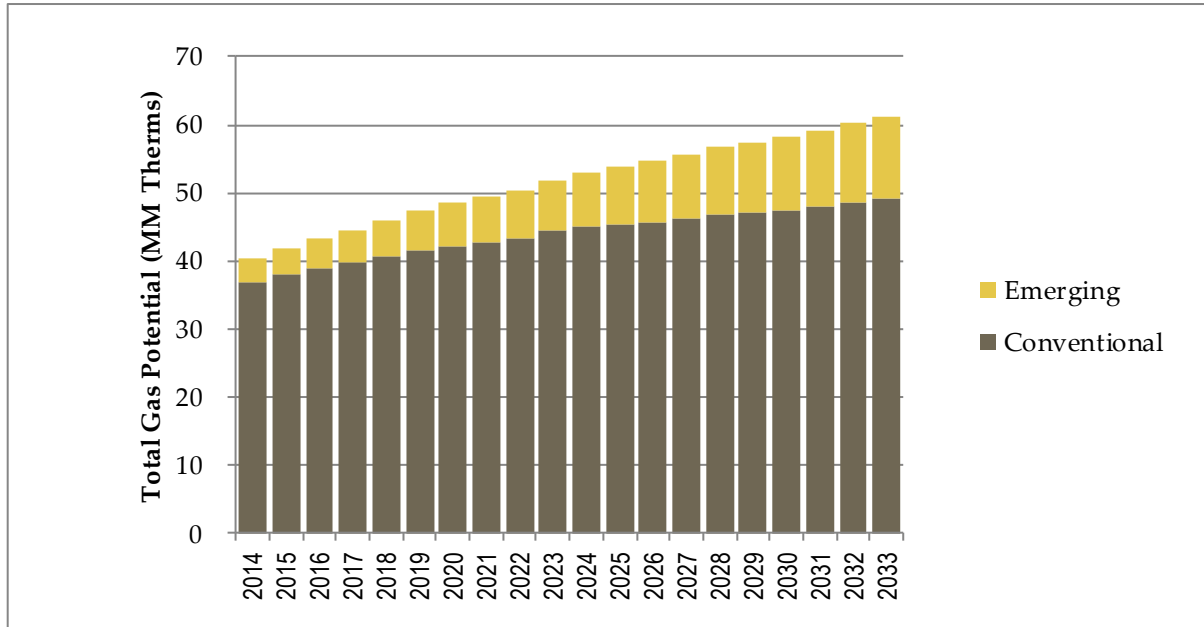
Source: Navigant analysis, 2014

Figure ES-5. Cumulative Gas Savings Potential (MMtherms) – with ETs



Source: Navigant analysis, 2014

Figure ES-6. Cumulative Cost-effective Gas Savings - Emerging vs. Conventional



Source: Navigant analysis, 2014

Table ES-1. Summary of Electric Savings Potential in 2033 (Average Megawatts)

Sector	Program	Technical	Achievable	Cost-Effective
				Achievable
Residential	New	81	69	60
	Retrofit	155	132	62
	Replace	161	136	105
Commercial	New	108	92	77
	Retrofit	184	157	118
	Replace	17	14	11
Industrial	New	12	10	10
	Retrofit	176	150	150
	Replace	19	16	15

Source: Navigant analysis, 2014

Table ES-2. Aggregate Cumulative Cost-effective Achievable Potential - All Sectors

Year	Electric Savings		Demand Savings		Gas Savings	
	MWh	% of Sales	Summer MW	Winter MW	MM Therms	% of Sales
2014	3,477,238	10.3%	442	530	40.3	4.7%
2015	3,575,951	10.5%	452	544	41.8	4.8%
2016	3,706,599	10.6%	468	563	43.3	4.9%
2017	3,802,344	10.7%	478	577	44.6	5.0%
2018	3,904,252	10.8%	490	591	45.9	5.1%
2019	4,012,545	10.9%	501	607	47.3	5.2%
2020	4,137,989	11.1%	513	626	48.5	5.2%
2021	4,212,197	11.2%	521	637	49.3	5.2%
2022	4,363,789	11.4%	541	659	50.3	5.3%
2023	4,478,869	11.5%	551	677	51.9	5.4%
2024	4,651,288	11.8%	574	702	53.0	5.4%
2025	4,728,601	11.8%	582	714	53.8	5.4%
2026	4,810,133	11.9%	590	725	54.7	5.4%
2027	4,878,684	11.9%	597	736	55.6	5.4%
2028	4,968,898	11.9%	606	749	56.7	5.4%
2029	5,043,665	11.9%	614	760	57.4	5.4%
2030	5,115,290	11.9%	620	770	58.3	5.4%
2031	5,185,445	11.9%	627	780	59.2	5.4%
2032	5,266,927	11.9%	635	792	60.2	5.4%
2033	5,329,351	11.9%	640	801	61.1	5.3%

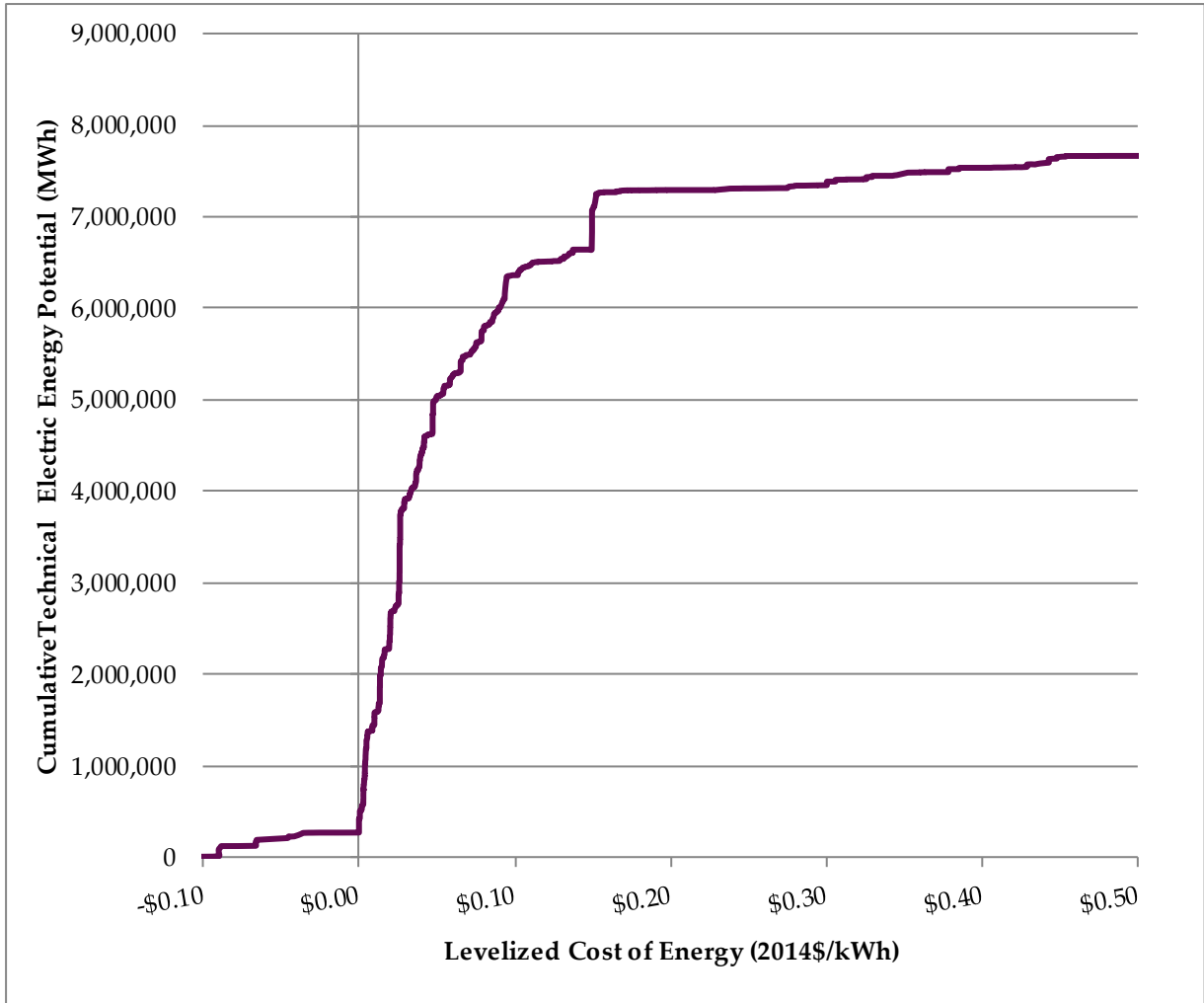
Source: Navigant analysis, 2014

Supply Curves

Figure ES-7 and Figure ES-8 show traditional efficiency supply curves for all sectors in 2033. The supply curves plot levelized cost of energy saved as a function of cumulative technical potential, for electric and gas savings measures respectively. These supply curves are constructed using individual efficiency measures that are sorted on a least-cost basis,⁶ and savings that are calculated on an incremental or tiered basis relative to the measures that precede them. Figure ES-7 shows the supply curve for cumulative energy potential in 2033. Approximately 266,000 MWh are available with levelized cost of energy less than zero. This potential is derived from light-emitting diode (LED) street lights, efficient showerheads, and faucet aerators whose present value of non-energy benefits exceed the upfront equipment costs, resulting in a negative levelized cost. There is an additional 160,936 MWh of potential from LEDs, switched reluctance motors, and high efficiency chillers that can be achieved at almost zero cost. Nearly 5,756,952 MWh of cumulative electric energy potential are available at levelized costs below \$0.08 per kWh levelized (in 2014 dollars), which is the lowest forecast of avoided energy costs in 2033.

⁶ Levelized measure costs were used as the cost basis for sorting the supply curves. To account for competing measures in this process, Navigant estimated an incremental levelized cost relative to the next highest rank within a competition group. Section 2.2.2 offers additional detail on the calculation of levelized costs.

Figure ES-7. Electricity Savings Supply Curve (2033)⁷



Source: Navigant analysis, 2014

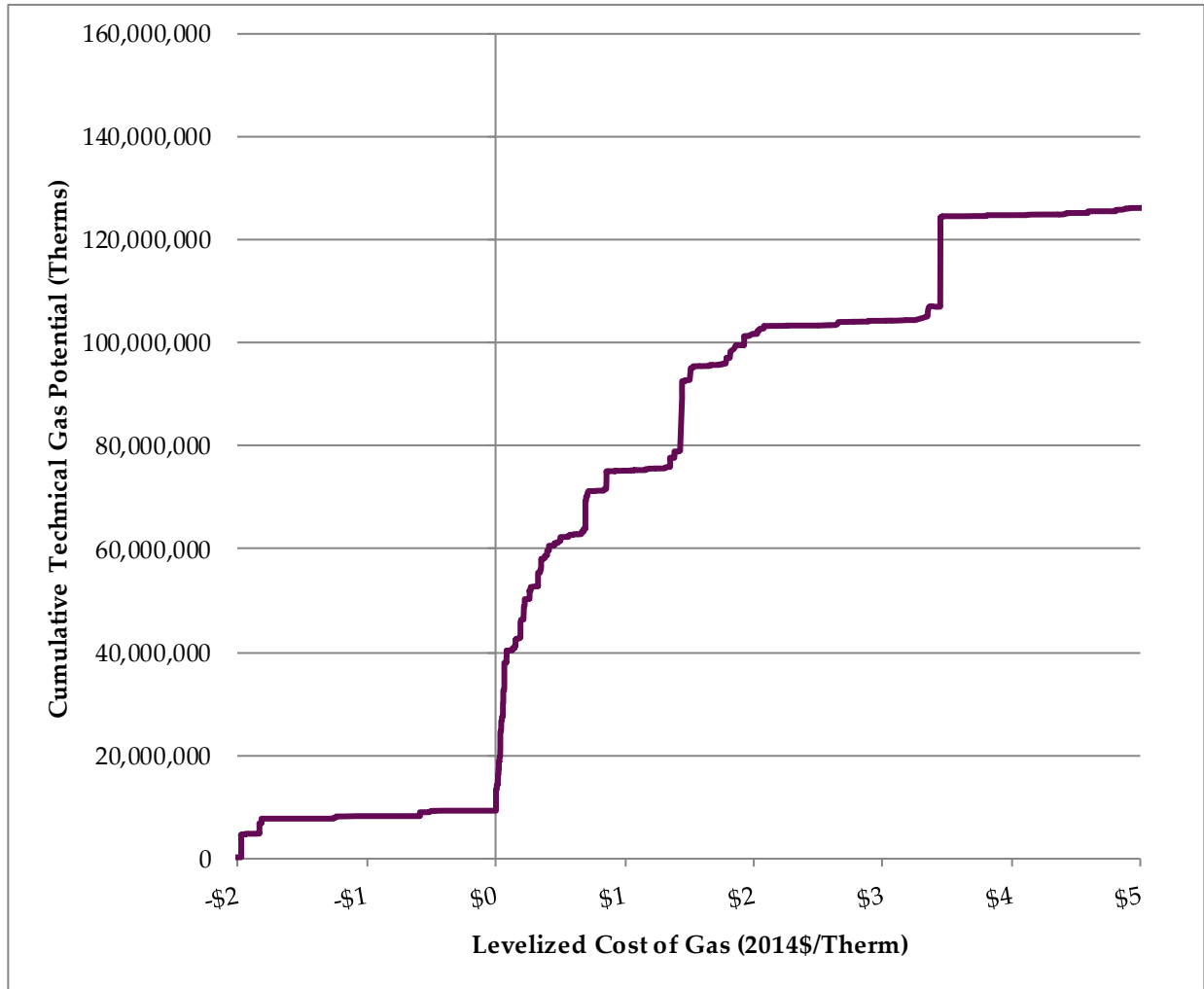
The levelized cost supply curve for cumulative gas saving potential in 2033 is shown in Figure ES-8. Negative-cost measures account for 9.2 MMtherms and are associated with efficient showerheads. Roughly 59 MMtherms of cumulative gas savings can be achieved at costs below \$0.40 per therm levelized, which is the lower bound of avoided cost forecasts in 2033. Approximately 147 MMtherms of cumulative gas savings can be achieved at costs below \$30 per therm levelized. Beyond 147 MMtherms of potential, costs begin to increase quickly.

It is important to recognize that customers may not view these as zero or negative-cost measures – most have upfront costs that are balanced by savings in replacement equipment costs or operation and

⁷ Graph has been scaled to show the area of interest, but additional potential above a levelized cost of of \$0.50 per kWh is not shown.

maintenance (O&M) cost, or in non-energy costs such as water, waste treatment, and so on. The supply curve considers all these values together, taking a long-term view.

Figure ES-8. Gas Savings Supply Curve (2033)⁸



Source: Navigant analysis, 2014

Caveats and Limitations

There are several caveats and limitations associated with the results of this study. The forecasted potential in this study is based on the best estimates of data available today. An important caveat to consider, however, is that uncertainty in the input data used can affect estimates of overall potential. The estimates of achievable potential assume an 85% achievability factor. This sets an upper limit of market penetration in the region over a 20-year period. While this is consistent with regional assumptions and is supported by retrospective research conducted by the NW Power and Conservation Council, there

⁸ Graph has been scaled to show the area of interest, but additional potential above a levelized cost of \$5 per therm is not shown.

remains uncertainty as to how much of the technical potential is achievable over the modeling period. Furthermore, cost-effective achievable potential in this study is not limited by actual program rollout rates or market acceptance dynamics; rather, it reflects the bucket from which program achievements can draw, at a rate that is to be defined by Energy Trust. The issue of rollout rate is addressed in later stages of Energy Trust's planning process. Finally, the risk associated with future cost and performance of emerging technologies introduces uncertainty into the estimates of future potential. For a full explanation of the limitations of this study, please see section 2.3, "Caveats and Limitations."

1 Introduction

1.1 Background and Study Goals

Energy Trust of Oregon (Energy Trust) selected Navigant Consulting, Inc. (Navigant) to prepare an energy efficiency resource assessment of its service territory in August 2013. The primary purpose of this resource assessment is to enable Energy Trust to support the Integrated Resource Planning (IRP) planning process of its four funding utilities by providing a 20-year forecast of efficiency resource potential of each utility, as well as informing Energy Trust’s strategic and program planning, as well as program design.

An additional focus of this assessment has been to include an “emerging technology” overlay capable of quantifying costs, potential, and risks associated with uncertain, but high-potential energy savings measures. Finally, a key component of this resource assessment is the Energy Trust Resource Assessment Model, which provides a flexible platform in which to estimate the technical and achievable potential for demand-side resources in Energy Trust’s service territory. This report does not include utility-specific results. However, the companion model does offer the ability to look at individual results for all four funding utilities (Portland General Electric (PGE), Pacific Power (PAC), Northwest Natural (NWN), and Cascade Natural Gas (CNG)).⁹

1.2 Organization of Report

This report is organized as follows: Section 2 describes the study approach to estimating potential for energy efficiency savings, including a discussion of measure identification and characterization and the approach to simulating technical, achievable, and cost-effective achievable potential. Section 3 offers the results of the potential study analysis for energy efficiency measures, including a summary of aggregate savings potential. Sections 4, 5 and 6 offer disaggregated savings results by sector, customer segment, end use, and program, as well as a discussion of emerging technologies and the top measures contributing toward potential. Section 7 offers details on energy efficiency potential supply curves.

⁹ Utility-specific results will be developed as part of the IRP process at each utility, using the most current utility-specific load forecasts.

2 Approach to Electric Energy, Demand, and Gas Savings

This section provides an overview of Navigant’s approach to estimating electric energy, demand, and gas savings. Section 2.1 describes the sources of the key inputs to the analysis, including the framework used for the measure identification and characterization process, details on how emerging technologies and code adjustments were treated. Section 2.2 discusses the methodological approach to estimating technical, achievable, and cost-effective achievable potential including details on the calculation of cost-effectiveness and tiered potential savings. Data developed as part of the measure characterization process was imported into the resource assessment model, which employs a combined “bottom-up/top-down” approach to identify and quantify the savings of all energy efficiency measures depending on the sector.

2.1 *Measure Identification and Characterization*

2.1.1 Measure Lists Development

Navigant developed comprehensive measure lists of conventional technologies as the first step in the measure characterization process. Conventional measures are commercialized technologies with noticeable market penetration and relatively stable price trajectories. In developing the conventional measure lists, Navigant reviewed the Energy Trust 2011 potential model and screened electric and gas technologies that contributed approximately 90% of the potential energy savings in the 2011 model. The measure lists were supplemented by additional measures in which Navigant reviewed measures from the Regional Technical Forum (RTF) and measure lists from other potential models that Navigant had developed in the past. Navigant then modified the measure lists to incorporate feedback from Energy Trust, including adding, consolidating, and deleting measures.

Navigant considered over 200 residential measures, 190 commercial measures, and 140 industrial measures. The measures included devices, structured approaches to modifying behavior that save energy, and approaches with both hardware and behavioral components. Ultimately, Navigant characterized 68 residential measures, 49 commercial measures, and 42 industrial measures in the final model. The final selection of measures was driven by the estimated energy savings potential, as well as Energy Trust and regional data availability. The final measure lists can be found in Appendix A.

Navigant characterized each of the residential measures on the final list for three customer segments: single family (SF), multi-family (MF), and manufactured homes (MH). Weather dependent measures were characterized for each of the climate zones. Some examples of weather dependent measures include heat pumps, solar water heaters, insulation and windows, and ENERGY STAR® new homes.

The commercial measures were characterized for all applicable commercial customer segments: office, restaurant, retail, grocery, warehouse, school, college, hospital, other health, lodging, other, data center, and street lighting.

Similarly, Navigant characterized the industrial measures for all applicable industrial customer segments: agriculture, chemicals, cold storage, metal foundries, food products, high technology, pulp & paper, metal fabrication, transportation and equipment, wood products, and other industrial sectors.

2.1.2 Measure Characterization Inputs

The measure characterization consisted of estimating or defining 33 measure inputs across customer segments and two climate zones. These parameters are listed and defined¹⁰ as follows:

1. **Measure ID**- Unique identifier of the measure in the model
2. **Measure Char Owner**- Initials of analyst completing the measure characterization
3. **Unique Measure Name**- Name specifying the efficient measure
4. **Zone Applicability**- Specification of the weather zone to which the measure is applicable. Most measures are applicable to both zone 1 and zone 2.
5. **Measure Description**- Detailed description of the efficient measure, including efficacy level
6. **Baseline Assumption**- Specification of the base measure being replaced, including efficacy level
7. **Conventional or Emerging Technology**- Identifier to distinguish if a measure is a conventional technology or an emerging technology
8. **End-Use Category**- Input to map a measure to an end-use category such as space heating and cooling, water heating, lighting, appliance, refrigeration, weatherization, behavioral, and other.
9. **Customer Segment**- Designation of customer segment
10. **Replacement Type**- Characterization of the measure as a retrofit (RET), replace-on-burnout (ROB), or a new construction (NEW) application.¹¹
11. **Scaling Basis** – Input to identify the unit basis for density values. For most of the residential measures, the scaling basis is the number of residential homes.
12. **Unit Basis**- Unit basis for cost and savings characterization (e.g., per unit or per square foot)
13. **Base Measure Lifetime**- The effective useful life of the baseline measure in years.
14. **Efficient Measure Lifetime**- The effective useful life of the efficient measure in years.
15. **Base Measure Cost**- Cost of installing the baseline technology in Real 2014 \$ per unit basis
16. **Efficient Measure Cost**- Cost of installing the efficient measure in Real 2014 \$ per unit basis
17. **Cost Source(s)**- Documentation of the data source(s) for the cost assumptions
18. **Base Energy Consumption**- Annual electricity consumption of the baseline technology in kWh per unit basis
19. **Efficient Energy Consumption**- Annual electricity consumption of the efficient measure in kWh per unit basis
20. **Energy Savings Loadshape**- The relevant electricity savings loadshape of the efficient measure. The loadshape is used to allocate energy savings across time.

¹⁰ The measure characterization template includes detailed descriptions of each of the measure characterization inputs.

¹¹ ROB is applied to measures where the primary economically feasible opportunity to substitute more efficient equipment occurs at or near the time of equipment failure. Retrofit is applied where it may be economically feasible to replace equipment for efficiency reasons earlier in its life. Some measures have more than one replacement type, for example, if a measure has both new application and replace-on-burn out applications, the replacement type is defined as “NEW and ROB.”

21. **Base Gas Consumption**- Annual gas consumption of the baseline technology in therms per unit basis
22. **Efficient Gas Savings**- Annual gas consumption of the efficient measure in therms per unit basis
23. **Gas Savings Loadshape**- The relevant gas savings loadshape
24. **Operation and Maintenance (O&M) Savings**- Indication of non-energy benefits such as water savings and operation and maintenance savings resulting from the installation of the efficient measure in \$ per year per unit basis
25. **Savings Source(s)**- Documentation of the data source(s) for savings assumptions
26. **Total Measure Density (Base+EE)**- The measure density (e.g., quantity of measures per home), as the sum of the base and efficient technology densities
27. **Technical Suitability**- The fraction of the total baseline measure which could be replaced with the efficient measure
28. **Baseline Initial Saturation**- The initial saturation of the baseline measure as defined by the fraction of the end-use stock that has the baseline measure installed
29. **Heating Fuel Type Applicability Multiplier**- Designation of the appropriate space heating fuel type to electric or gas-specific measures
30. **Domestic Hot Water (DHW) Fuel Type Applicability Multiplier**- Designation of the appropriate DHW fuel type for electric- or gas-specific measures
31. **Competition Group**- Identifier of measures that are competing for the same installation. Measures in the same competition group share the same baseline technology; therefore, the baseline initial saturation and total measure density are the same for measures in the same competition group.
32. **Density/Applicability Source(s)**- Documentation of the data source(s) for density and applicability factors
33. **Emerging Technology Risk Factor**- Multiplier to account for emerging technology risk

Navigant gave priority to Energy Trust program data and prescriptive costs and savings resources when characterizing the measures.¹² Other regional data sources used in this analysis include the Residential Building Stock Assessment (2011), Commercial Building Stock Assessment (2009), RTF unit energy savings (UES) measure workbooks, the Northwest Power Council 6th Power Plan, and the Energy Trust 2011 residential, commercial, and industrial resource potential models. Navigant used national data sources where regional data were unavailable. Navigant documented the data sources for inputs in the measure characterization input files. The following table summarizes the data sources for key measure characterization inputs.

¹² Energy Trust measure analyses provide a synthesis of data from the other sources. In many cases, the Energy Trust uses RTF analyses directly. Navigant went to other sources for measure characterization where Energy Trust did not have an analysis or new data, or when an updated analysis had become available since Energy Trust's last update.

Table 2-1. Summary of Measure Characterization Input Data Sources

Measure Input	Data Sources
Measure Costs, Measure Savings, Measure life, Energy and Gas Savings Loadshapes	» Energy Trust Blessing Memos ¹³
	» Energy Trust 2011 Potential Model
	» Energy Trust Program Data
	» Impact Evaluation of Energy Trust's 2009-2011 Production Efficiency Program
	» RTF measure workbooks
	» Database for Energy Efficient Resources (DEER)
	» Engineering Analyses
	» DOE Appliance Standards Rulemaking Supporting Documents
	» Northwest Power Conservation Council (NWPCC)
	» Industrial Assessment Center (IAC) Database
Fuel Type Applicability Multiplier, Density, Baseline Initial Saturation, Technical Suitability, End-use Consumption Breakdown	» RBSA 2011
	» CBSA 2009
	» Northwest Non-Residential Lighting Market Study
	» Energy Trust 2011 Potential Model
	» ENERGY STAR shipment reports
	» California Potential, Goals, and Target Model
	» Engineering Assumptions
» Manufacturing Energy Consumption Survey (MECS)	
Codes and Standards Multiplier, Baseline Consumption Multiplier	» Department of Energy Code of Federal Regulations (DOE CFR)
	» Engineering Analyses

Source: Navigant analysis, 2014

2.1.3 Measure Characterization Approaches

Navigant reviewed Energy Trust internal data, regional resources, and Navigant internal resources to determine the appropriate measure characterization approach for each of the measures.

2.1.3.1 Energy Savings and Costs Approaches

RBSA and CBSA provided building stock measure counts or density proxies enabling Navigant to characterize residential and commercial measures with a bottom-up approach. The bottom-up approach estimates the unit energy savings and costs of each measure and scales the savings potential using measure densities.

Stock assessment data were not available for the industrial sector; therefore, Navigant characterized industrial measures using a top-down approach. Measure savings were calculated as percentages of the customer segment consumption.¹⁴

¹³ “Blessing memos” are cost-benefit analysis and approval memos for Energy Trust prescriptive efficiency measures.

¹⁴ This is common practice for industrial resource assessments.

Residential and Commercial Energy Savings and Costs Approaches

Navigant took three general approaches to analyzing residential and commercial measure energy savings and costs:

1. **Energy Trust Primary Data Review and Analysis-** The majority of measures used Energy Trust primary data. Navigant reviewed Energy Trust blessing memos and program data. Some Energy Trust analyses included multiple efficiency tiers; for those instances, the measure characterization team weighted the measure costs and savings by program uptake or measure market share sourced from RBSA or CBSA.
2. **Regional Secondary Resources-** RTF Unit Energy Savings workbooks contained comprehensive regional engineering analyses for several measures such as clothes washers, dishwashers, refrigeration, and window measures. Upon reviewing both Energy Trust and RTF analyses, the RTF input might be chosen if the data vintage was more recent.
3. **Engineering Analysis-** Measures without Energy Trust data or regional analysis were characterized using engineering algorithms.

Industrial Energy Savings and Costs Approaches

The savings and costs estimations vary depending on measure data availability. The Industrial Assessment Center (IAC) database, Energy Trust Production Efficiency Program impact evaluation data, and the existing Energy Trusts industrial resource assessment tool were the three main data sources:

1. **IAC Database¹⁵:** The IAC database collected nationwide industrial facility assessment data including facility energy consumption, efficiency improvements recommendation, savings, and costs of implementation. Navigant extracted relevant measure data from the IAC database by searching for applicable recommendation codes.¹⁶ The percentage energy savings from all relevant entries were averaged to represent the overall measure savings as a percentage of facility consumption and scaled to customer segment consumption. Navigant calculated the measure cost by averaging the \$/energy saved of all relevant IAC entries.
2. **Energy Trust Production Efficiency Program Verification and Program Data:** Navigant utilized Energy Trust Production Efficiency Program's verification data to develop measure savings as a percentage of the whole facility consumption. From the same dataset, Navigant calculated the average measure cost in \$/energy saved. The savings percentages and measure costs were applied to each of the customer segments.
3. **Energy Trust Industrial Resource Assessment Tools:** The IAC database and Energy Trust's program data do not cover a subset of industrial measures on the measure list; for those measures Navigant relied on secondary sources and the existing industrial tool to populate savings percentages and the measure costs. Using Manufacturing Energy Consumption Survey data, Navigant developed an end-use consumption map disaggregating the percentage end use of the total energy consumption for each of the industrial customer segments for both electricity

¹⁵ The IAC database is available at <http://iac.rutgers.edu/database/>

¹⁶ The IAC recommendation code mapping is available in the measure input template.

and gas fuel types.¹⁷ Measure savings were estimated as a percentage of end-use consumption and extrapolated to the customer segment level.

2.1.3.2 *Density and Initial Saturation*

The RBSA and CBSA served as the primary resource for developing residential and commercial measure total densities and initial saturation factors. Navigant extracted primary data from the RBSA and CBSA and calculated the densities and initial saturation factors by customer segments. For instances where data was not available, Navigant reviewed the existing model and conducted secondary research to estimate the density and initial saturation. One of the goals of the measure characterization task was to best customize measure input data to Energy Trust’s resource assessment needs. Therefore, Energy Trust specific data had the highest priority followed by Oregon and region specific data.

Navigant estimated density per home for each residential measure. Density data for most residential measures were available through RBSA. Navigant filled data gaps using applicable regional studies, primary data collected for potential studies completed in other regions, or secondary research.¹⁸

For commercial measures without unit density data, the efficient measure savings were calculated as a percentage reduction of the baseline measures. Navigant then scaled the energy savings by applying the savings percentages to the end-use energy use intensities (EUI).

Navigant established the baseline EUI for each end use and building type using CBSA whole building EUI estimates and the end-use energy consumption distribution using the NWPCC 6th Power Plan and Commercial Buildings Energy Consumption Survey (CBECS). The EUI approach was applicable to commercial lighting, data center, heating, ventilation, and air-conditioning (HVAC), and water heating measures.

Since Navigant analyzed the industrial measures with a top-down approach, savings were represented by a percentage reduction of the total customer segment consumption; therefore, the default industrial measure density value is 1.

¹⁷ The energy use map by customer segment is included in the measure input template.

¹⁸ Specific data sources are documented in the measure input templates.

2.1.3.3 Treatment of Bundled Measures vs. Individual Measures in New Construction Applications

The ENERGY STAR Builder Option Package (BOP) Home measure was a new construction bundle measure, which included multiple individual measures.¹⁹ To avoid double counting technical savings potential, Navigant adjusted the baseline of the individual measures included in the ENERGY STAR BOP measure to reflect minimum ENERGY STAR BOP efficacy levels. In other words, savings and costs of these individual measures under the new replacement type were incremental to the ENERGY STAR BOP measure. The following individual measures were affected:

- » Screw-In Compact Fluorescent Lamp (CFL)
- » Screw-In Light-Emitting Diode (LED)
- » Gas Storage Water Heater
- » Solar DHW- Electric
- » Solar DHW- Gas
- » Tankless Gas Hot Water Heater
- » Tier 1 and Tier 2 Heat Pump Water Heater
- » Specialty Lights
- » Windows (U=0.25)

2.1.3.4 Tax Credits

Navigant subtracted Oregon Department of Energy tax credits from the incremental cost of eligible residential measures listed in Table 2-2.²⁰

Table 2-2. Oregon Department of Energy Residential Energy Efficiency Tax Credits²¹

Measure	Tax Credit
Electric Heat Pump Water Heater Tier 1	\$600
Electric Heat Pump Water Heater Tier 2	\$837
Gas Water Heater .85 Efficiency	\$246
Gas Furnace AFUE 95-96.9%	\$352
Heat Recovery Ventilation	\$225
Air-source heat pump 9.0	\$759
Ductless heat pump (mini-split)	\$1040

Source: Navigant analysis, 2014

¹⁹ A bundle was modeled in this case because it simplified the model and reflected the primary savings opportunity in the market – ENERGY STAR is an important driver in program participation, so the “package” is viewed by much of the market as a discrete choice.

²⁰ This is consistent with guidance from the Oregon PUC on determining incremental costs for purposes of the Total Resource Cost test. Oregon Department of Energy 2014 Residential energy Tax Credit Rates:

<http://www.oregon.gov/energy/CONS/docs/2014RETCRates.pdf>

²¹ Energy Trust has included the Solar Domestic Hot Water Heater Federal and State tax credits in their cost assumptions, therefore the Solar DHW credits are not included in this list.

Navigant completed the tax credit review for all commercial measures. Commercial federal tax credits expired in 2013, and the state tax credits are greatly diminished in value and not as widely available as the previous Business Energy Tax Credit (BETC) program. Therefore, there is no adjustment to commercial incremental cost due to tax credits.

2.1.3.5 Non-Energy Benefits (NEB)

Clothes washers, dishwashers, showerheads, and faucet aerators yield water savings in addition to energy savings. Navigant included the NEB of these measures under O&M savings. Navigant sourced the values from Energy Trust program resources and RTF measure analysis workbooks.

2.1.4 Emerging Technologies

The goal of the Emerging Technologies Overlay is to establish a range of possible savings from emerging technologies. Emerging technology is defined as any technology with *at least one* of the following criteria:

- » Is currently not commercially available but expected to become so during the time span of the analysis
- » Is expected to achieve significant efficiency or cost improvements over the forecast time horizon

2.1.4.1 Selecting Emerging Technologies

To select the emerging technologies analyzed, Navigant first identified the end uses within the residential and commercial sectors that account for the largest energy use in the Energy Trust territory. To assess the various energy end uses, we primarily relied on data provided by the previous resource assessment model, utility load forecast, Northwest Conservation and Electric Power Plan, supplemented by national level data from the Energy Information Administration. In the residential sector, end uses considered for emerging technology analysis included the following:

- » Domestic Water Heating – Electric
- » Domestic Water Heating – Gas
- » Space Heating – Gas
- » Space Heating – Electric
- » Space Cooling – Electric
- » Lighting
- » Envelope
- » Behavioral

In the commercial sector, end uses considered for emerging technology analysis included the following:

- » Lighting
- » Envelope
- » Space Cooling
- » Space Heating
- » Ventilation
- » Refrigeration
- » Water Heating

Next, Navigant used the following sources to identify emerging technologies with the highest potential savings in each end use:

- » Other resource assessments conducted by Navigant
- » NEEA/BPA list of emerging technologies
- » Emerging technology scans done by Navigant for other utilities and governments
- » Research and development (R&D) and commercialization reports from national research labs, and federal and state governments
- » Navigant emerging technology experts

2.1.4.2 Characterizing Emerging Technologies

Navigant then characterized emerging technologies using similar criteria and resources as conventional technologies, with additional data gathered from the following:

- » U.S. Department of Energy (DOE) Building Technologies Prioritization Tool
- » DOE R&D reports
- » DOE appliance standards analyses
- » Historic data of price trends of appliances
- » Interviews with Navigant experts

In addition, for each emerging technology, Navigant estimated time-series profiles for several inputs. Navigant developed the following multipliers (where appropriate) to characterize assumed changes in measure characteristics over time:

- » Market Availability Profile
 - This value is used to identify whether a product is commercially available (a value of 0 indicates not commercially available; a value of 1 indicates that it is commercially available).
- » Energy Consumption Multiplier
 - This value adjusts the efficient technology energy consumption over time to reflect changes due to technology improvement.
- » Cost Multiplier
 - This value adjusts the efficient technology cost over time due to predicted declines in technology cost.

Table 2-3 provides an example of an energy consumption time-series profile for solar thermal water heaters. The profile suggests that by 2019 the energy consumption of this measure will be 20% less than its current consumption in 2014. Navigant used similar profiles for all emerging technology measures to capture significant efficiency and cost improvements over the forecast horizon.

Table 2-3. Illustration of Time-series Profile

Emerging Technology Measure	2014	2015	2016	2017	2018	2019
Solar Thermal Water Heating	1.00	0.95	0.91	0.87	0.84	0.80

Source: Navigant analysis, 2014

2.1.4.3 Developing a Range of Savings

The performance and cost characterizations discussed above represent the “Maximum Potential” for emerging technology measures; however, it is important to characterize the likelihood of whether these technologies will meet those targets or even come to market. Instead of trying to produce multiple cost and performance projections for each emerging technology measure, Navigant developed a risk factor for each emerging technology to characterize the inherent uncertainty in the ability for ETs to produce reliable future savings. This risk factor was determined based on qualitative metrics of the following:

- » Market risk
- » Technical risk
- » Data source risk

The framework for assigning the risk factor is shown in Table 2-4. Each ET was assessed within each risk category; a total weighted score was then calculated. Well-established and well-studied technologies (such as LEDs) have lower risk factors while nascent, unevaluated technologies (e.g., Advanced CO2 Heat Pump Water Heater or Supermarket Max Tech Refrigeration) have higher risk factors. This risk factor was then used as a multiplier of the incremental savings potential of the measure.

Table 2-4. Emerging Technology Risk Factor Score Card

Risk Category	ET Risk Factor				
	10%	30%	50%	70%	90%
Market Risk (25% weighting)	High Risk: <ul style="list-style-type: none"> » Requires new/changed business model » Start-up, or small manufacturer » Significant changes to infrastructure » Requires training of contractors; consumer acceptance barriers exist 			Low Risk: <ul style="list-style-type: none"> » Trained contractors » Established business models » Already in U.S. Market » Manufacturer committed to commercialization 	
	High Risk: Prototype in first field tests A single or unknown approach	Low volume manufacturer Limited experience	New product with broad commercial appeal	Proven technology in different application or different region	Low Risk: Proven technology in target application Multiple potentially viable approaches
Data Source Risk (50% weighting)	High Risk: Based only on manufacturer claims	Manufacturer case studies	Engineering assessment or lab test	Third party case study (real world installation)	Low Risk: Evaluation results or multiple third party case studies

Source: Navigant analysis, 2014

2.1.4.4 Residential Emerging Technologies Characterized

The following is a list of the emerging technologies included in the residential sector:

- » Solar hot water heater (gas and electric)
- » CO2 Heat Pump Water Heater
- » Absorption Gas Water Heater
- » R-10 Windows
- » R-30 Wall Insulation
- » R-75 Attic Insulation
- » High Efficiency Condensing Furnace
- » Advanced Heat Pumps
- » LED lighting
- » Home Automation/Smart Devices

2.1.4.5 Commercial Emerging Technologies Characterized

The following is a list of the emerging technologies included in the commercial sector:

- » Advanced Package A/C RTU
- » Hybrid Indirect-Direct Evaporative Cooler
- » Energy Recovery Ventilator
- » Advanced Refrigeration Controls
- » Supermarket Max Tech Refrigeration
- » Advanced Ventilation Controls
- » Absorption Heat Pump
- » LED Lighting (multiple applications)
- » Wall insulation R-35, Vacuum insulated panels
- » Highly Insulated Windows
- » Smart/Dynamic Windows
- » Absorption Heat Pump Water Heater
- » A/C Heat Recovery for Water Heating

2.1.4.6 Industrial Emerging Technologies Characterized

The following is a list of the emerging technologies included in the industrial sector.

- » Advanced LED Lighting Retrofits
- » Wall Insulation – VIP, R0-R35
- » Gas-Fired Heat Pump Water Heater
- » Switched Reluctance Motors
- » Advanced Refrigeration Controls – Industrial

2.1.5 Code Adjustments

Measure characterization values are aligned with national and local codes and standards assumptions. As future codes and standards become effective, the energy savings from existing measures subjected to

the codes and standards will diminish. Navigant accounted for the impact of codes and standards (C&S) by the C&S multiplier, which reduced the baseline equipment consumption starting from the year when particular codes and standards begin to take effect.

The DOE Technical Support Documents (TSDs)²² contain information on energy and cost impact of each appliance standard. Typically, the engineering analysis is available in Chapter 5 of the TSDs, energy use analysis is available in Chapter 7, and cost impact is available in Chapter 8. Navigant sourced the C&S multipliers from DOE's analysis and/or assumptions.

In general, Navigant compares the new standard requirements with the current baseline to determine the energy reduction and refer to the relative energy efficiency mark up to determine the cost increase due to codes and standards. Navigant identified the following measures as affected by future codes and standards:

- » Tier 1 and Tier 2 Heat Pump Water Heaters
- » Gas Storage Water Heater
- » Tankless Gas Hot Water Heater
- » Advanced CO2 Heat Pump Water Heater
- » Absorption Gas Heat Pump Water Heater
- » Solar DHW – Electric
- » Solar DHW – Gas
- » Screw-In Bulbs (CFL and LED)
- » High Efficiency Clothes Washers
- » Furnace
- » Heat Pump
- » Gas Hearth
- » Advanced Package A/C RTU
- » Hybrid Indirect-Direct Evaporative Cooler

²² Appliance standards rulemaking notices and Technical Support Documents can be found at: <http://energy.gov/eere/buildings/current-rulemakings-and-notices>

The analysis reduced the baseline technology consumption to align with codes and standards at the effective year of implementation. Due to this approach, savings from the implementation of codes and standards are not included as part of the potential. Table 2-5 summarizes the measures impacted by upcoming codes and standards.

Table 2-5. Measures Impacted by Upcoming Codes and Standards

Affected Measures	Initial Federal Legislation	Effective Date of Last Standard	Issued By
Tier 1 and Tier 2 Heat Pump Water Heaters, Advanced CO2 Heat Pump Water Heater, Solar DHW-Electric	EPACT 1992	2014	DOE
Gas Storage Water Heater, Tankless Gas Hot Water Heater, Absorption Gas Heat Pump Water Heater, Solar DHW- Gas	EPACT 1992	2014	DOE
High Efficiency Clothes Washers	NAECA 1987	2015	DOE
Screw-In Bulbs (CFL and LED)	EISA 2007	2020	U.S. Congress
Heat Pump, Advanced Packaged A/C RTU, Hybrid Indirect-Direct Evaporative Cooler	EPACT 1992	2015	DOE
HP T8, LED (Troffer)	EPACT 1992	2014	DOE

Source: Navigant analysis, 2014

2.2 Approach to Estimating Technical, Achievable, and Cost-Effective Achievable Potential

Navigant estimated the technical, achievable, and cost-effective achievable potential using the resource assessment model, which employs a combined “bottom-up/top-down” approach to identify and quantify the savings of all energy efficiency measures depending on the sector. This modeling approach assumes an energy efficiency measure to be any possible change that can be made to building, equipment or process that could save energy. The residential and commercial sector savings potential were estimated using a bottom-up approach, which considers the potential technical impacts of various demand-side technologies that are aggregated in the model to produce estimates of resource potential at the end use, customer segment, and service territory level. The industrial sector modeling approach is best described as a top-down methodology that begins with the most current utility load forecasts before decomposing them into their constituent end-use components. The model calculates energy savings above a baseline that is determined by a regulatory (i.e., code or standard) or market driver. Figure 1 provides a summary of the key input and output of the model.

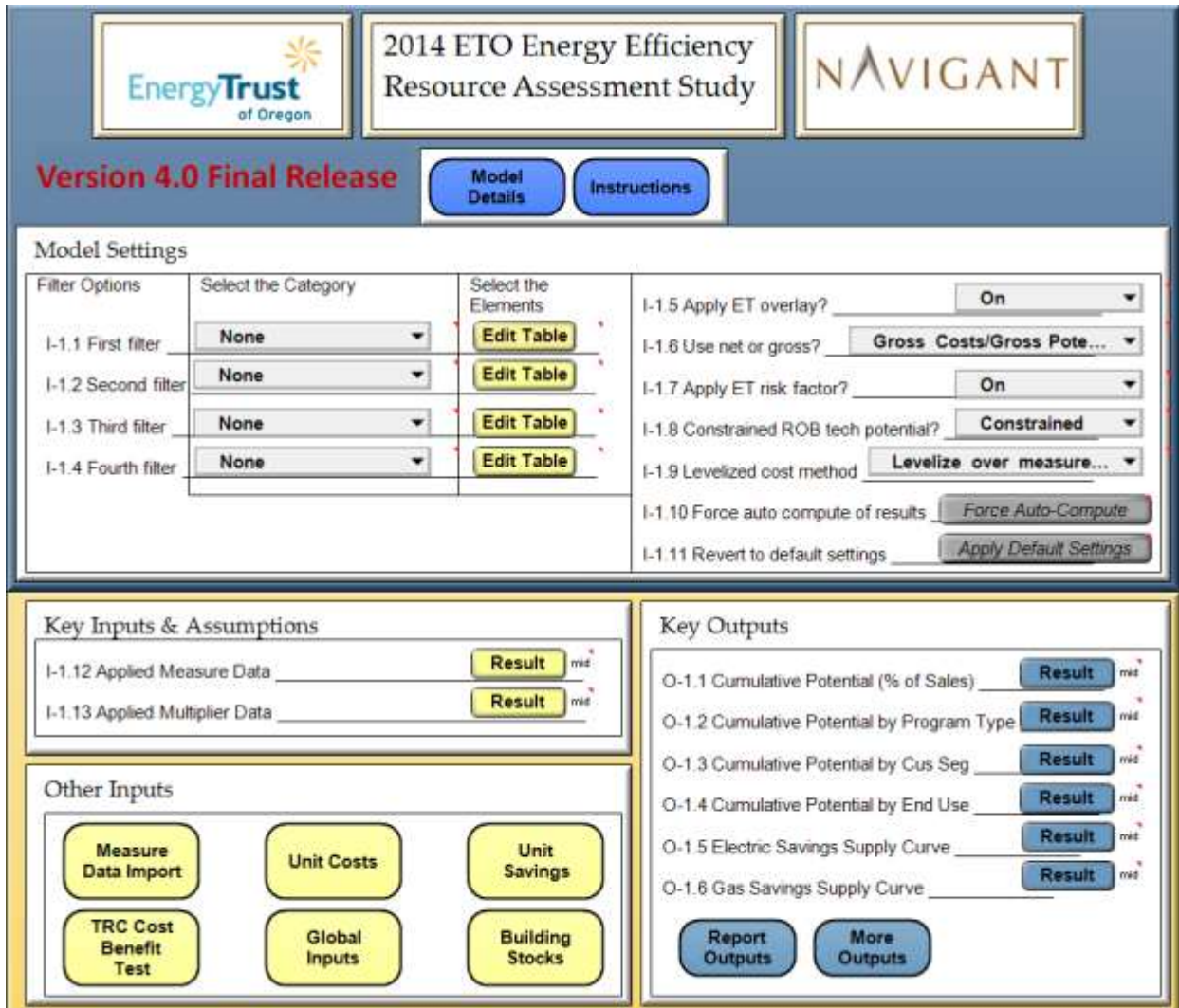
Figure 1. Resource Assessment Model Input and Output

Key Input	Key Output
<ul style="list-style-type: none"> » EE Measure Costs, Savings and Lifetimes » Utility Data <ul style="list-style-type: none"> • Electricity Rates, Avoided Costs, Fuel Type Multipliers, Climate Zone Multipliers, Discount Rates » Initial Measure Saturation » Maximum Measure “Density” (e.g., units/home) » NTG Ratios » Emerging Technology Risk Factors 	<ul style="list-style-type: none"> » Energy/Demand/Gas Savings (Technical/Achievable/Cost-effective Achievable) » Risk-adjusted Tiered Savings » Levelized \$/kWh and \$/therm » Total Resource Cost Test » Savings as a % of Sales » Energy Efficiency Supply Curves

Source: Navigant analysis, 2014

Navigant imported input data, developed as part of the measure characterization process, into the model using the graphical user interface displayed in Figure 2. The model interface enables detailed exploration (graphical or tabular) and quality control of all model output at the measure level, across customer segments, utilities, end-use categories, and program types. The model interface also offers the ability to easily turn on or off the ET overlay and risk factor options.

Figure 2. Base Resource Assessment Model Graphical User Interface



Source: Navigant analysis, 2014

2.2.1 Types of Potential

The study calculates three types of energy efficiency potential.

2.2.1.1 Technical Potential

The calculation of technical potential in this study differs depending on the assumed measure replacement type. Technical potential is calculated on a per-measure basis and includes estimates of savings per unit, measure density (e.g., quantity of measures per home), and total building stock in each service territory. The study accounts for three replacement types, each of which has a specific definition of technical potential as described below.

1. New Construction (NEW) Measures

New Construction technical potential is driven by new measures coming into the market each year due to new building stock. New building stock determines the incremental annual addition to technical potential, which would then be added (cumulated) to calculate the cumulative potential in any given year. The equations used to calculate technical potential for new construction measures are provided below.

Annual Incremental Technical Potential (AITP):

$$AITP_{YEAR} = \text{New Buildings}_{YEAR} \text{ (e.g., buildings/year*)} \times \text{Measure Density (e.g., widgets/building*)} \times \text{Savings}_{YEAR} \text{ (e.g., kWh/widget)} \times \text{Technical Suitability (dimensionless)}$$

Cumulative Technical Potential:

$$CTP_Y = \sum_{YEAR=2014}^{YEAR=Y} AITP_{YEAR}$$

* Note: Units for new building stock and measure densities may vary by measure and customer segment (e.g., 1000 square feet of building space, # of residential homes, etc.)

2. Replace-on-Burnout Measures

Technical potential for ROB measures is driven by turnover of existing measure stock (1/lifetime of the stock is assumed to burn out each year). This definition of technical potential for ROB measures is considered to be “constrained” in the sense that potential is limited by the turnover rate of inefficient measure stock due to burnout. The model also incorporates the ability to calculate and view “unconstrained technical potential,” which assumes immediate replacement of inefficient measures with efficient measures, regardless of stock turnover constraints. However, the results presented in this study only show a view of constrained technical potential for consistency with Energy Trust’s usage of potential for program planning purposes. The equations used to calculate constrained technical potential for ROB measures are provided below.

Annual Incremental Technical Potential (AITP):

$$AITP_{YEAR} = \text{Retired Measures}_{YEAR} \text{ (e.g., measures/year)} \times \text{Unit Savings}_{YEAR} \text{ (e.g., kWh/measure)} \times \text{Technical Suitability (dimensionless)}$$

Where:

$$\text{Retired Measures}_{YEAR} = \text{Remaining Measures}_{YEAR-1} \times (1/\text{Base Measure Lifetime})$$

Cumulative Technical Potential:

$$CTP_Y = \sum_{YEAR=2014}^{YEAR=Y} AITP_{YEAR}$$

3. Retrofit (RET) Measures

Retrofit measures have a different meaning for technical potential compared with ROB and NEW measures. In any given year, the *entire* building stock is used for the calculation of technical potential and is consistent with Energy Trust’s desire not to constrain the calculated technical potential to any pre-assumed rate of adoption of retrofit measures. Code/standard changes from year-to-year could result in potential for a given measure being lower in later years. For retrofit measures, annual potential is equal to cumulative potential thus offering an *instantaneous* view of technical potential. The equation used to calculate technical potential for retrofit measures is provided below.

Annual Potential:

$$\text{Cumulative Potential} = \text{Existing Building Stock}_{YEAR} \text{ (e.g., buildings*)} \times \text{Measure Density (e.g., widgets/building*)} \times \text{Savings}_{YEAR} \text{ (e.g., kWh/widget)} \times \text{Technical Suitability (dimensionless)}$$

* Note: Units for new building stock and measure densities may vary by measure and customer segment (e.g., 1000 square feet of building space, # of residential homes, etc.).

2.2.1.2 Achievable Potential

Achievable potential is specified as a percentage of the technical potential. The percentage of technical potential that is deemed “achievable” is by default 85% based on the Northwest Power and Conservation Council (Council) planning assumptions.²³ The Council has adopted the 85% value based on the assumptions that the region has 20 years to achieve the 85% goal, that utilities can offer to pay up to the full incremental cost of all cost-effective measures, and that utilities are able to implement state and federal codes and standards over the planning horizon. This definition of achievable potential represents the cumulative upper limit of market penetration over the planning horizon and is not impacted by program rollout rates or market acceptance dynamics. Rather, it represents a bucket of savings from which program achievements can draw, at a rate set by Energy Trust. Although the achievable potential results presented in this study assume a default value of 85%, this is a user-input value in the model, editable at the measure level.

²³ Achievable Savings – A Retrospective Look at the Northwest Power and Conservation Council’s Conservation Planning Assumptions - http://www.nwcouncil.org/media/29388/2007_13.pdf

2.2.1.3 *Cost-Effective Achievable Potential*

Cost-effective achievable potential is estimated as a subset of achievable energy efficiency that only includes savings from measures that pass the Total Resource Cost (TRC) test. The TRC for each measure is calculated each year and compared against the measure-level TRC screen threshold (default value of 1.0). If a measure’s TRC exceeds the threshold, it is included in the cost-effective achievable potential. For end uses with multiple tiers of efficient measures that could replace the same inefficient base measure, the model uses an incremental or “tiered” approach to calculating cost-effectiveness, which is further described in the next section. The Oregon TRC in particular is determined through the fairly nuanced provisions of Rule UM-551, which includes provisions for exceptions as well as incorporation of quantifiable non-energy benefits. Navigant’s analysis took a relatively straightforward approach to the TRC. Cost-effectiveness of many measures may be determined through the rulings in three cost-effectiveness dockets currently underway in Oregon. To the extent that there are exceptions provided in those dockets, or cost-effectiveness is dependent on more detailed analysis of non-energy benefits than are provided in this report, the cost-effectiveness assessments provided in this report are not the “last word” on the subject. Energy Trust will continue to make final cost-effectiveness determinations through its “blessing memos” for prescriptive measures and prescribed calculations, and through site-specific analysis for custom measures. However, we believe that this assessment is at the appropriate detail for estimating the overall conservation resource with one caveat. The potential for savings from gas shell measures in existing single family homes may change significantly based on the Oregon Public Utilities Commission’s (PUC’s) determinations.

It is also important to note that Washington’s Utilities and Transportation Commission’s guidance currently relies on a combination of the TRC and the utility cost test. For this reason, adjustments to these results based on program-specific analysis may be warranted for use in Washington.

2.2.2 **Approach to Calculating Cost-Effectiveness**

Cost-effectiveness of energy efficiency measures in this study is defined by the results of the TRC test. The TRC test is a cost-benefit analysis that measures the net benefits of energy efficiency measures from the viewpoint of an entire service territory. The TRC benefit-cost ratio is calculated in the model using the following equation:

$$TRC = \frac{\textit{Benefits of Avoided Cost} + \textit{O\&M Savings}}{\textit{Technology Cost} + \textit{O\&M Cost}}$$

where:

Benefits of Avoided Cost is the monetary benefit of energy and gas savings (e.g., avoided costs of generation, and transmission and distribution investments, as well as avoided fuel costs due to energy conserved by energy efficiency programs).

Technology Cost is the incremental equipment cost to the customer.

O&M Savings are non-energy benefits including incremental operation and maintenance cost savings and water savings that can be attributed to energy efficiency measures.

O&M Cost is the incremental operation and maintenance cost to the customer due to energy efficiency measures.

Navigant calculated TRC benefit-cost ratios for each measure based on the present value of benefits and costs (as defined above) over its useful life. Rebates and bill payments are considered “transfer” payments that stay within the scope of the TRC—the utility system and the customer—and are therefore do not change costs for the TRC calculation. Depending on whether a measure is tiered or not, the model uses different definitions for calculating cost-effectiveness. For individual measures that are not tiered (i.e., they are non-competing measures), a TRC is calculated relative to the measure’s baseline equipment and compared against the measure-level TRC screen threshold (default benefit-cost value of 1). If a measure’s TRC exceeds the threshold, the measure is considered cost-effective. However, for competing technologies used to define competition groups an incremental or “tiered” approach is used, as discussed below.

2.2.2.1 Competition Groups

Navigant’s modeling approach considers that some efficient technologies will compete against each other in the calculation of potential. The study defines “competition” as efficient measures competing for the same installation as opposed to competing for the same savings (e.g., windows vs. furnaces) or for the same budget (e.g., lighting vs. water heating). For instance, a consumer may install an AFUE 95, AFUE 96, or AFUE 98 furnace, all of which belong to the same competition group, as only one of these would be installed. General characteristics of competing technologies used to define competition groups in this study include the following:

- » Competing technologies share the same or similar baseline technology.
- » The baseline technology densities, costs, and consumption of competing efficient technologies are the same.
- » The total maximum densities of competing efficient technologies are the same.
- » Installation of competing technologies is mutually exclusive (i.e., installing one precludes installation of the others for that application).
- » Competing technologies share the same replacement type.

2.2.2.2 Tiered TRC

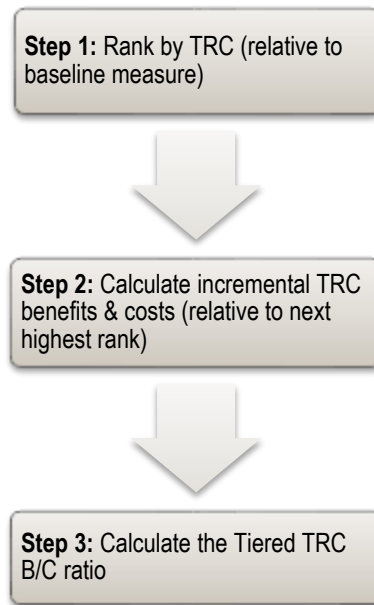
Many energy efficiency potential studies explicitly account for market share among multiple efficient technologies that are competing for the same service. This market share can be a direct user input, or it can be calculated by various methods. Energy Trust’s guidance to Navigant was to not assume a given market share and instead to determine cost-effectiveness based on the marginal costs and benefits provided by each measure. Navigant has used “tiered” TRC ratios and tiered levelized cost of energy to capture the marginal cost-effectiveness of each measure.

This method has the advantage that market share, which is a highly uncertain parameter, need not be specified. In addition, the tiered TRC provides insight into the cost-effectiveness of achieving an additional or marginal unit of energy savings. A standard TRC ratio based on full benefits and costs will only provide information about the average cost-effectiveness of a measure relative to an inefficient baseline. In some situations, a measure’s standard TRC (relative to the inefficient baseline) will be greater than 1.0; while it is tiered TRC (relative to the next efficient technology) will be less than 1.0. In such a situation, the tiered TRC is a more informative metric because it suggests the incremental energy

provided from that technology (relative to another efficient technology that provides a similar service) may not justify its additional costs. Lastly, the tiered approach ensures that the potential from competing technologies is not double-counted because each technology is only credited with its incremental potential.

For competing measures with multiple tiers of efficiency, a “tiered” approach is employed to evaluate cost-effectiveness. In other words, if several measures could possibly be used to replace a common base measure, the savings (and incremental costs) of a given measure will be compared with the measure just below it in ranking from a TRC perspective.

Figure 3. Overview of Approach to Calculating Tiered TRC



Source: Navigant analysis, 2014

The following steps describe Navigant’s approach to calculating a tiered TRC for measures within a competition group, as summarized in Figure 3.

Step 1. Rank by TRC

Competing measures within a competition group are ranked based on each measure’s TRC relative to that measure’s baseline equipment. These measures are then sorted based on their TRC rank such that the measure with the highest TRC within a competition group is stacked first.

Step 2. Calculate Incremental TRC Benefits and Costs

The incremental benefits and costs of the TRC are then calculated relative to the measure with the next highest rank within a competition group. This incremental approach of calculating benefits and costs is only used for measures that belong to a competition group and whose rank is greater than 1. Benefits and costs of measures that are ranked first will be estimated relative to their baseline equipment.

Step 3. Calculate the Tiered TRC B/C Ratio

The incremental or tiered TRC for competing measures is then calculated by dividing the incremental benefits by the incremental costs. Figure 4 defines how the TRC is calculated for all combinations of positive and negative incremental costs and benefits. If the incremental benefits and costs are both negative, then the TRC is found by dividing the reduction in costs by the reduction in benefits. In other words, if the reduction in costs for a measure exceeds the reduction in benefits, the measure is still considered to be cost-effective. Also, ranking by the non-tiered TRC ensures that we never have a situation where a measure has positive incremental benefits but negative incremental costs as measures with higher incremental benefits but lower costs would always have a higher non-tiered TRC. Finally, if the incremental benefits of a measure are negative and the incremental costs are positive, then a TRC of zero is assigned to that measure. If both the incremental benefits and costs are negative, the reduction in costs is divided by the reduction in benefits. An incremental measure where the reduction in costs is greater than the reduction in benefits is considered cost effective.

Figure 4. Rules for Calculating TRC

		PV of Incremental Benefits (B)	
		Positive (+)	Negative (-)
PV of Incremental Costs (C)	Positive (+)	TRC = B/C	TRC = 0
	Negative (-)	Ranking by non-tiered TRC ensures this never occurs, as a measure with incremental benefits but fewer costs would have a higher non-tiered TRC	
			TRC = C/B

Source: Navigant analysis, 2014

2.2.2.3 Levelized Cost

Navigant’s modeling approach also considers the levelized cost (\$/kWh or \$/therms) of each measure as an additional cost-effectiveness metric, which is graphed against cumulative potential in the supply curves. The default method calculates levelized cost as the discounted present value cost of the measure annuitized over its life divided by the annual energy savings. The costs included in this calculation are the incremental cost of each measure less any operation and maintenance cost savings. All figures in this report use the default levelization method based on measure lives. Another levelization method is made available within the model that computes costs and savings over a consistent planning horizon for all

measures²⁴. To account for competition among efficient technologies, Navigant estimated an incremental levelized cost relative to the next highest rank within a competition group, using the same “tiered” approach described above. While the model calculates both levelized cost and TRC as outputs, only the TRC is used to screen for cost-effectiveness.

Similar to the TRC, the value of the levelized cost is determined based on the sign of the costs and the energy savings. Anytime the incremental energy savings are negative, the levelized cost is assigned a value of infinity. Figure 5 defines how levelized cost is calculated for all combinations of positive and negative incremental costs and energy savings.

Figure 5. Rules for Calculating Levelized Cost

		PV of Incremental Costs (C)	
		Positive (+)	Negative (-)
PV of Incremental Savings (S)	Positive (+)	Levelized Cost = C/S	Levelized Cost = C/S
	Negative (-)	Levelized Cost = INF	Levelized Cost = INF

Source: Navigant analysis, 2014

2.2.3 Approach to Simulating Tiered Potential Savings

The approach to calculating savings potential follows a methodology consistent with cost-effectiveness. Similar to cost-effectiveness, measures are treated differently depending on whether or not they belong to a competition group. The savings potential for non-competing measures is determined relative to a baseline measure. Potential for competing technologies is determined relative to the measure with the next highest rank within a competition group, following the “tiered” approach.

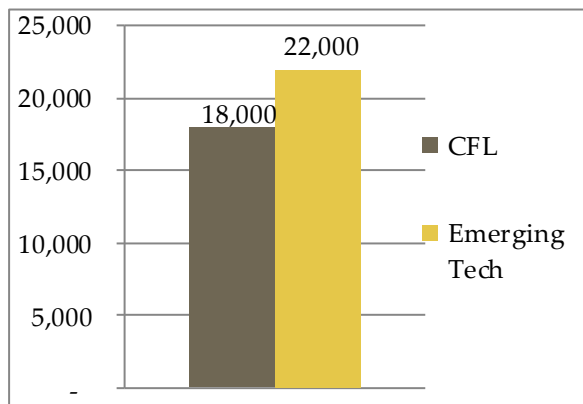
²⁴ The levelization approach based on the same planning horizon, say 20 years, for all measures uses a combination of a true cash flow approach and an annuity approach. For example, a measure having a 5-year lifetime can be installed four times over a 20-year horizon. This means that the cash and energy flows can be repeated exactly four times during that horizon. A measure with an 8-year lifetime is slightly more nuanced. The 8-year measure can be installed twice during the horizon and receive credit for the full 8 years of savings each time. To account for the remaining 4 years in the horizon, the costs over the full measure life are annuitized and assigned to each of the last 4 years. This ensures that the 8-year measure is not penalized with the full incremental costs while only being credited with the 4 years of savings. Once cash streams are determined for all 20 years in the planning horizon, the present value can be annuitized and divided by the annual energy savings to determine the levelized cost of energy.

Savings potential for emerging technologies is also subject to a risk adjustment, which requires a two-stage approach to finding risk-adjusted tiered potential. Risk adjustments are applied to emerging technologies to reflect uncertainty in the ability of those technologies to deliver the assumed savings. The risk adjustments are only applicable to the tiered potential, which for competing measures is incremental to the measure with the next highest rank within a competition group. Calculating risk-adjusted tiered savings potential requires a multi-step process that includes the following steps.

Step 1. Find Tiered Potential

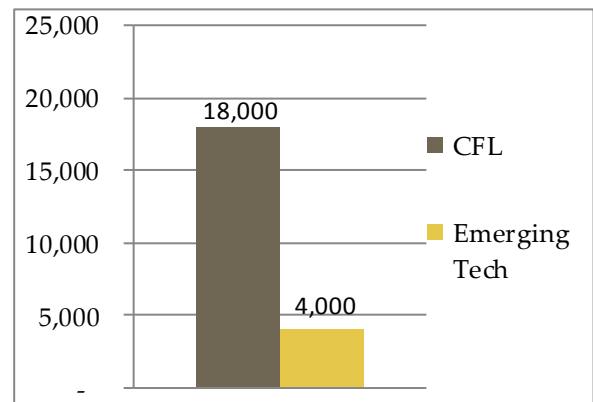
For non-competing measures, the savings potential relative to a baseline measure were used. Competing measures are ranked by the TRC (similar to Step 1 of the tiered TRC calculation above) before the incremental potential for each measure in the competition group is calculated (similar to Step 2 of the tiered TRC calculation). Figure 6 shows the potential relative to baseline for a hypothetical competition group that includes a CFL measure and a generic lighting emerging technology. If the CFL has a higher TRC than the ET, then tiered potential for the ET will be incremental to the CFL as is shown in Figure 7.

Figure 6. Hypothetical Potential Relative to Baseline (kWh/yr)



Source: Navigant analysis, 2014

Figure 7. Hypothetical Tiered Potential (kWh/yr)



Source: Navigant analysis, 2014

Step 2. Apply Risk Factors and Determine Reduction in Potential

The tiered potential for all emerging technologies are multiplied by $(1 - risk\ factor)$ to determine the reduction in potential. The *risk factor* is a value between 0 and 1.0 that reduces the effective savings potential. If the ET in Figure 7 has a risk factor of 0.5, then we would expect a risk reduction of 2,000 kWh/yr, as is shown in Figure 8. No adjustment is made to the CFL, since it is not an emerging technology.

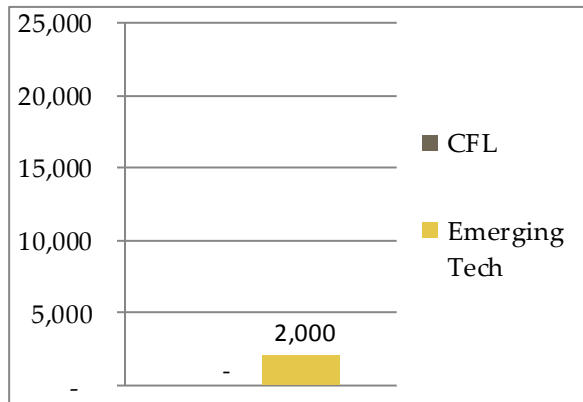
Step 3. Calculate the Risk-Adjusted Potential Relative to Baseline

The reduction in potential is then subtracted from the savings potential relative to baseline. Figure 9 shows the resulting difference from subtracting the emerging technology’s risk reduction of 2,000 kWh/yr from its potential relative to baseline of 22,000 kWh/yr.

Step 4. Find the Tiered Risk-Adjusted Potential

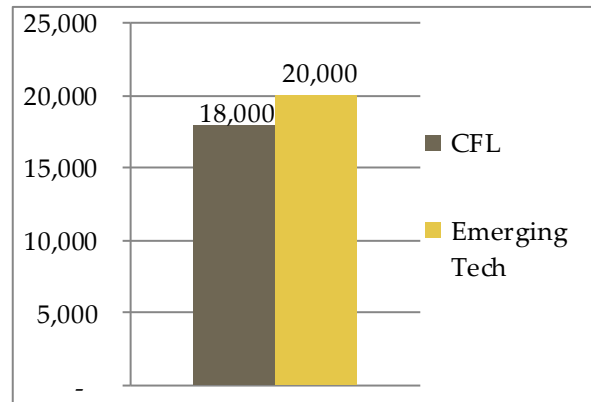
Using the risk-adjusted potential relative to a baseline measure, Step 1 (“Find Tiered Potential”) is repeated to find the risk-adjusted tiered potential. When the emerging technology’s risk-adjusted potential is tiered relative to the CFL, the resulting risk-adjusted tiered potential is illustrated in Figure 10.

Figure 8. Hypothetical Reduction in Potential due to Risk (kWh/yr)



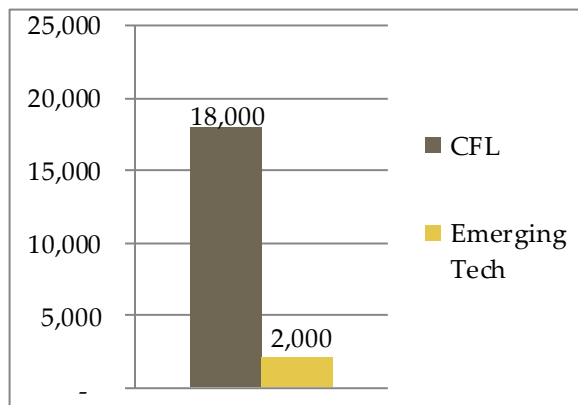
Source: Navigant analysis, 2014

Figure 9. Hypothetical Risk-Adjusted Potential Relative to Baseline (kWh/yr)



Source: Navigant analysis, 2014

Figure 10. Hypothetical Risk-Adjusted Tiered Potential (kWh/yr)



Source: Navigant analysis, 2014

After the risk-adjusted tiered potential has been computed on an annual basis for every measure, it is then cumulated in accordance with the definitions of NEW, ROB, and RET specified in section 2.2.1.1.

2.3 Caveats and Limitations

There are a number of important caveats and limitations associated with the results of these forecast and modeling efforts.

2.3.1 Data Uncertainties

The Navigant team drew upon many different secondary data sources for estimation of measure energy consumption, incremental cost, market saturation, and emerging technology risk factors. However, inevitable uncertainty in these estimates exists, which can affect estimates of potential. In some cases, national data was used in lieu of regional data. Navigant did not conduct sensitivity or uncertainty analysis on these estimates as part of this study.

2.3.2 Market Uncertainties

Several key uncertainties exist regarding the cost-effectiveness of energy efficiency measures. For instance, gas prices are highly uncertain, which in turn drive uncertainty in avoided cost benefits that are a key determinant of cost-effective achievable potential in the model. Additionally, while the study includes risk factors for each ET to characterize natural uncertainty in their ability to produce reliable future savings, there is still uncertainty in the estimation of risk factors for these technologies. While the study accounts for on-the-books and expected codes and standards, it is expected that new standards could significantly reduce the potential savings that may be available for utility programs. However, there are countervailing considerations that provide some assurance.

- » The risk factors applied across many emerging technologies can each be wrong individually, and the aggregate estimates of savings reasonably useful if the overall approach taken to risk is balanced in aggregate.
- » Codes are not a “competing force” with Energy Trust programs but an integral part of Energy Trust’s plans to achieve market transformation wherever this is feasible. The purpose of the study is to estimate overall available savings- if savings come in through new codes and standards, they will still be achieved, but at lower cost to the utility system, and in all likelihood to the consumer also. Therefore, the main hazard is that by not incorporating future codes and standards Energy Trust may be overestimating the long-term cost of some measures, and possibly excluding them from the cost-effective resource potential. Since measures that are not estimated to be cost-effective are rarely incorporated into standards, any exclusion would likely be small and limited in nature.

2.3.3 Forecasting under Uncertainty

Cost-effective achievable potential in this study is not limited by actual program rollout or market adoption rates; rather, it reflects the bucket of savings from which program achievements can draw, at a rate that is to be defined by Energy Trust. Forecasts are inherently uncertain. The estimates of future energy efficiency potential included in this study are not a reflection of what *will* happen. Instead, these forecasts are intended as possible futures and provide a view of what *could* be achieved. . The estimates of achievable potential assume an 85% achievability factor. This sets an upper limit of market penetration in the region over a 20-year period. However, there is uncertainty as to how much of the technical potential is truly achievable over the modeling period.

3 Energy Trust Energy Efficiency Potential Results

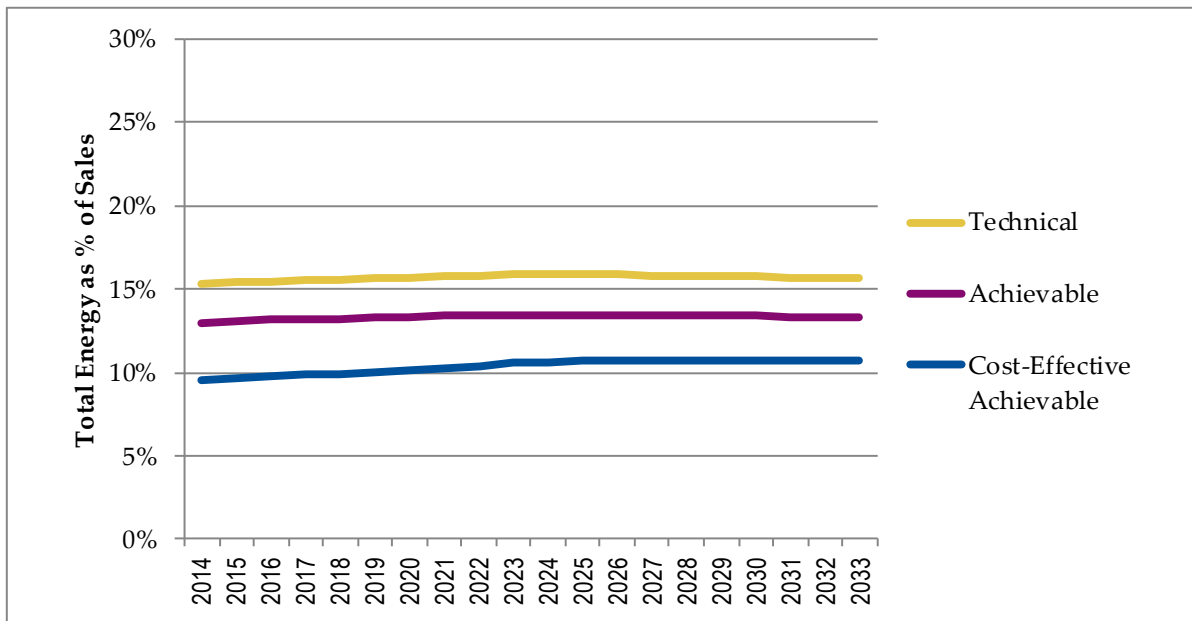
This section provides electric, demand and gas savings potential estimates at an aggregate level. These are estimates of total technical, achievable, and cost-effective achievable potential for all sectors and utilities within the Energy Trust service territory as a percentage of baseline forecast sales. All graphs in this section report a risk-adjusted tiered potential as described in section 2.2.3. These comparisons offer a useful way to compare potential estimates with other studies and past program achievements, while serving as a quality control tool during the study. A more disaggregated view of potential by sector, customer segment, end use, and program are provided in sections 4, 5, and 6, which also include emerging technology results and a discuss of the top saving measures within each sector.

3.1 Aggregate Savings Potential

3.1.1 Energy Trust Electric Energy Potential

The cumulative technical, achievable, and cost-effective achievable potential as a percentage of baseline forecast energy sales for all conventional measures (i.e., without emerging technologies) is provided in Figure 11. As seen in this figure, technical potential represents about 15% of baseline energy sales over the 20-year forecast horizon, while achievable potential represents about 13% over the same horizon. Technical potential as a percentage of sales stays relatively flat as it is largely driven by retrofit measures that do not increase over time. Cost-effective achievable potential is about 9%-10% over the forecast horizon. Achievable potential represents an upper bound that is not affected by market adoption rates and program priorities.

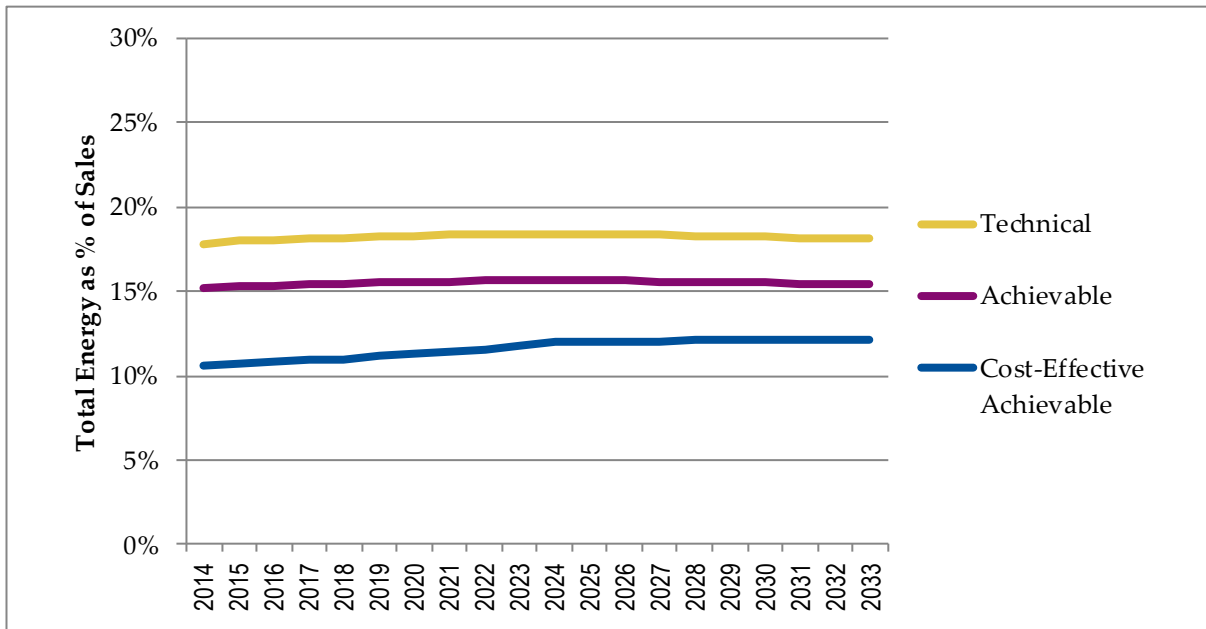
Figure 11. Cumulative Electric Energy Savings (% of Sales) – without ETs



Source: Navigant analysis, 2014

Figure 12 shows technical, achievable, and cost-effective achievable potential as a percentage of baseline forecast energy sales with the addition of emerging technologies. The inclusion of emerging technologies in the study across all three sectors results in technical potential increasing to 18% of baseline energy sales by 2033, while achievable potential represents 15% of sales over the time horizon. Cost-effective achievable potential is now about 12% over the forecast period, which represents a 2% increase by 2033 due to the addition of emerging technologies. Emerging technology savings in future years are tempered by the inclusion of a risk factor in the calculation of tiered potential savings. Advanced ventilation controls and LED troffers are the largest contributors toward emerging technology savings by 2033. Table 3-1 provides the same information as shown in Figure 12, but in tabular format.

Figure 12. Cumulative Electric Energy Savings (% of Sales) – with ETs



Source: Navigant analysis, 2014

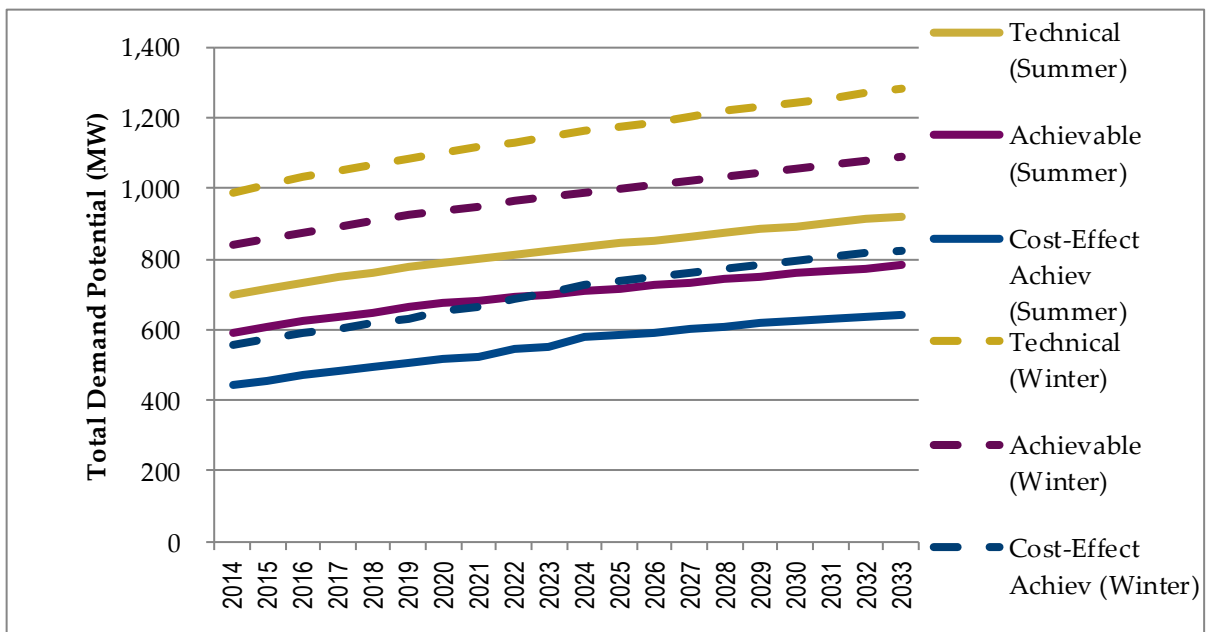
Table 3-1. Cumulative Energy Savings (% of Sales) – with ETs

Year	Technical	Achievable	Cost-Effective Achievable
2014	17.5%	14.9%	10.3%
2015	17.7%	15.1%	10.5%
2016	17.8%	15.1%	10.6%
2017	17.9%	15.2%	10.7%
2018	17.9%	15.2%	10.8%
2019	18.0%	15.3%	10.9%
2020	18.0%	15.3%	11.1%
2021	18.1%	15.4%	11.2%
2022	18.1%	15.4%	11.4%
2023	18.2%	15.4%	11.5%
2024	18.2%	15.4%	11.8%
2025	18.2%	15.4%	11.8%
2026	18.1%	15.4%	11.9%
2027	18.1%	15.4%	11.9%
2028	18.1%	15.4%	11.9%
2029	18.1%	15.4%	11.9%
2030	18.0%	15.3%	11.9%
2031	18.0%	15.3%	11.9%
2032	17.9%	15.2%	11.9%
2033	17.9%	15.2%	11.9%

Source: Navigant analysis, 2014

Figure 13 displays cumulative technical, achievable, and cost-effective achievable demand savings potential for the years 2014 through 2033. This graph shows peak demand savings for both summer and winter peak periods. Although electric and gas savings graphs in this section show potential as a percentage of baseline forecast sales, demand charts include only absolute values for potential. Cost-effective achievable peak demand savings for summer increases steadily from 442 MW in 2014 to 640 MW in 2033, while winter peak demand savings increases from 530 MW in 2014 to 801 MW in 2033. Winter peak demand savings are consistently higher than summer peak demand savings over the study period, which is to be expected since the Northwest region is winter peaking. Table 3-2 presents a tabulated version of the results shown in Figure 13.

Figure 13. Cumulative Demand Savings (Seasonal Peak MW) – with ETs



Source: Navigant analysis, 2014

Table 3-2. Cumulative Seasonal Demand Savings (MW) – with ETs

Year	Summer			Winter		
	Technical	Achievable	Cost-Effective	Technical	Achievable	Cost-Effective
2014	693	589	442	956	813	530
2015	711	604	452	976	830	544
2016	730	620	468	999	849	563
2017	745	633	478	1017	865	577
2018	759	645	490	1035	880	591
2019	776	659	501	1055	897	607
2020	788	670	513	1073	912	626
2021	799	679	521	1087	924	637
2022	810	689	541	1102	937	659
2023	821	698	551	1117	949	677
2024	832	707	574	1133	963	702
2025	841	715	582	1145	974	714
2026	851	723	590	1159	985	725
2027	861	731	597	1173	997	736
2028	871	741	606	1189	1010	749
2029	880	748	614	1200	1020	760
2030	889	755	620	1213	1031	770
2031	898	763	627	1226	1042	780
2032	908	772	635	1241	1055	792
2033	916	779	640	1252	1064	801

Source: Navigant analysis, 2014

3.1.2 Energy Trust Natural Gas Potential

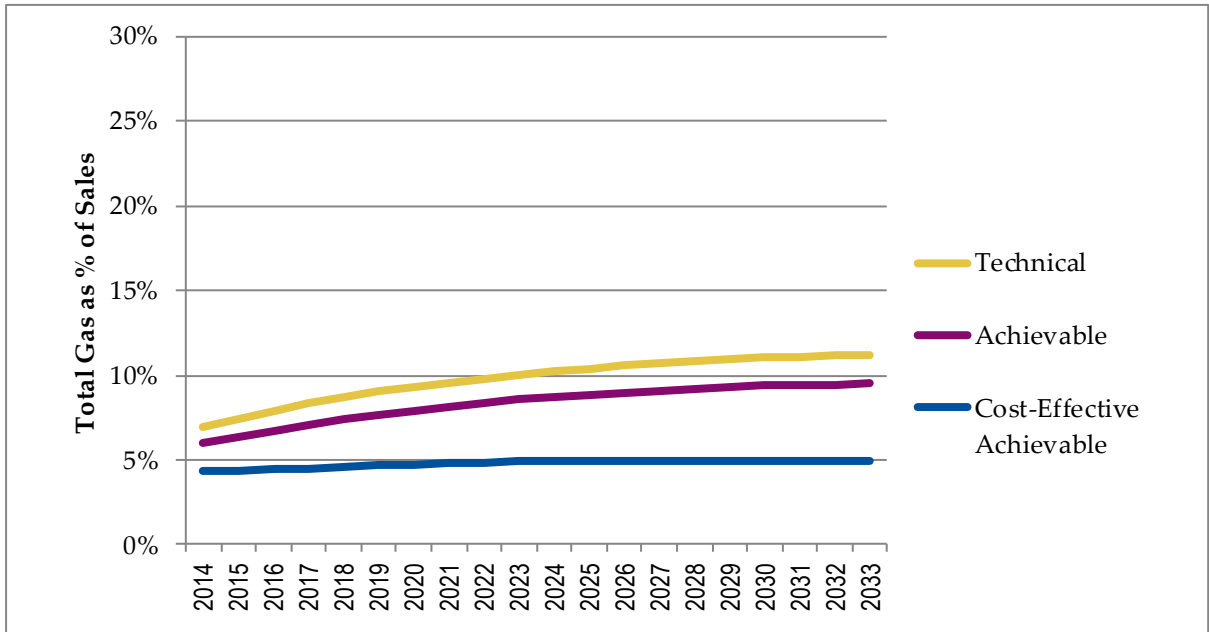
Energy Trust cumulative technical, achievable and cost-effective achievable gas savings potential as a percentage of baseline forecast gas sales for conventional measures (i.e. excluding emerging technologies) is presented in Figure 15. Technical gas potential increases steadily from 7% to 11% over the forecast horizon. This increase in gas technical potential over the 20-year horizon is driven by growth in ROB and NEW gas measures. ROB gas potential increases in the outer years as the baseline stock begins to turn over, creating additional opportunities for savings over time. Cost-effective achievable gas potential rises from about 4.3% in 2014 to 4.9% in 2033. This forecast of cost-effective achievable gas potential is low compared with technical and achievable potential. Currently low natural gas prices result in low gas avoided costs, which result in relatively low benefits in the TRC calculation, making it difficult for gas measures to pass cost-effectiveness. Navigant notes that this phenomenon of low gas prices making it difficult for gas measures to pass cost-effectiveness criteria is a nationwide one²⁵.

Figure 15 presents the same result as shown in Figure 15, except that it also includes savings from emerging technology gas measures. Technical potential represents 13.7% of gas sales, while cost-effective

²⁵ See Hoffman I., Borgeson M., and Zimring M., (2013). Implications of Cost Effectiveness Screening Practices in a Low Natural Gas Price Environment: Case Study of a Midwestern Residential Energy Upgrade Program. Clean Energy Program Policy Brief. <http://eetd.lbl.gov>

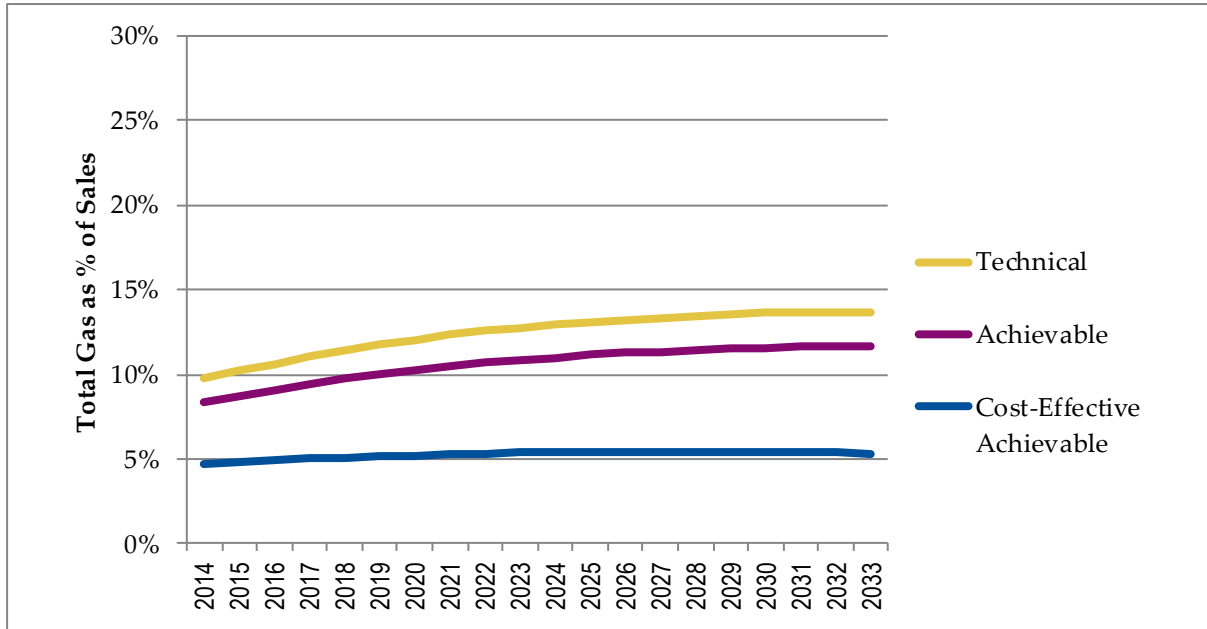
achievable potential represents 5.3% by 2033. Window replacement (U<0.2), gas-fired heat pump water heaters, and smart devices home automation account for the bulk of cost-effective emerging technology gas savings over the study period. Table 3-3 presents a tabulated version of the results shown in Figure 15.

Figure 14. Cumulative Gas Savings Potential (% of Sales) – without ETs



Source: Navigant analysis, 2014

Figure 15. Cumulative Gas Savings Potential (% of Sales) – with ETs



Source: Navigant analysis, 2014

Table 3-3. Cumulative Gas Savings (% of Sales) – with ETs

Year	Technical	Achievable	Cost-Effective Achievable
2014	9.8%	8.3%	4.7%
2015	10.2%	8.7%	4.8%
2016	10.6%	9.0%	4.9%
2017	11.1%	9.4%	5.0%
2018	11.4%	9.7%	5.1%
2019	11.8%	10.0%	5.2%
2020	12.0%	10.2%	5.2%
2021	12.3%	10.5%	5.2%
2022	12.6%	10.7%	5.3%
2023	12.8%	10.8%	5.4%
2024	12.9%	11.0%	5.4%
2025	13.1%	11.1%	5.4%
2026	13.2%	11.2%	5.4%
2027	13.3%	11.3%	5.4%
2028	13.4%	11.4%	5.4%
2029	13.5%	11.5%	5.4%
2030	13.6%	11.6%	5.4%
2031	13.7%	11.6%	5.4%
2032	13.7%	11.6%	5.4%
2033	13.7%	11.6%	5.3%

Source: Navigant analysis, 2014

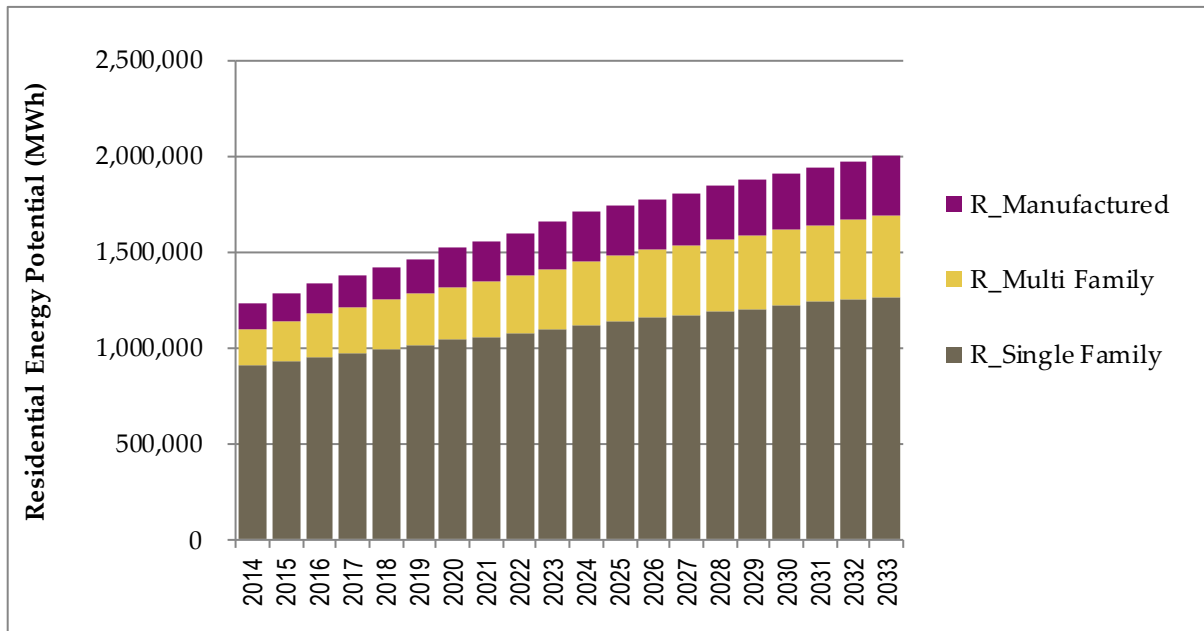
4 Energy Efficiency Potential in Energy Trust’s Residential Sector

This section provides estimates of energy and gas savings for residential buildings, including SF homes, MF structures, and MH. All the results shown in this section are estimates of risk-adjusted tiered cost-effective achievable potential for the various impact types (i.e., energy, demand, and gas), and include savings potential for both conventional and emerging technology measures.

4.1 Residential Cost-effective Achievable Potential – Customer Segment

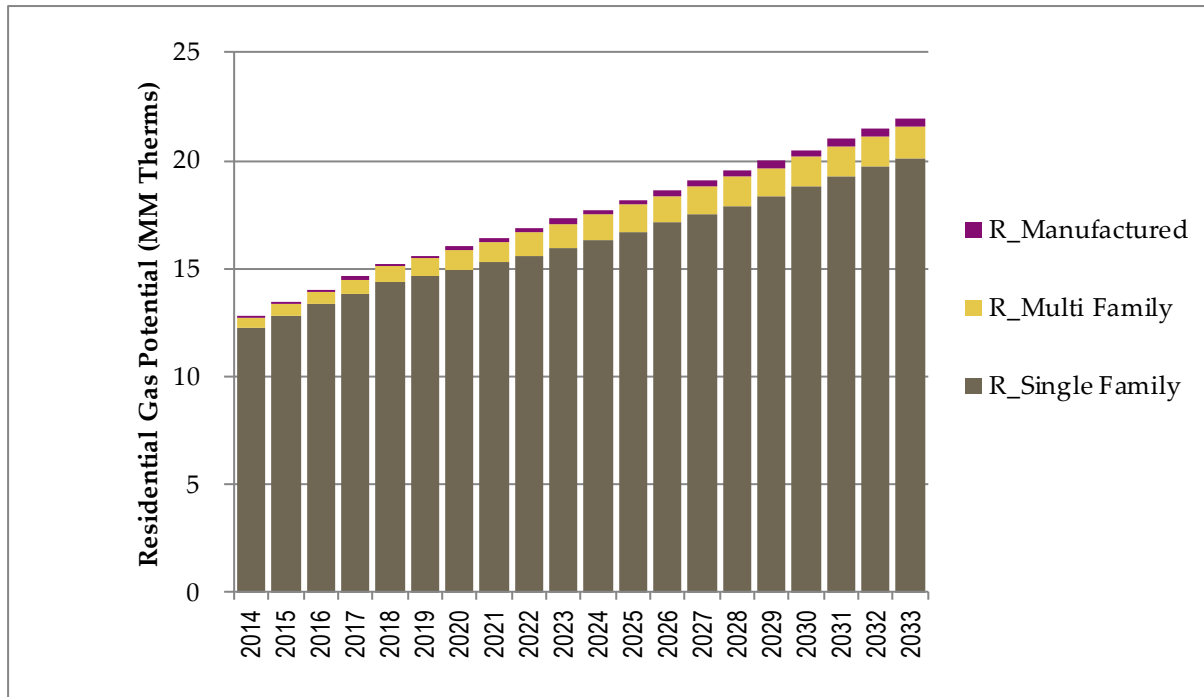
Navigant modeled the savings potential for each measure in each of three different customer segments. Cumulative cost-effective achievable potential for each impact type (i.e., energy, demand and gas savings) is provided in Figure 16 through Figure 17. The majority of residential energy efficiency potential comes from single family homes. For electric energy savings, single family homes account for 63% of cumulative cost-effective achievable potential by 2033, while for gas savings, they account for about 92% of cumulative cost-effective achievable potential. A key reason for this difference is that while the distribution of electric measures between the three segments is more even, the number of gas measures applicable to single family homes is much higher compared with the other two segments.

Figure 16. Cumulative Residential Cost-effective Energy Savings (MWh) by Customer Segment



Source: Navigant analysis, 2014

Figure 17. Cumulative Residential Cost-effective Gas Savings (MMtherms) by Customer Segment



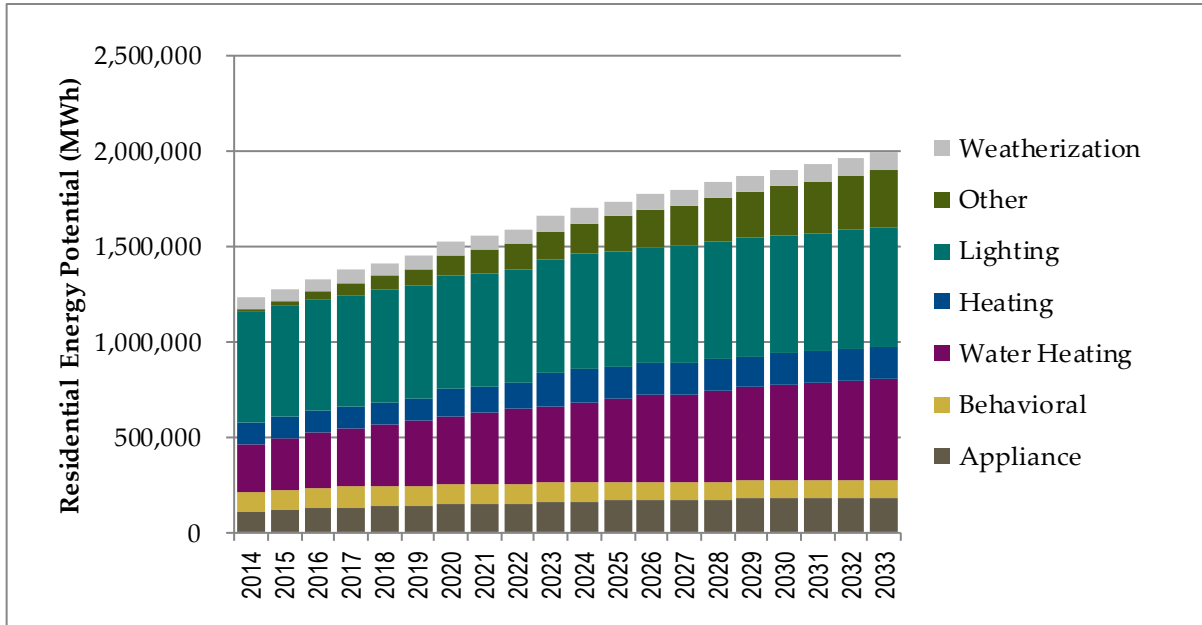
Source: Navigant analysis, 2014

4.2 Residential Cost-Effective Achievable Potential – End Use

Navigant calculated savings potential at the measure level and customer segment level before aggregating these results into six residential end-use categories. End-use categories provide a useful way to categorize and roll-up measure-level savings while also providing a high-level perspective of the measures in that category. As can be seen in Figure 18 through Figure 19, lighting and water heating measures account for a bulk of the residential energy and demand savings potential. By 2033, it is estimated that lighting and water heating measures will contribute up to 58% of cost-effective achievable electric energy potential, with heating and appliance measures contributing about 8% and 9% respectively.

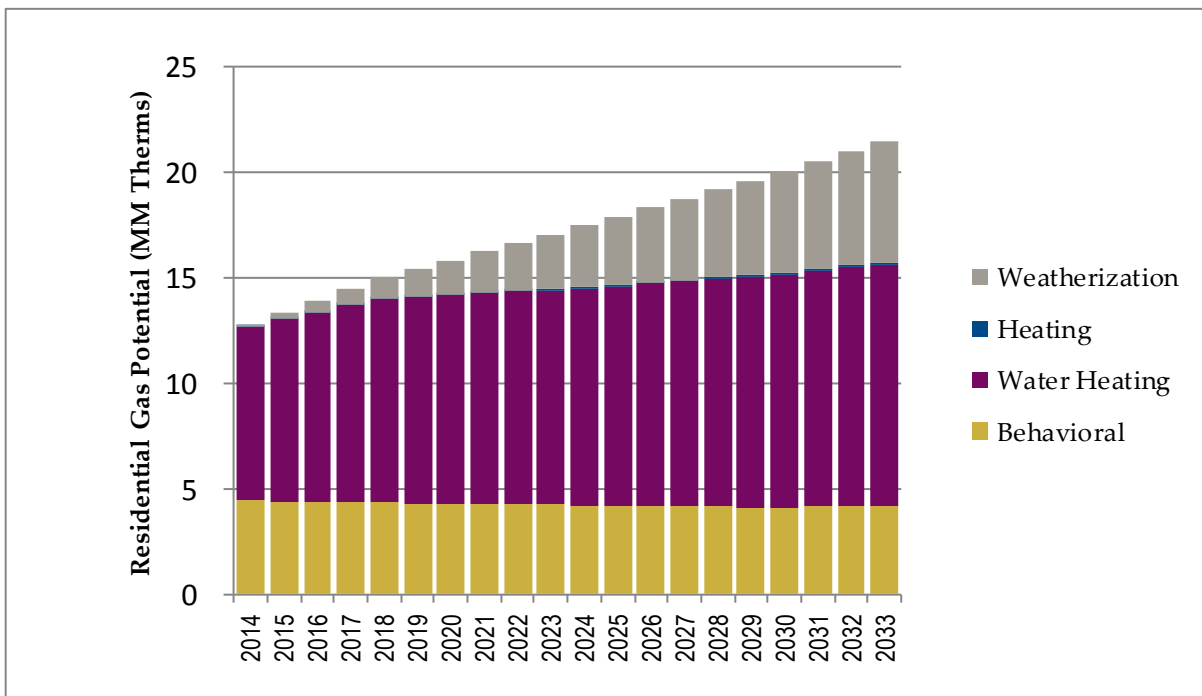
Figure 19 shows the cumulative cost-effective achievable potential for gas energy savings by end-use category for the residential sector. The main drivers of gas savings potential over the forecast horizon are water heating and weatherization measures. In particular, showerheads and window replacement savings contribute significantly toward cost-effective gas potential. Additional detail about the measures that drive overall energy and gas savings results can be found in section 4.4.

Figure 18. Cumulative Residential Cost-effective Energy Savings (MWh) by End Use



Source: Navigant analysis, 2014

Figure 19. Cumulative Residential Cost-effective Gas Savings (MMtherms) by End Use

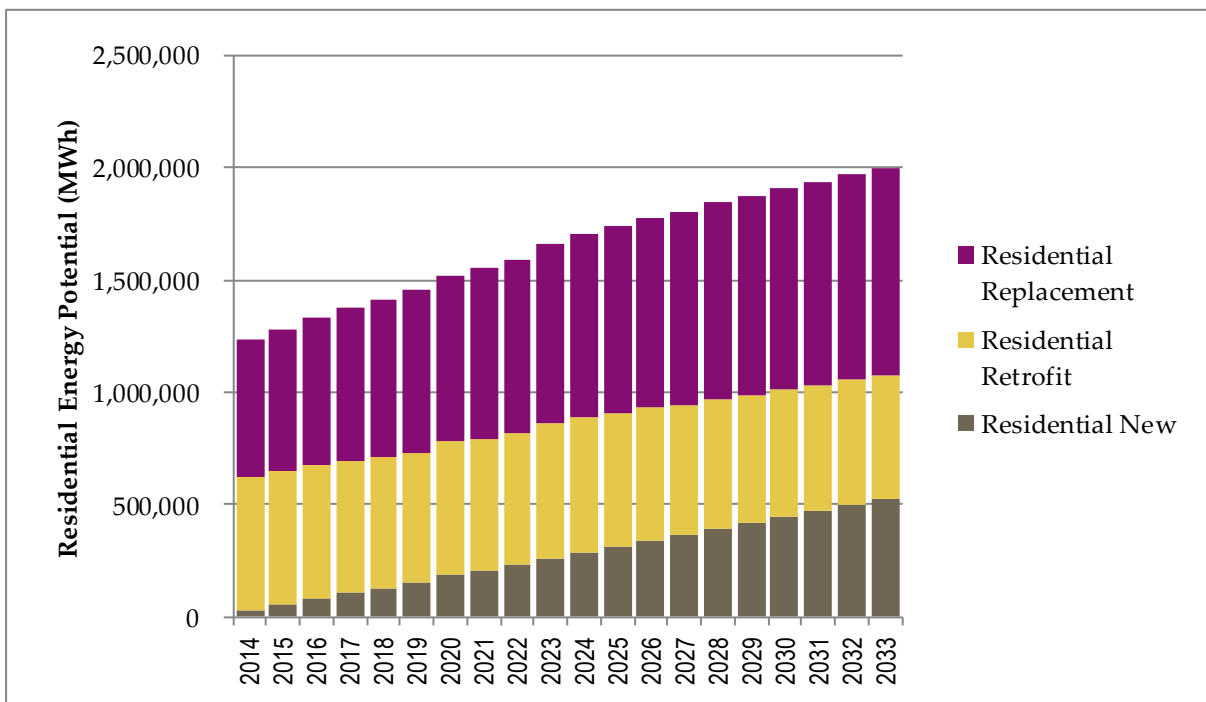


Source: Navigant analysis, 2014

4.3 Residential Cost-effective Achievable Potential – Program

Navigant mapped measure-level output of the model to program types, which are defined by Energy Trust as the combination of sector (e.g., Residential, Commercial, Industrial) and replacement type (e.g., New Construction, Retrofit, Replacement). For example, “Residential Replacement” in Figure 20 shows the cumulative cost-effective achievable potential for ROB measures over the 20-year forecast horizon. Figure 20 shows that the majority of electric energy savings comes from ROB measures. In particular, CFLs and heat pump water heaters dominate ROB electric energy savings potential, while retrofit electric energy savings are driven primarily by showerheads and faucet aerators.

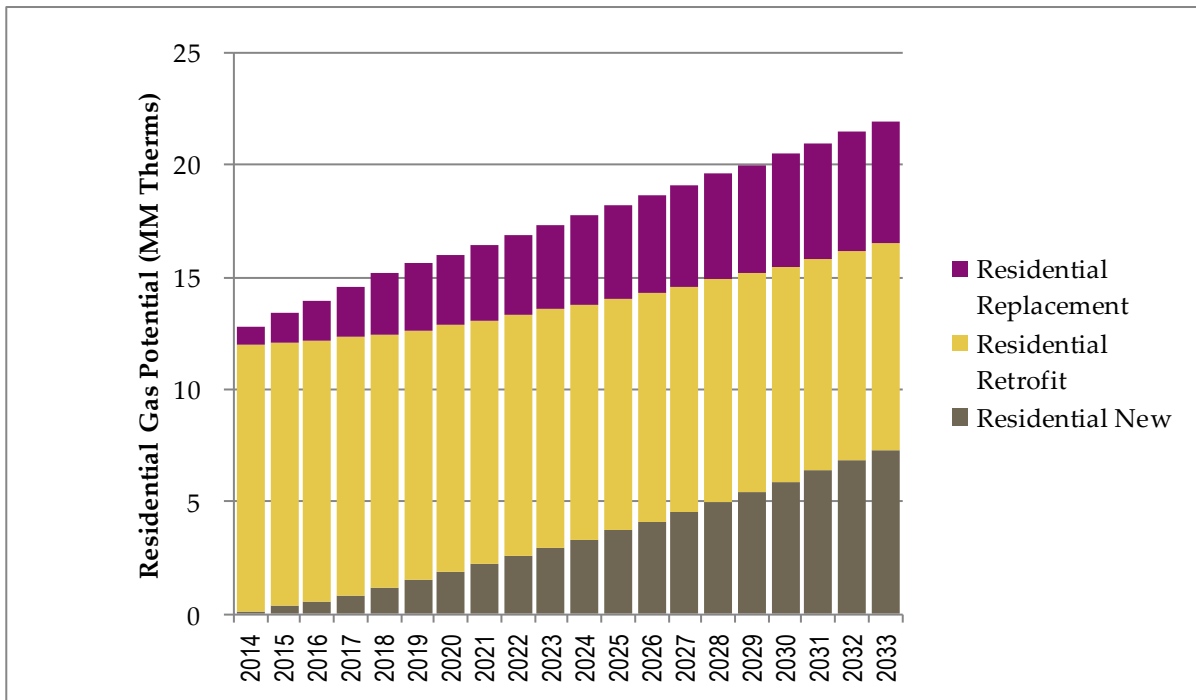
Figure 20. Cumulative Residential Cost-effective Energy Savings (MWh) by Program Type



Source: Navigant analysis, 2014

Figure 21 shows cost-effective achievable gas potential by program type. This graph shows that while potential in the early years is dominated by retrofit measures (e.g., showerheads, faucet aerators and behavior savings), future potential in outer years is also driven by ROB and NEW measures, especially windows replacements and absorption gas heat pump water heaters. See Appendix B for more measure-level detail of potential by program type.

Figure 21. Cumulative Residential Cost-effective Gas Savings (MMtherms) by Program Type

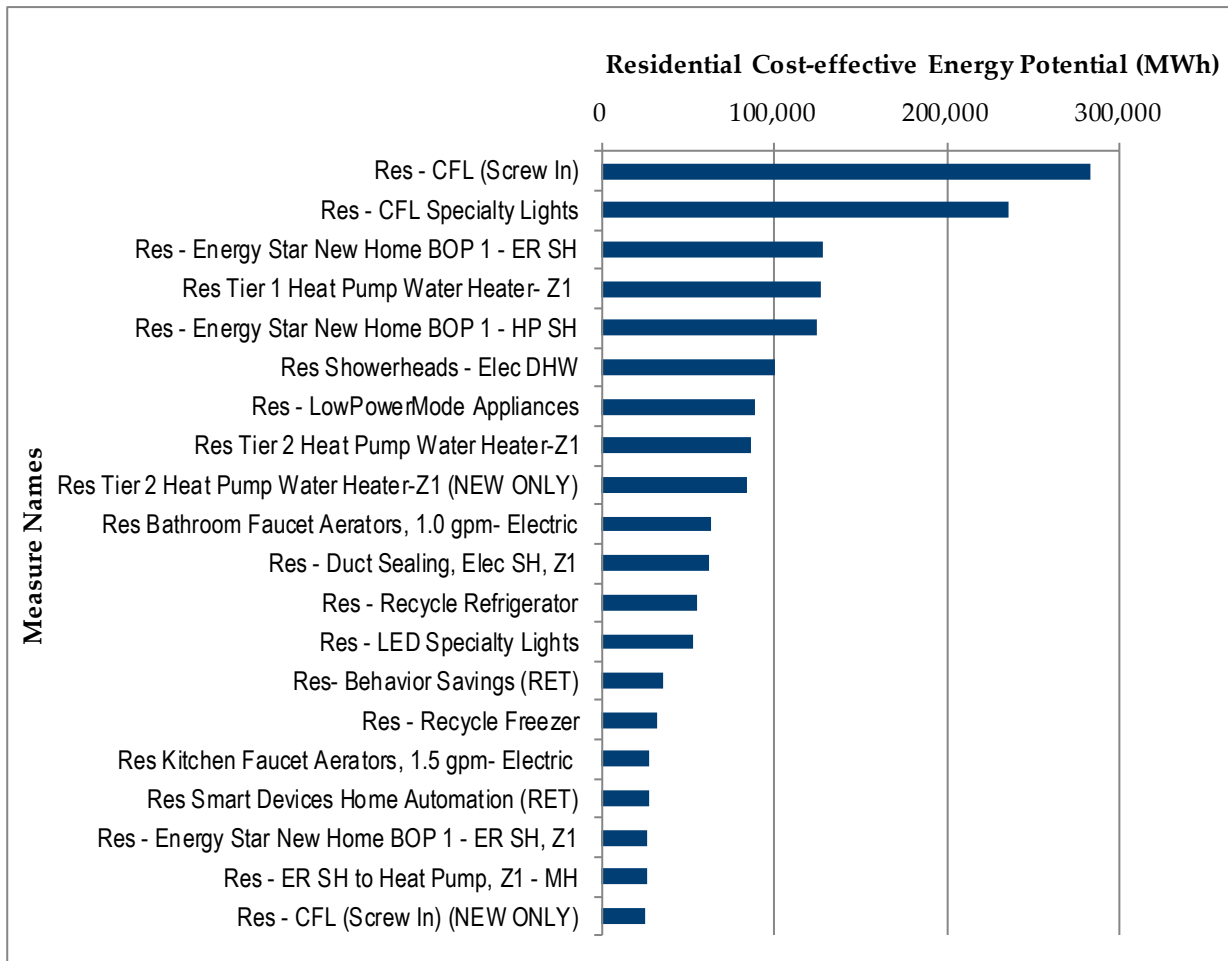


Source: Navigant analysis, 2014

4.4 Histograms of Top 20 Residential Measures

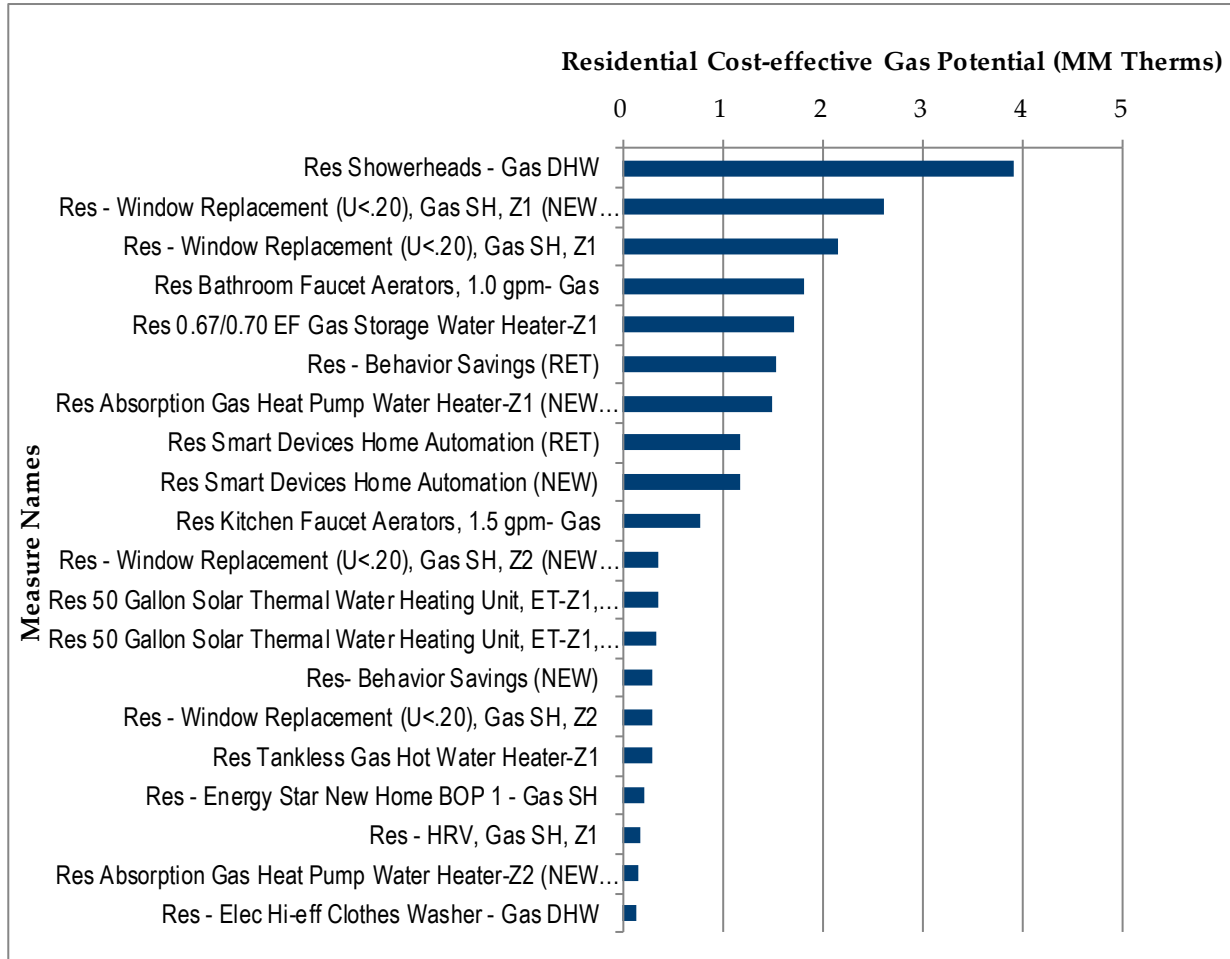
It is common in potential studies for a small number of measures to account for a majority of the savings. Figure 22 and Figure 23 provide a set of histograms showing the cumulative achievable potential by 2033 of the top 20 electric and gas measures in Energy Trust’s residential sector. These measures represent over 90% of the total cost-effective achievable potential for both electric and gas measures. For electric potential, the top three measures are residential screw-in CFLs, specialty CFLs and ENERGY STAR New Home BOP – Space Heat. For gas potential, the top three measures are showerheads, window replacement measures, and faucet aerators. For more details on measure-level savings, refer to Appendix B.

Figure 22. Top 20 Residential Electric Measures by 2033



Source: Navigant analysis, 2014

Figure 23. Top 20 Residential Gas Measures by 2033



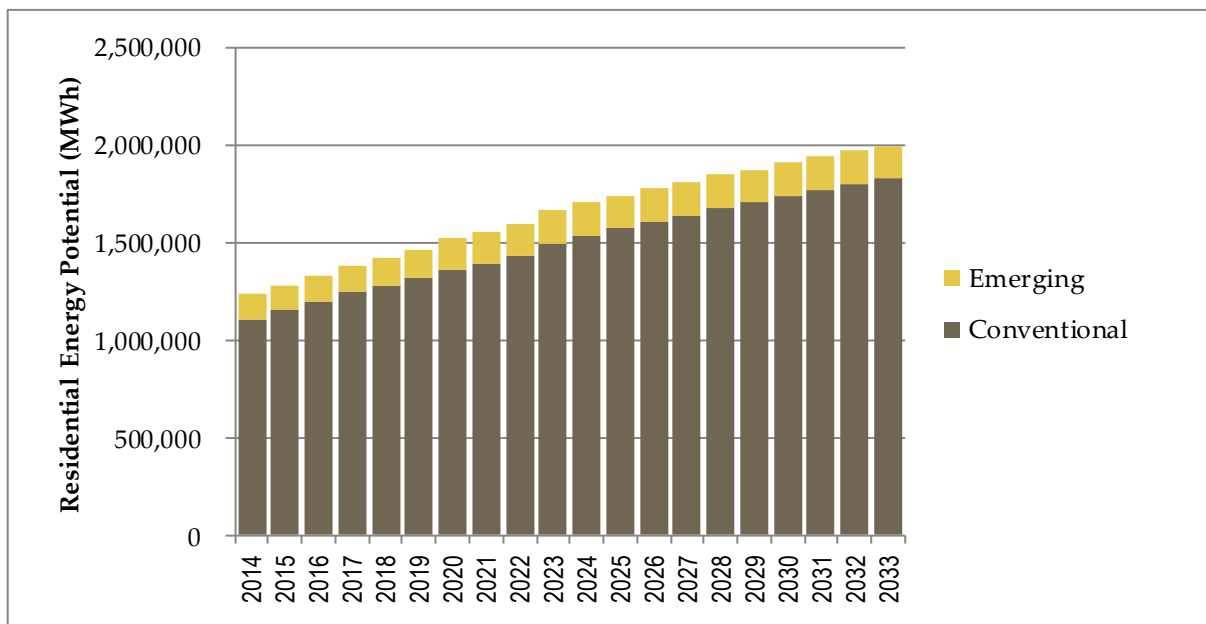
Source: Navigant analysis, 2014

4.5 Residential Emerging Technology Results

Navigant’s modeling approach includes an emerging technology (ET) overlay that enables the model to capture the range of possible savings from ETs due to cost and efficiency improvements over time. Additionally, the model also accounts for an ET risk factor (see section 2.1 for details on ET measure characterization) to capture the inherent uncertainty in future market development of ETs. As described in section 2.2.3, a tiered approach was used to estimate savings among efficient measures that compete for the same installation. Therefore, ET measures compete with conventional measures within a competition group, and their cost-effectiveness is assessed on an incremental basis relative to the next highest rank within the competition group. Figure 24 and Figure 25 show the contribution of emerging and conventional measures toward cumulative risk-adjusted cost-effective achievable (electric and gas) potential for the residential sector. For electric potential, emerging technology savings over the 20-year forecast horizon are small compared with conventional measure savings; by 2033, ETs contribute about 8% of total cost-effective achievable electric energy potential. There are two reasons for this:

1. Energy saving ETs are incrementally less cost-effective compared with competing conventional technologies. In other words, there is not a lot of incremental (relative to the next most cost-effective measure) cost-effective achievable ET savings in the calculation of tiered potential (since the measure against which it is compared is already more efficient than the baseline measure).
2. The application of ET risk factors (to account for uncertainty in ET savings) reduces the total tiered potential of ETs. The inclusion of a risk factor reduces cumulative cost-effective achievable potential of ETs by 60% in 2033.

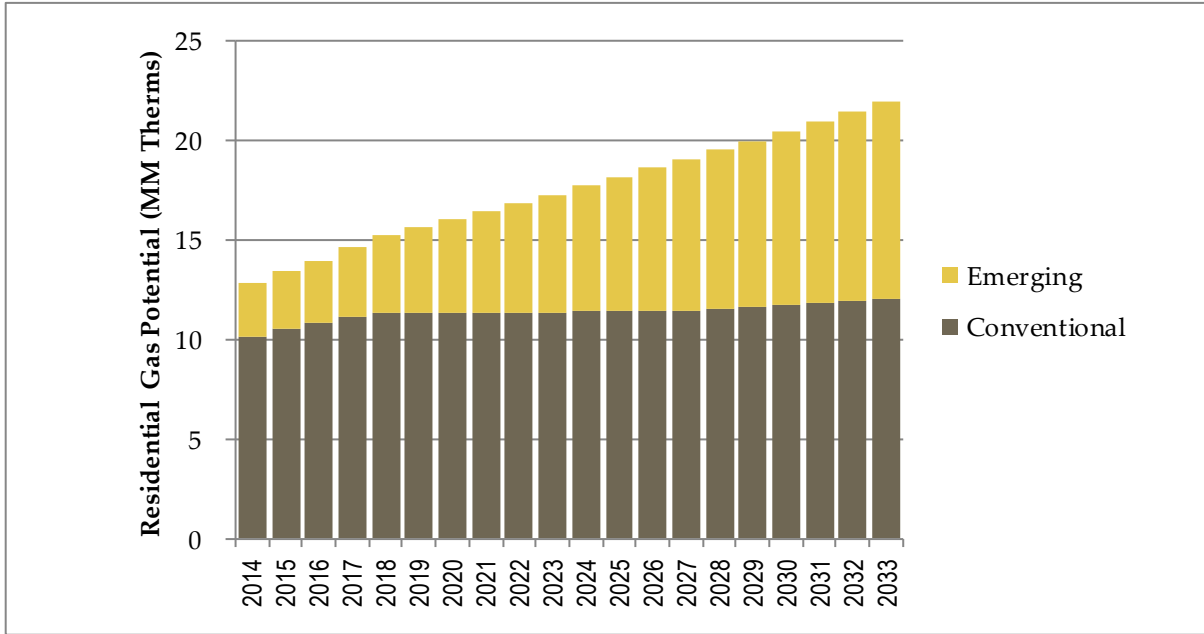
Figure 24. Cumulative Residential Cost-effective Energy Savings (MWh)-Emerging vs. Conventional



Source: Navigant analysis, 2014

Figure 25 shows that gas ETs have a more significant impact on future gas savings. Smart devices home automation, absorption gas heat pump water heater, and windows replacement measures contribute a bulk of the future gas potential.

Figure 25. Cumulative Residential Cost-effective Gas Savings (MMtherms)-Emerging vs. Conventional



Source: Navigant analysis, 2014

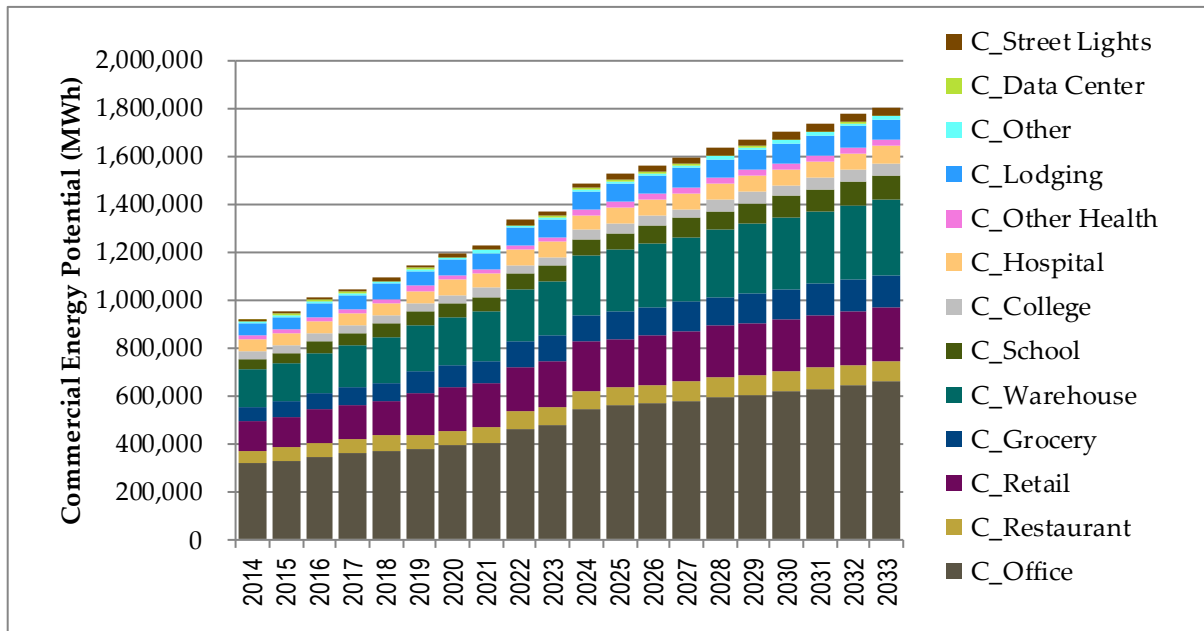
5 Energy Efficiency Potential in Energy Trust’s Commercial Sector

This section provides estimates of electric energy and gas savings for all commercial buildings, including existing and new construction buildings. All the results shown in this section are estimates of risk-adjusted tiered cost-effective achievable potential for the electric energy and gas impact types, and include savings potential for both conventional and emerging technology measures.

5.1 Commercial Cost-Effective Achievable Potential – Customer Segment

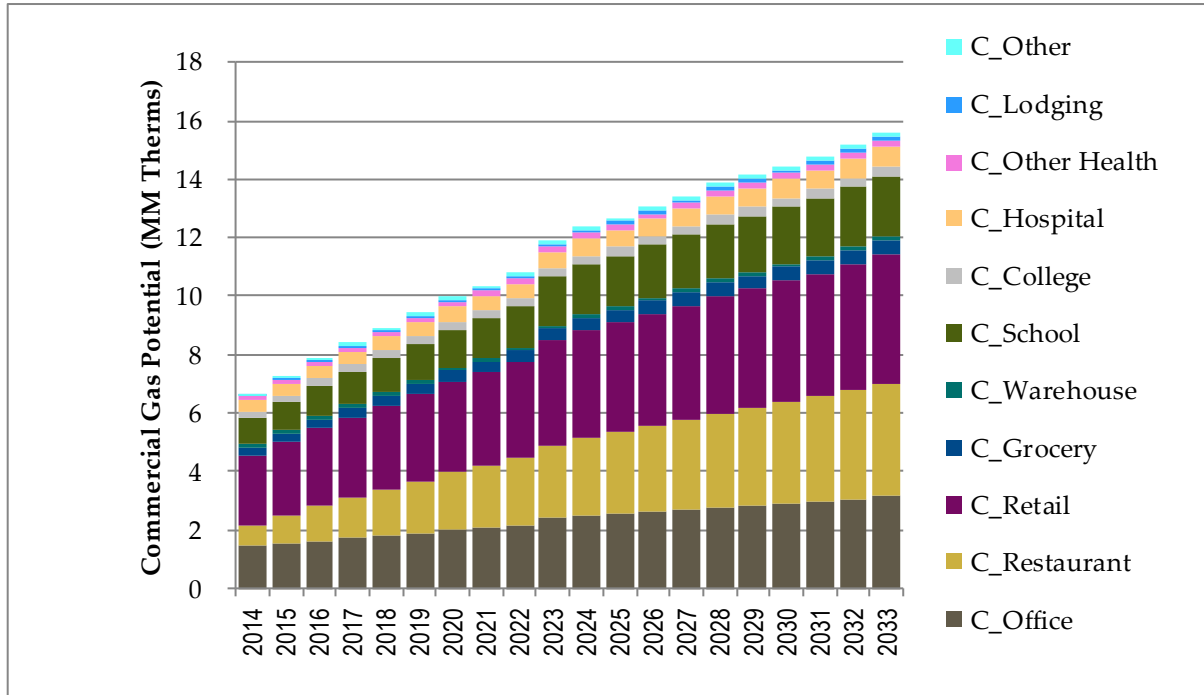
Navigant estimated the savings potential in thirteen different commercial customer segments as shown in Figure 26 and Figure 27. For electric energy savings, commercial offices offer the largest potential for savings accounting for 36% of cumulative cost-effective achievable potential by 2033. Commercial retail and warehouse segments also contribute significantly toward overall potential, accounting for a combined 29% of cost-effective achievable potential by 2033. For commercial gas savings, the retail and restaurant segments show the largest potential for savings contributing 53% of total cost-effective achievable potential by 2033. The bump in gas savings in 2023 is attributable to the commercial wall insulation (R-11) measure becoming cost-effective starting in that year.

Figure 26. Cumulative Commercial Cost-effective Energy Savings (MWh) by Customer Segment



Source: Navigant analysis, 2014

Figure 27. Cumulative Commercial Cost-effective Gas Savings (MMtherms) by Customer Segment

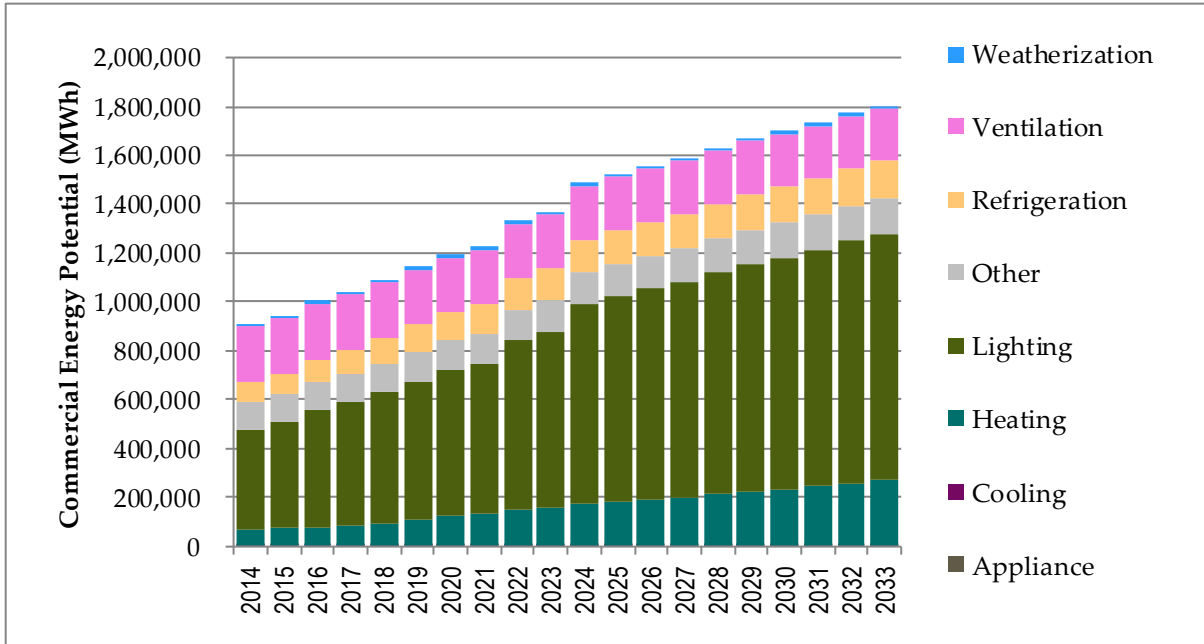


Source: Navigant analysis, 2014

5.2 Commercial Cost-Effective Achievable Potential – End Use

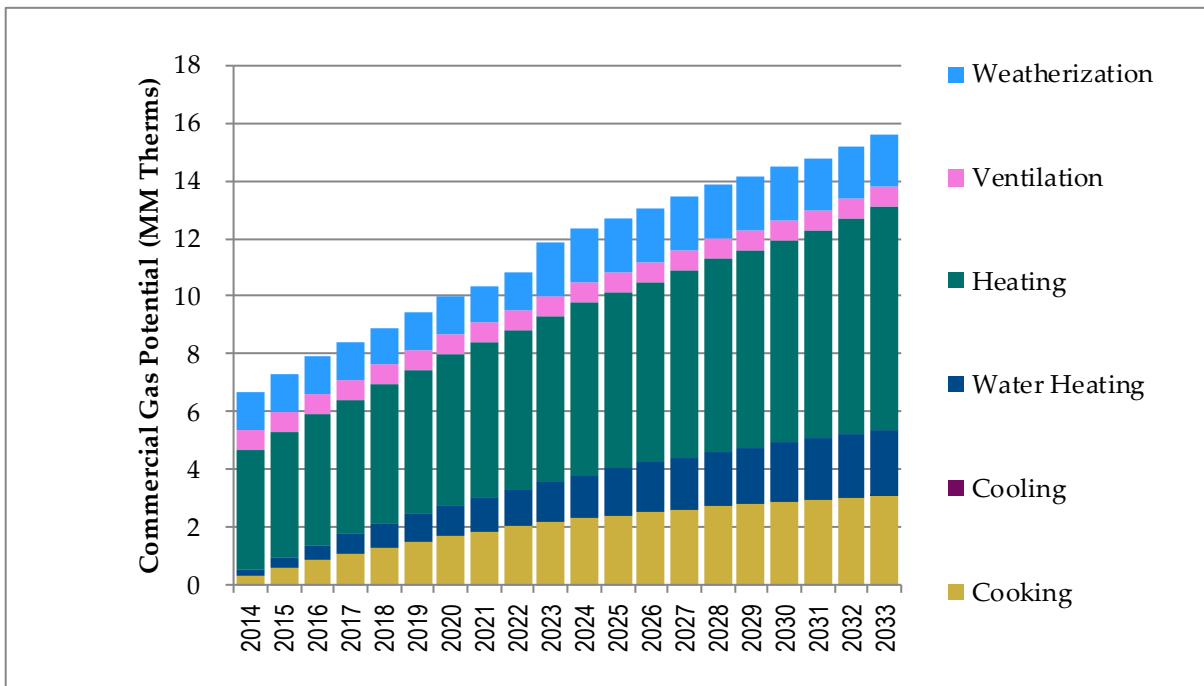
Navigant calculated cost-effective achievable potential at the measure level and customer segment level before aggregating results for the commercial sector into seven different end-use categories. Figure 28 and Figure 29 show the cumulative cost-effective achievable potential for electric and gas savings respectively, disaggregated by end-use category. For electric energy savings, commercial lighting contributes up to 54% of total cost-effective achievable potential by 2033. In particular, commercial lighting savings are driven by CFLs, LED troffers, and exterior LEDs. Ventilation and refrigeration contribute about 20% toward total cost-effective achievable electric energy potential by 2033. For gas savings, heating and cooking measures provide the largest savings opportunity by 2033, driven largely by demand control ventilation, Direct Digital Control (DDC) HVAC controls, and condensing tankless water heaters. Additional detail regarding high impact commercial measures can be found in section 5.4.

Figure 28. Cumulative Commercial Cost-effective Energy Savings (MWh) by End Use



Source: Navigant analysis, 2014

Figure 29. Cumulative Commercial Cost-effective Gas Savings (MMtherms) by End Use

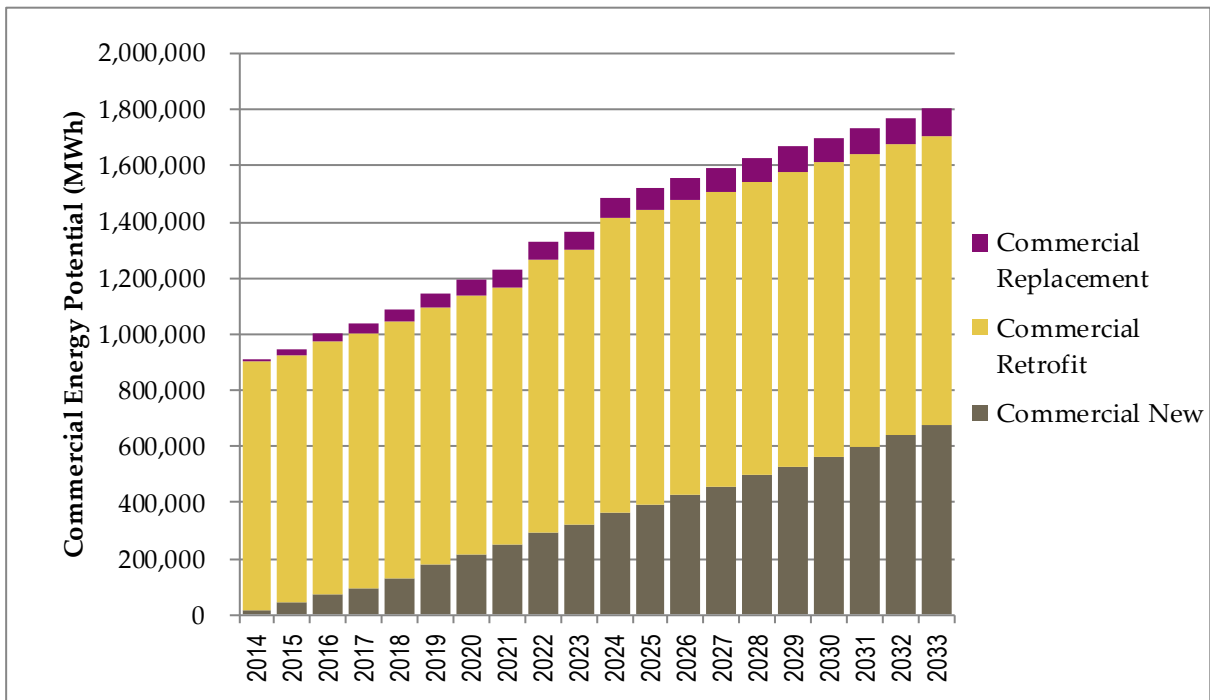


Source: Navigant analysis, 2014

5.3 Commercial Cost-Effective Achievable Potential – Program

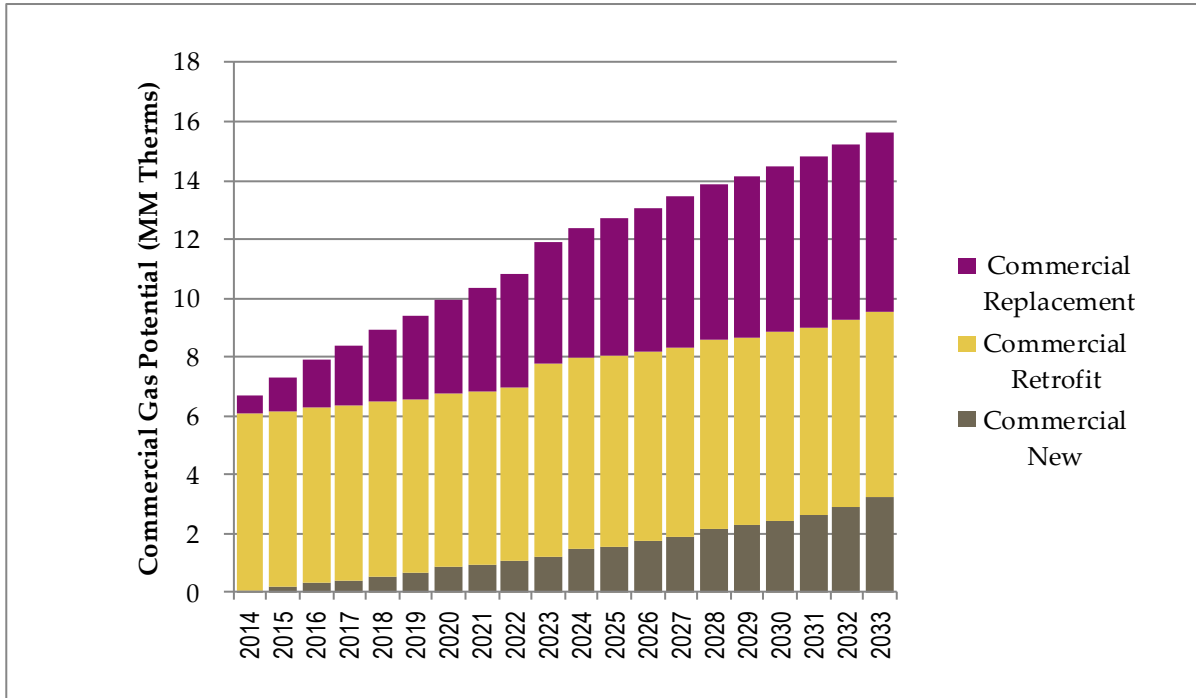
This subsection presents details about commercial electric energy and gas savings disaggregated by program type (e.g., New Construction, Retrofit, and Replacement). Figure 30 and Figure 31 show cumulative cost-effective achievable potential for electric and gas savings measures by program type. Commercial retrofit and new construction measures account for 90% of total cost-effective achievable electric energy savings potential by 2033. In particular, commercial lighting measures, which are characterized as retrofit, account for a bulk of these savings along with demand control ventilation and advanced ventilation controls. The modeling of lighting measures as retrofit implies that, unlike in the residential sector, commercial lighting savings are not constrained by the rate at which the base measure stock turns over. For gas savings, Figure 31 shows that commercial replacement measures contribute significantly toward cost-effective achievable potential by 2033, in addition to retrofit measures. In particular, cooking (e.g., ENERGY STAR fryer) and water heating (e.g., condensing tankless DHW) measures are key drivers of ROB gas savings by 2033, while heating measures (e.g., demand control ventilation) drive retrofit gas savings by 2033. See Appendix B for more measure-level detail of potential by program type.

Figure 30. Cumulative Commercial Cost-effective Energy Savings (MWh) by Program Type



Source: Navigant analysis, 2014

Figure 31. Cumulative Commercial Cost-effective Gas Savings (MMtherms) by Program Type

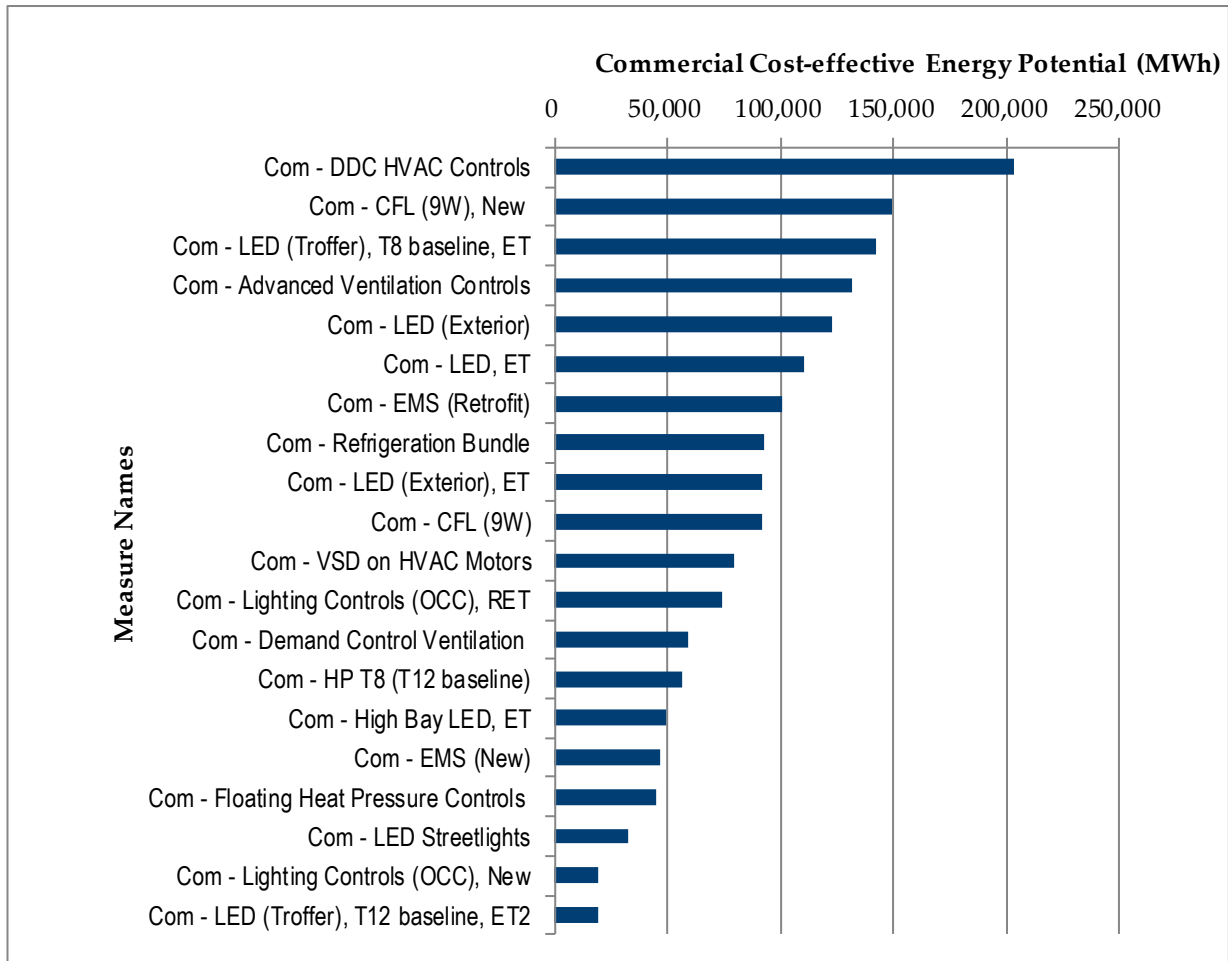


Source: Navigant analysis, 2014

5.4 Histograms of Top 20 Commercial Measures

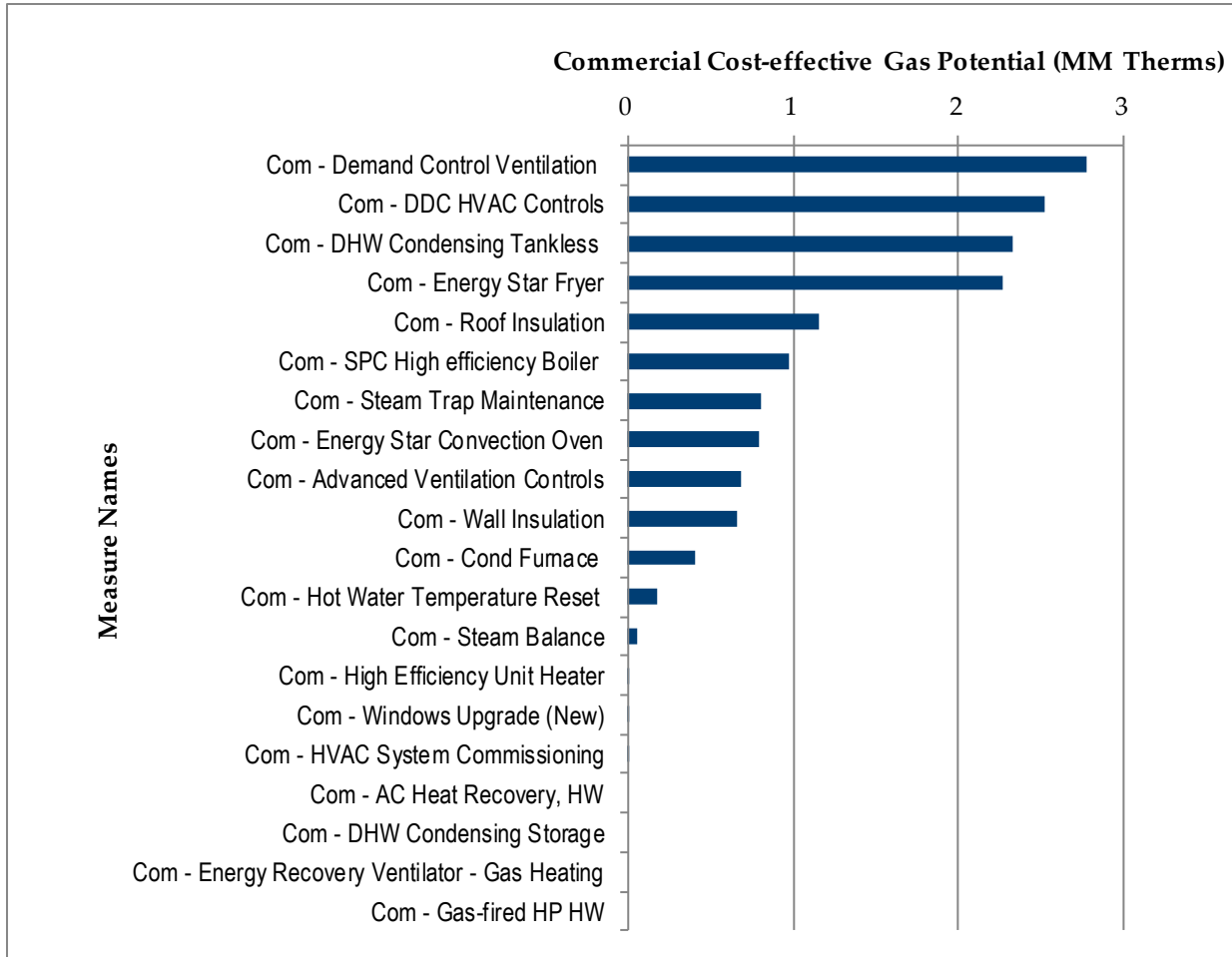
Figure 32 and Figure 33 provide a set of histograms showing the cumulative cost-effective achievable potential by 2033 of the top 20 high impact (electric and gas) measures in Energy Trust’s commercial sector. These measures represent over 90% of the total cost-effective achievable potential within the commercial sector. For electric measures, the top three measures are DDC HVAC Controls, CFLs (9W), and LED troffers. Lighting measures have historically been high impact measures in the commercial sector and will continue to do so as LEDs become increasingly cost-effective over the study period. For gas measures, the top three measures are demand control ventilation, DDC HVAC Controls, and DHW condensing tankless water heaters. For more details on measure-level savings, refer to Appendix B.

Figure 32. Top 20 Commercial Electric Measures by 2033



Source: Navigant analysis, 2014

Figure 33. Top 20 Commercial Gas Measures by 2033

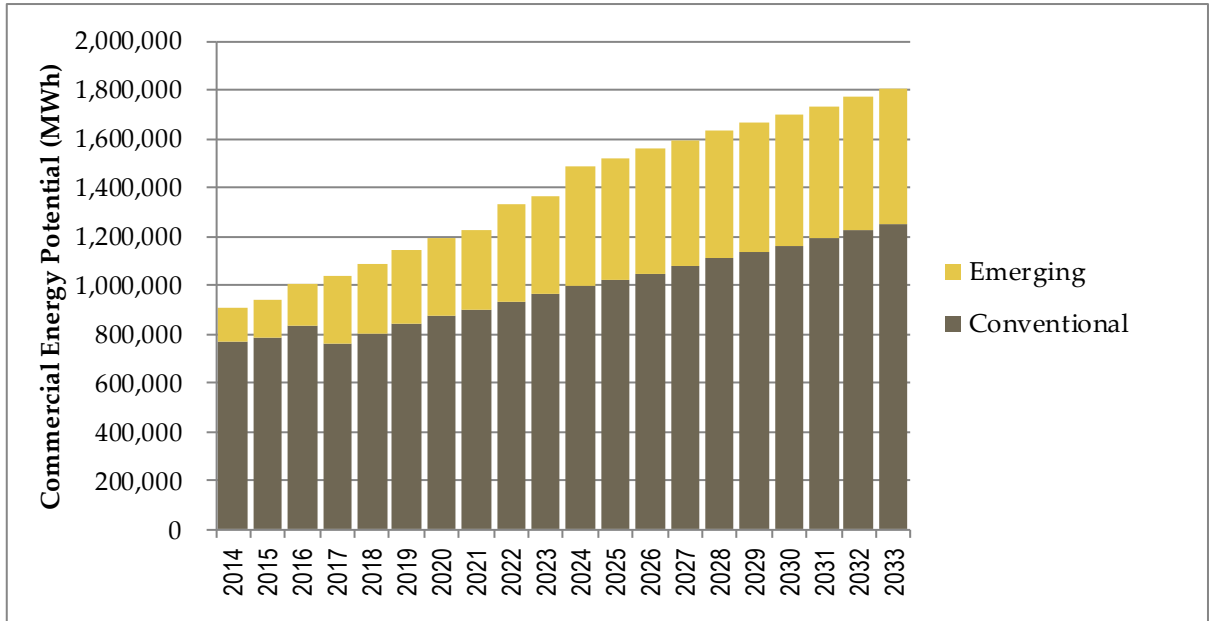


Source: Navigant analysis, 2014

5.5 Commercial Emerging Technology Results

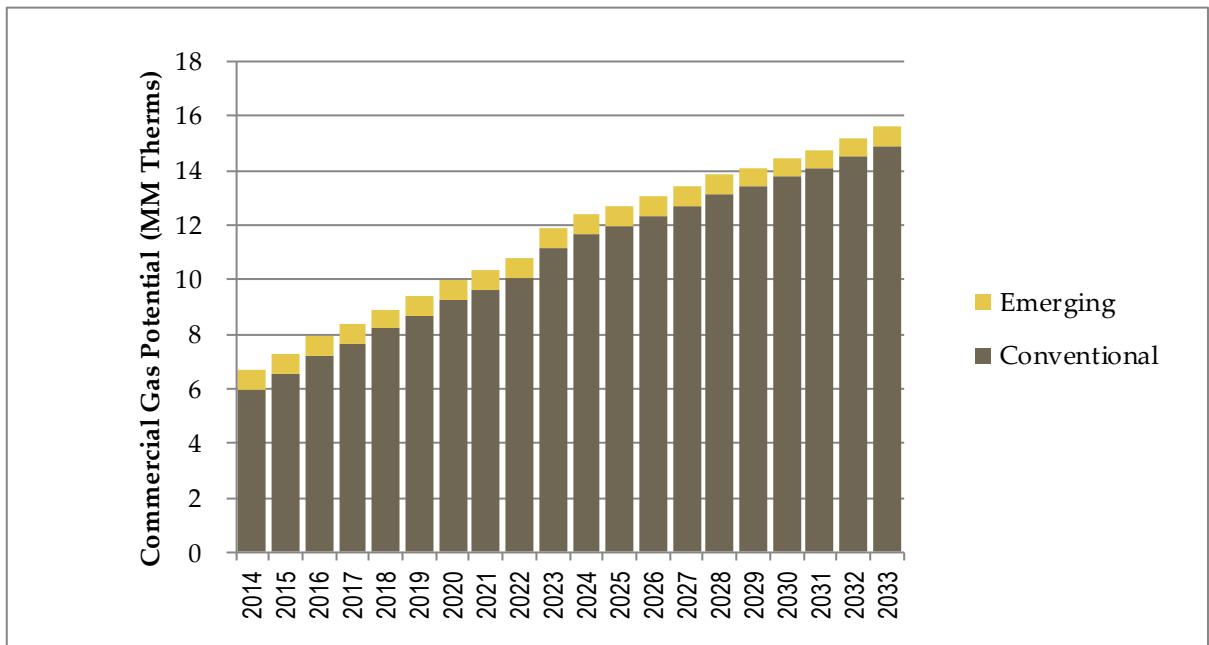
Figure 34 and Figure 35 show the contribution of emerging and conventional measures toward cumulative risk-adjusted cost-effective achievable (electric and gas) potential for the commercial sector. For electric energy potential, emerging technology measure savings are a key contributor toward overall cost-effective achievable potential. By 2033, ETs contribute about 30% of total cost-effective achievable potential, driven primarily by LEDs and advanced ventilation controls. For gas potential, apart from advanced ventilation controls, the emerging technology gas measures characterized by Navigant offer no cost-effective potential over the modeling period. The combination of high incremental costs for gas ETs and low avoided gas costs result in most of the commercial gas ET measures not screening the TRC test. While the costs for gas ETs might decrease over time, Navigant was unable to find any credible data sources that forecast a decrease over the study period.

Figure 34. Cumulative Commercial Cost-effective Energy Savings (MWh)-Emerging vs. Conventional



Source: Navigant analysis, 2014

Figure 35. Cumulative Commercial Cost-effective Gas Savings (MMtherms)-Emerging vs. Conventional



Source: Navigant analysis, 2014

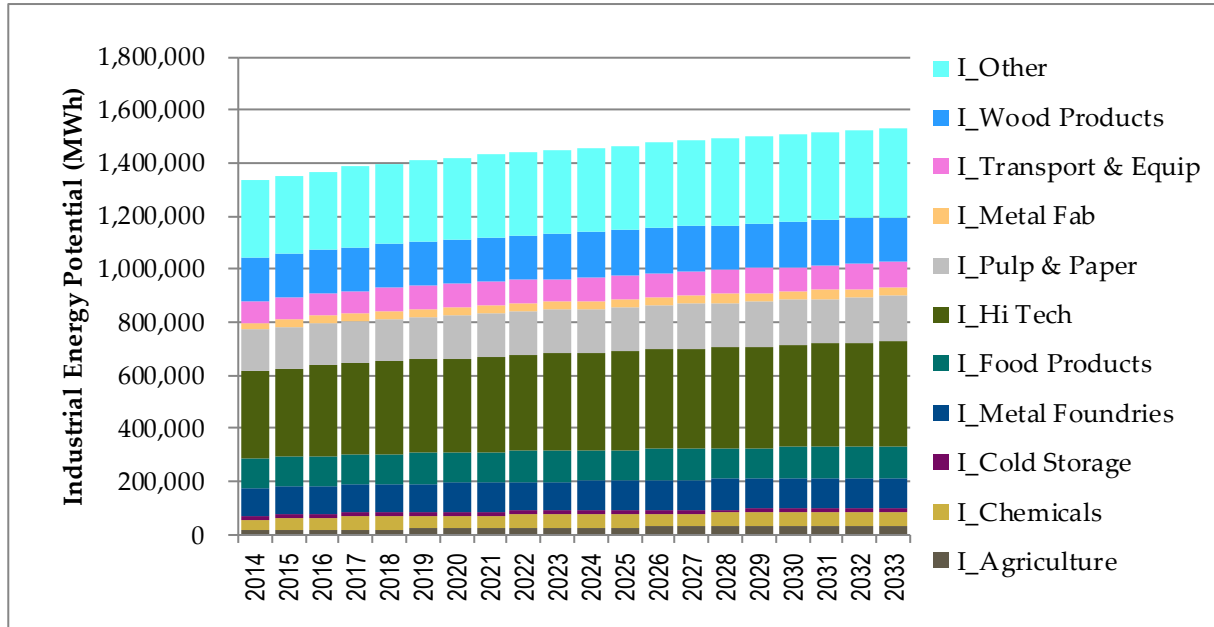
6 Energy Efficiency Potential in Energy Trust's Industrial Sector

This section provides estimates of electric energy and gas savings for the industrial sector. All the results shown in this section are estimates of risk-adjusted tiered cost-effective achievable potential for the electric energy and gas impact types, and include savings potential for both conventional and emerging technology measures. Navigant used a top-down approach to estimate potential for the industrial sector because of the diversity of end uses and custom nature of projects in the sector. Whereas total potential for the residential and commercial sectors are estimated based on the number of residential homes or square footage of building space, industrial potential is calculated using the load consumption forecast. While the companion Analytica model offers the ability to view disaggregated potential for different industrial customer classes (<1aMW,>1aMW, self-direct etc.), the results in this section show an aggregated view of industrial savings potential.

6.1 *Industrial Cost-Effective Achievable Potential – Customer Segment*

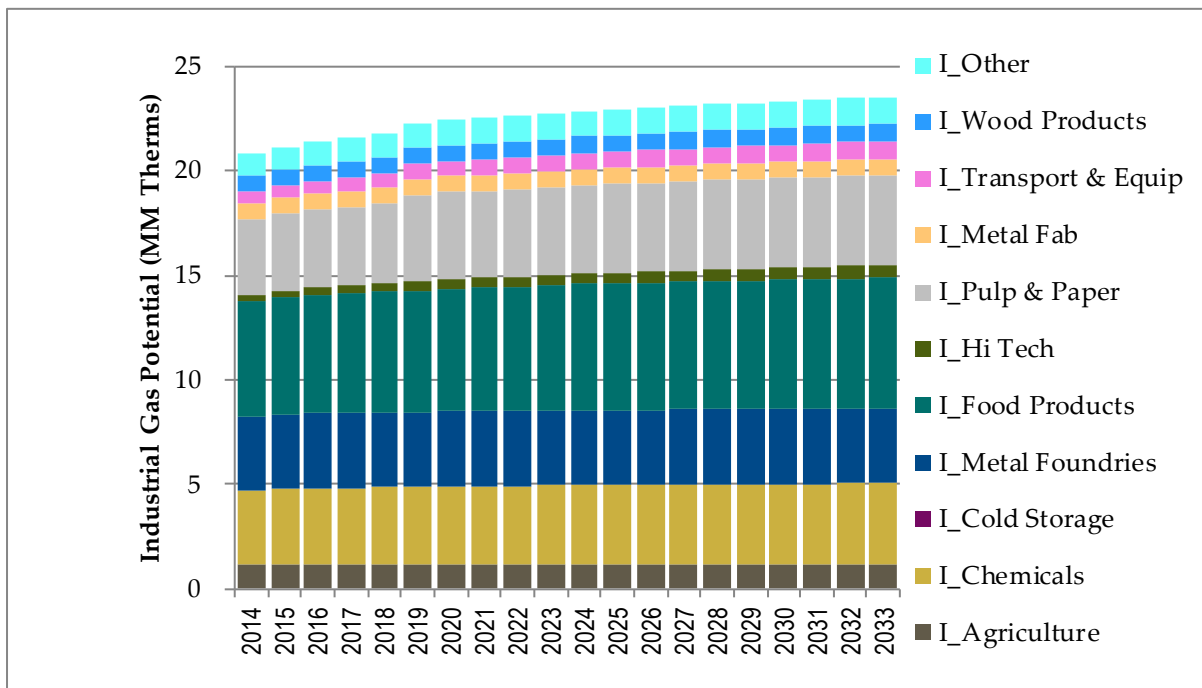
Navigant calculated the savings potential in eleven different industrial customer segments as shown in Figure 36 and Figure 37. For industrial electric potential, the hi-tech customer segment offers the largest savings accounting for 25% of the cost-effective achievable potential by 2033. This is because the hi-tech customer segment has the largest load consumption forecast over the modeling period across combined electric utilities in the Energy Trust service territory. Similarly, for industrial gas savings, the food products, pulp & paper, and chemicals segments show the largest savings over the study period accounting for 61% of total cost-effective achievable gas potential by 2033. Additional details regarding measures that drive overall electric and gas savings within these segments can be found in section 6.4.

Figure 36. Cumulative Industrial Cost-effective Energy Savings (MWh) by Customer Segment



Source: Navigant analysis, 2014

Figure 37. Cumulative Industrial Cost-effective Gas Savings (MMtherms) by Customer Segment

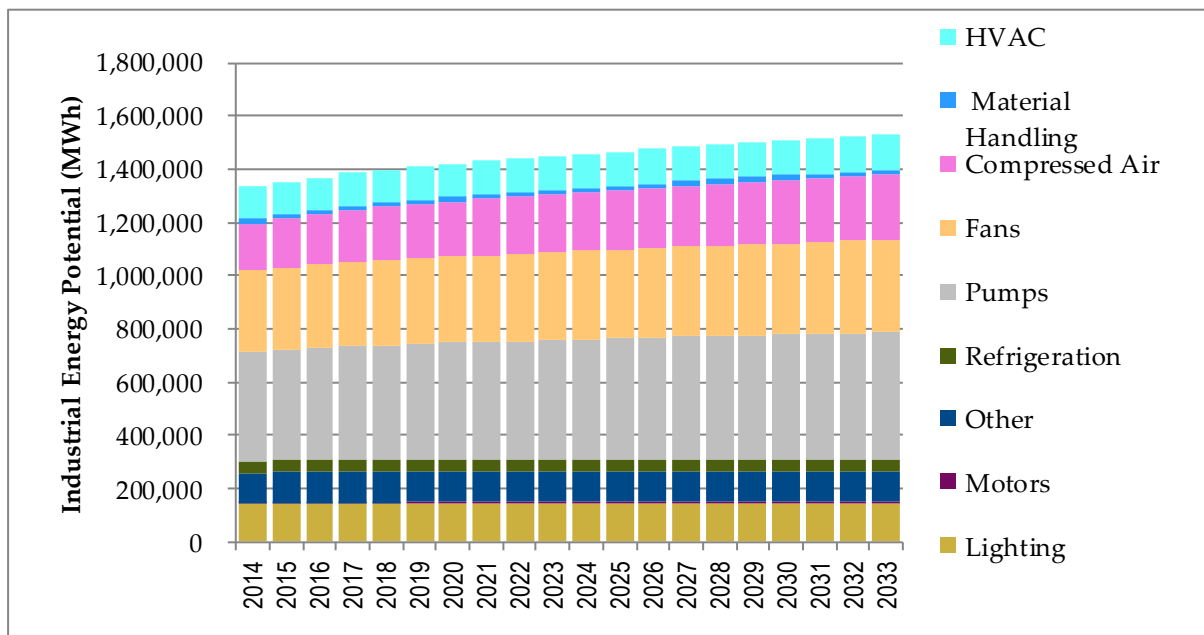


Source: Navigant analysis, 2014

6.2 Industrial Cost-Effective Achievable Potential – End Use

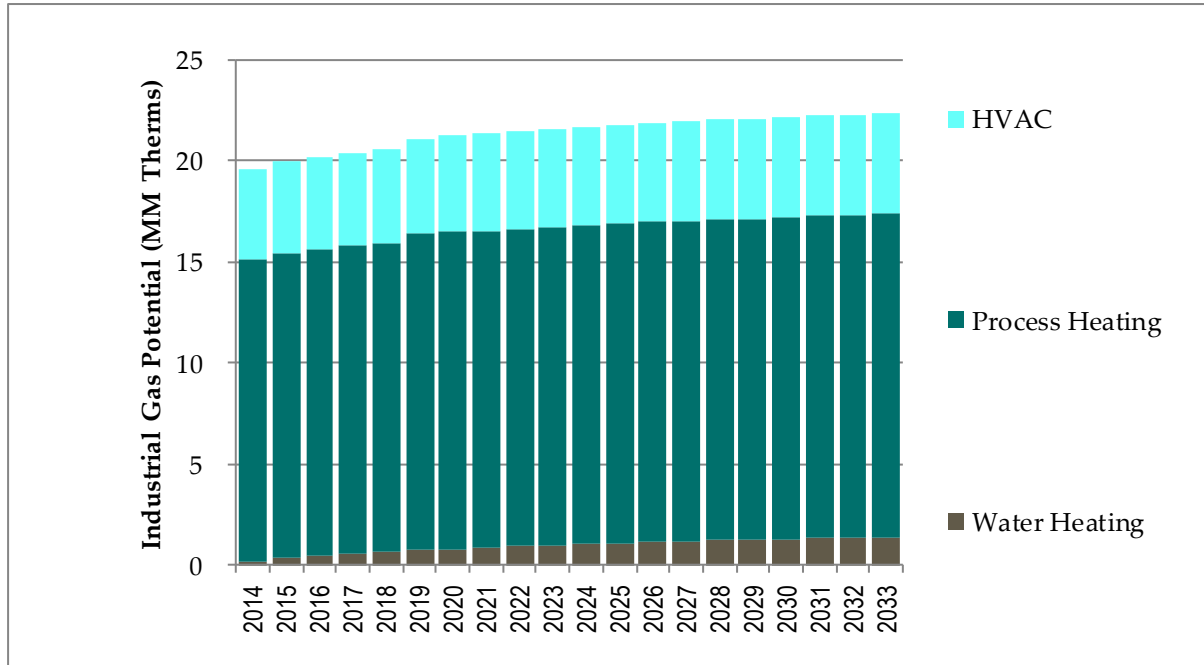
Navigant calculated industrial cost-effective achievable potential at the measure level and customer segment level, which was then aggregated into eleven end-use categories. Figure 38 and Figure 39 show the cumulative industrial cost-effective achievable potential for electric energy and gas savings at the end-use category level. Pumps and fans account for a bulk of the electric energy savings potential, accounting for 54% of total cost-effective achievable potential by 2033. In particular, industrial pump and fan savings are driven by pump and fan variable frequency drives (VFDs), and pump sequencing controls. For industrial gas savings, HVAC and process heating account for over 90% of the cost-effective achievable potential by 2033. Industrial burner upgrades, boiler tune-ups, and roof and wall insulation measures are the biggest contributors toward industrial gas savings over the study period. Further details on measures that drive overall savings can be found in section 6.4.

Figure 38. Cumulative Industrial Cost-effective Energy Savings (MWh) by End Use



Source: Navigant analysis, 2014

Figure 39. Cumulative Industrial Cost-effective Gas Savings (MMtherms) by End Use

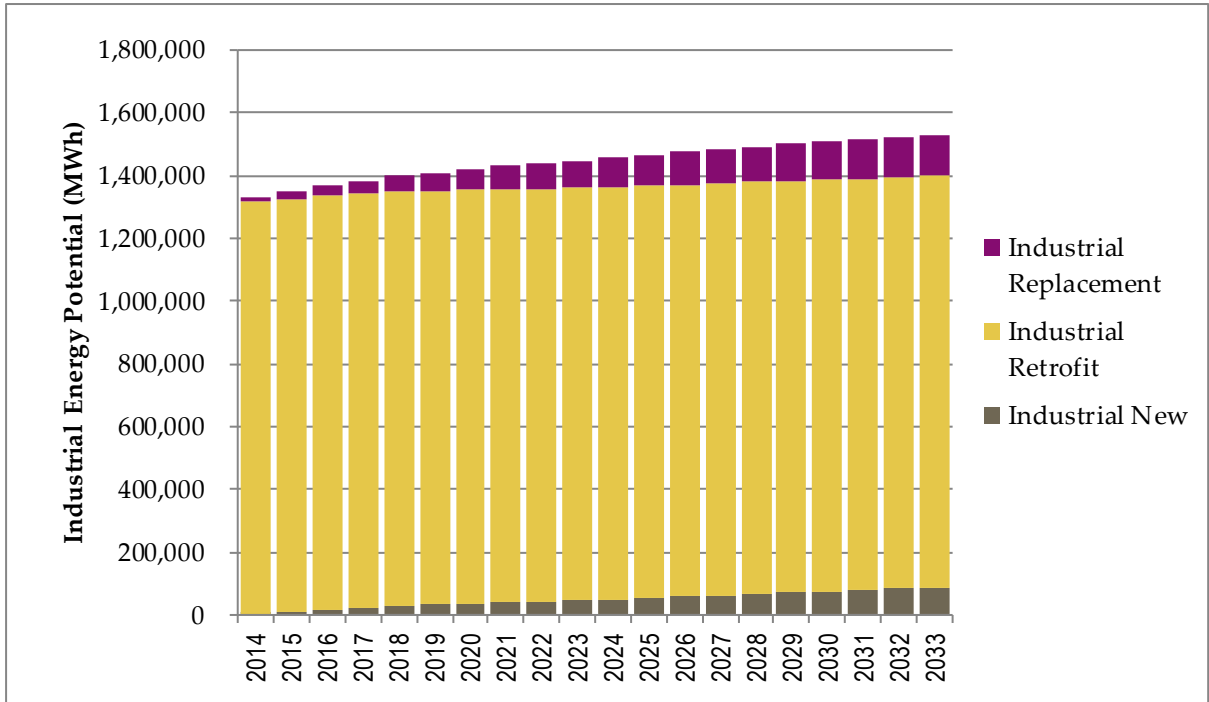


Source: Navigant analysis, 2014

6.3 Industrial Cost-Effective Achievable Potential – Program

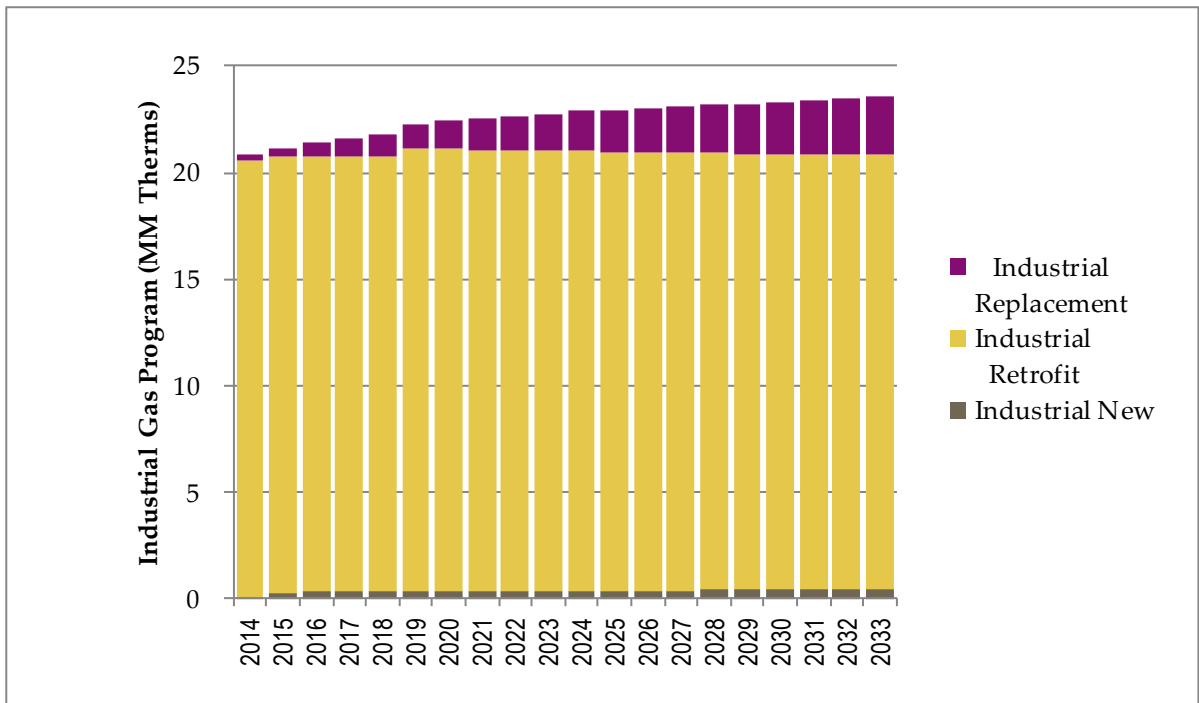
Navigant disaggregated industrial cost-effective achievable potential by program type (e.g., New Construction, Retrofit, Replacement) for electric and gas savings, as shown in Figure 40 and Figure 41. For both electric and gas savings, industrial retrofit measures account for close to 90% of cost-effective achievable potential by 2033. This assumes that most industrial energy efficiency measures (e.g., lighting retrofits or variable frequency drives) are implemented as part of retrofit programs. For ROB and new construction measures, electric savings potential is attributable to equipment (e.g., pump and fan) upgrades while gas savings potential comes from gas-fired heat pump water heaters and high efficiency boilers.

Figure 40. Cumulative Industrial Cost-effective Energy Savings (MWh) by Program Type



Source: Navigant analysis, 2014

Figure 41. Cumulative Industrial Cost-effective Gas Savings (MMtherms) by Program Type

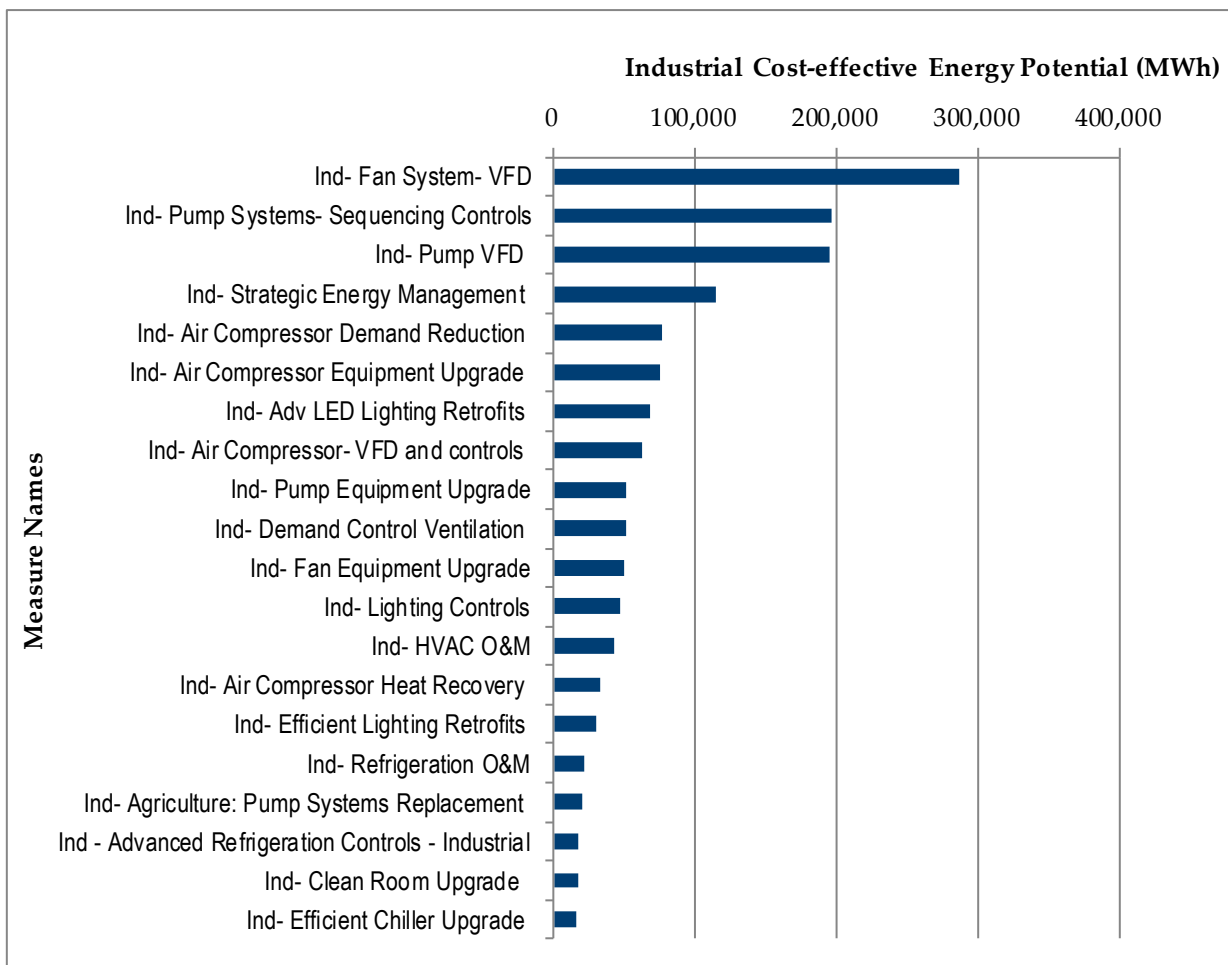


Source: Navigant analysis, 2014

6.4 Histograms of Top 20 Industrial Measures

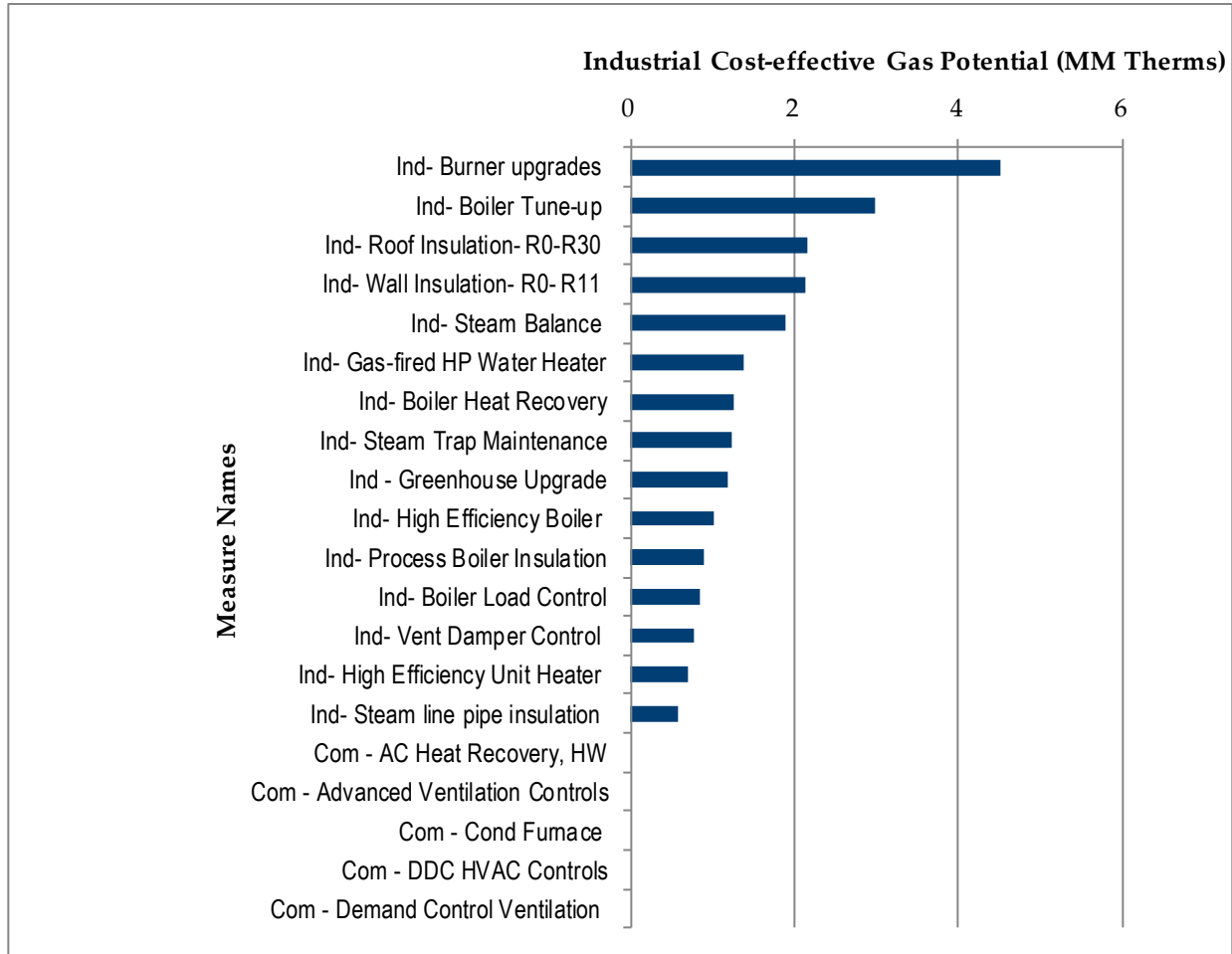
Figure 42 and Figure 43 present histograms showing the cumulative cost-effective achievable potential by 2033 of the top 20 (electric and gas) measures in Energy Trust’s industrial sector, which account for over 90% of the savings potential. For electric measures, the top three high impact measures are pump and fan variable frequency drives as well as pump system sequencing controls. The top three high impact gas measures in the industrial sector are burner upgrades, boiler tune-ups, and roof insulation measures. For more details on measure-level savings in the industrial sector, refer to Appendix B.

Figure 42. Top 20 Industrial Electric Measures by 2033



Source: Navigant analysis, 2014

Figure 43. Top 20 Industrial Gas Measures by 2033

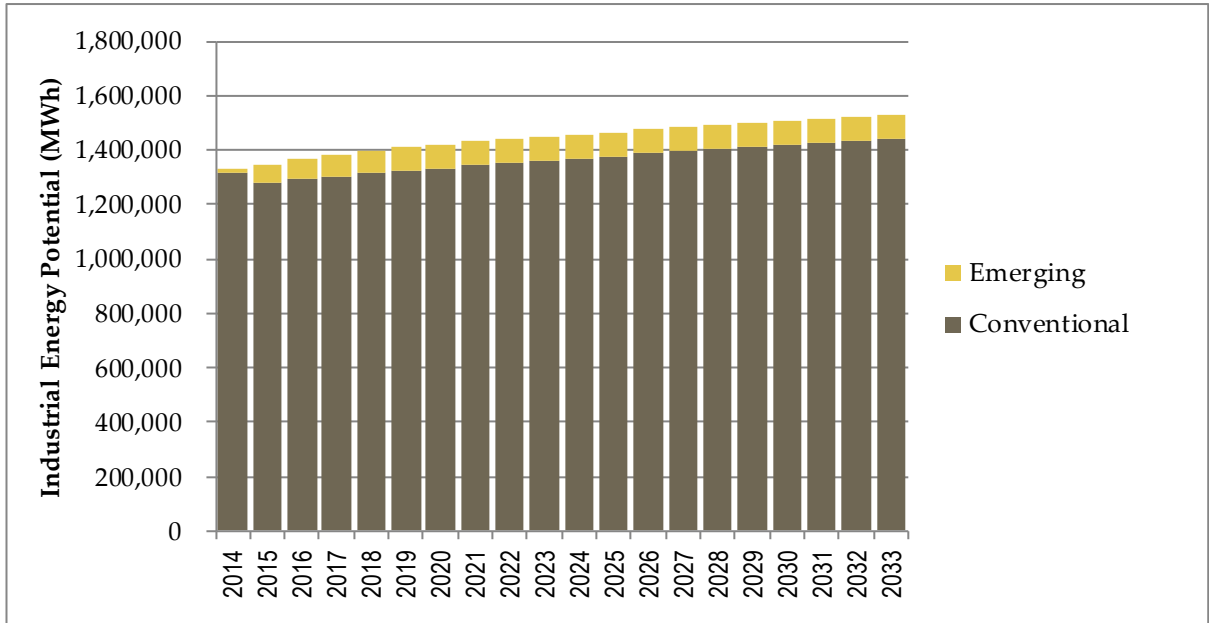


Source: Navigant analysis, 2014

6.5 Industrial Emerging Technology Results

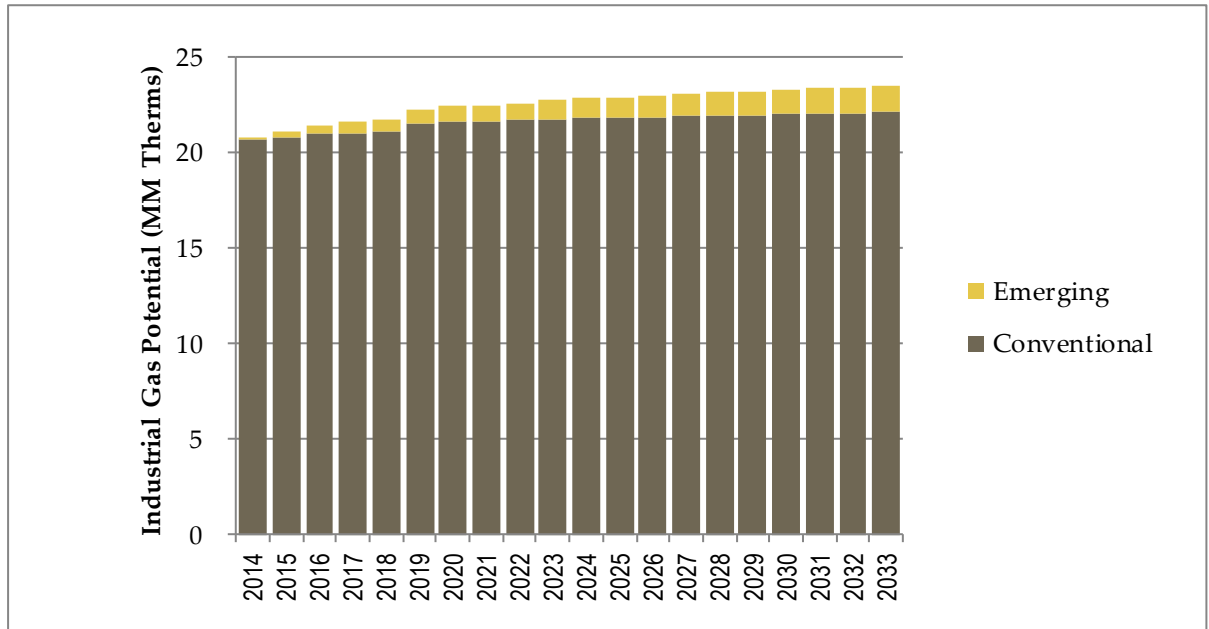
This subsection presents details about the contribution of emerging and conventional technologies toward total cumulative cost-effective achievable potential in the industrial sector. Figure 44 and Figure 45 show the contribution of ETs and conventional technologies toward total cost-effective achievable potential for electric and gas measures respectively. For electric energy savings, ETs contribute about 6% of total cost-effective achievable potential by 2033. Most of the ET energy savings in the industrial sector are attributable to advanced LED lighting retrofits and advanced refrigeration controls. For gas savings, ETs account for about 6% of cost-effective achievable potential by 2033. The main contributors of ET gas savings for the industrial sector are gas-fired heat pump water heaters and wall insulation (vacuum insulated panels).

Figure 44. Cumulative Industrial Cost-effective Energy Savings (MWh) - Emerging vs. Conventional



Source: Navigant analysis, 2014

Figure 45. Cumulative Industrial Cost-effective Gas Savings (MMtherms) - Emerging vs. Conventional



Source: Navigant analysis, 2014

7 Energy Efficiency Potential Supply Curves

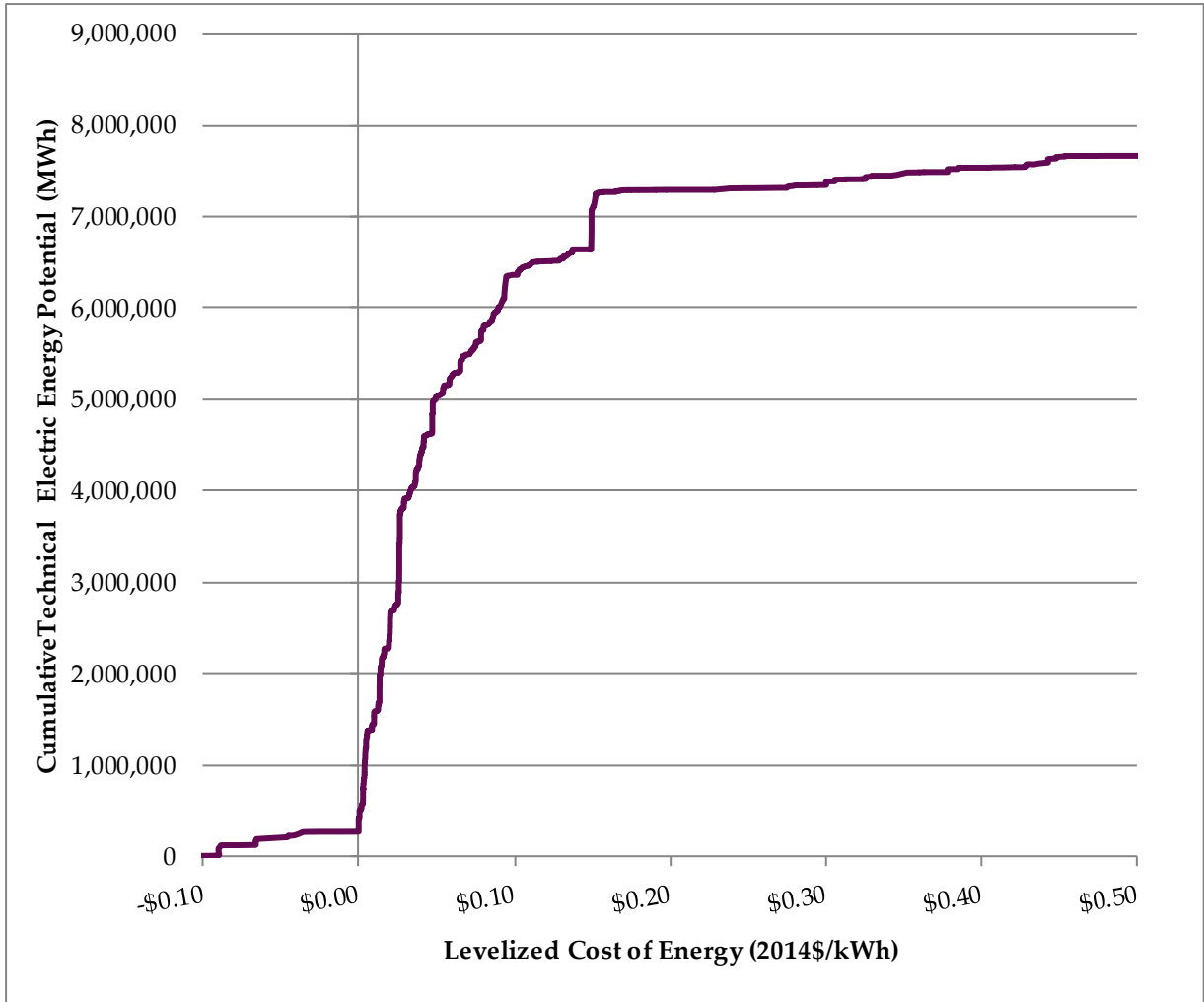
Energy efficiency supply curves offer a useful way to illustrate the amount of energy savings per dollar spent. A supply curve typically consists of two axes – one that shows the cost per unit of savings (e.g., levelized cost per kWh saved) and one that captures the energy savings at each cost level. The curve is constructed using individual efficiency measures differentiated by customer segment, replacement type, and utility, and those measures are sorted on a least-cost basis. Savings are calculated on an incremental basis relative to the measures that precede them.

The levelized cost is the ratio of the present value of equipment and O&M costs (or possibly O&M savings) divided by the present value of energy savings. For this report and under Energy Trust’s guidance, all present values are calculated over the lifetime specific to each measure. However, within the potential model, the user can decide whether present values are based on measure-specific lifetimes or a common planning horizon of 20 years.

Lastly, a levelized cost-based supply curve has the potential to show negative levelized cost values. Negative levelized cost values occur when the present value of costs are negative, while the incremental savings are still positive. This can occur when O&M savings or non-energy benefits exceed the upfront equipment costs.

Figure 46 depicts the supply curve for cumulative electric energy potential in 2033. Roughly, 266,000 MWh are available with levelized costs less than zero. This potential is derived from LED street lights, efficient showerheads, and faucet aerators whose present value of non-energy benefits exceed the upfront equipment costs, resulting in a negative levelized cost. Examples of non-energy benefits include avoided water and sewage costs and O&M savings. In effect, these measures are able to provide energy savings *and* cost savings. There is an additional 160,936 MWh of potential from LEDs, switched reluctance motors, and high efficiency chillers that can be achieved at almost zero cost. Nearly 5,756,952 MWh of cumulative electric energy potential are accessible at a levelized cost of energy below \$0.08 per kWh (in 2014 dollars), which is the lowest forecast of avoided energy costs in 2033. Costs steeply increase for potential beyond 7,300,000 MWh.

Figure 46. Electric Savings Supply Curve (2033)²⁶

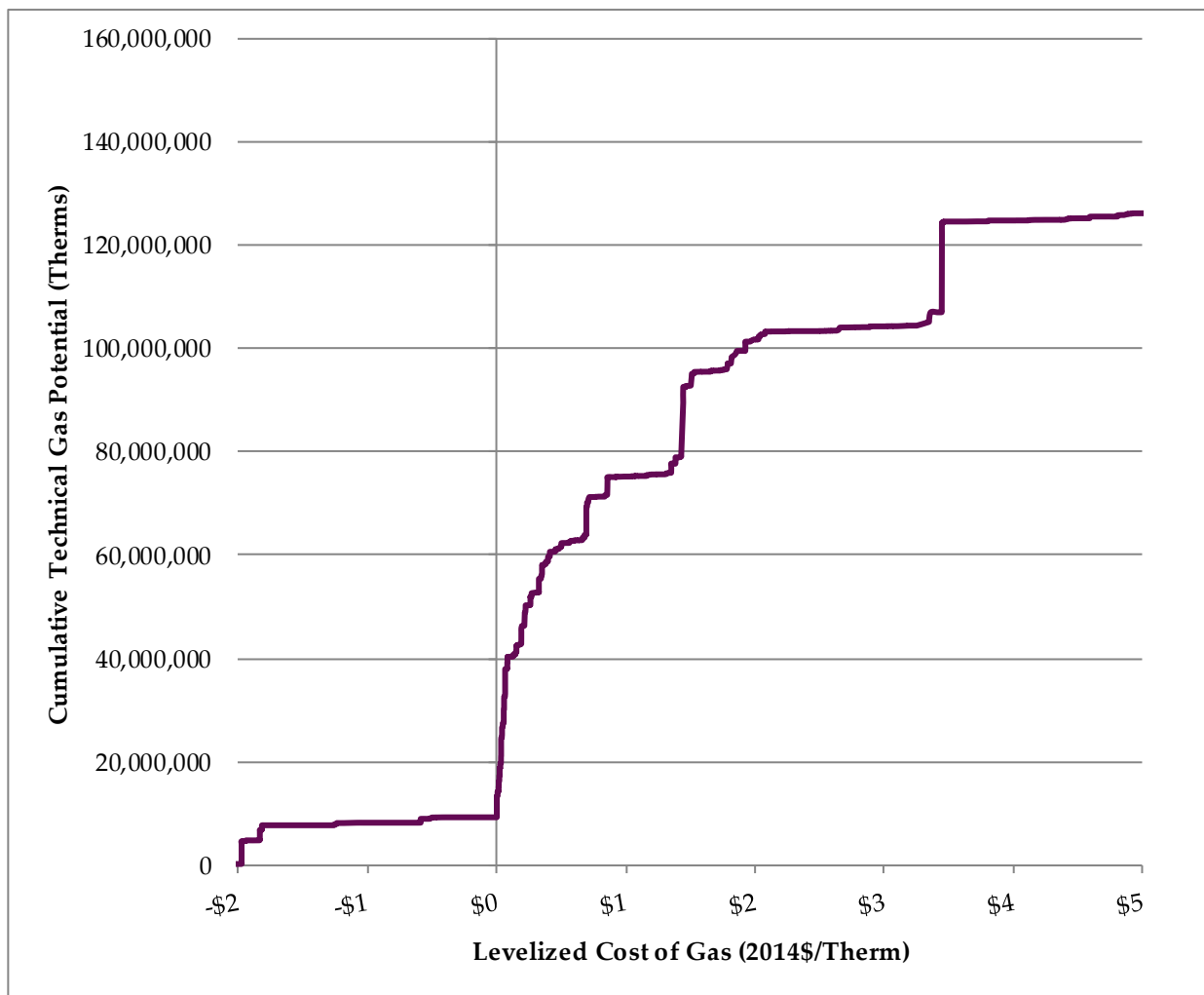


Source: Navigant analysis, 2014

²⁶ Graph has been scaled to show the area of interest, but additional potential above a levelized cost of of \$0.50 per kWh is not shown.

The levelized cost of energy supply curve for cumulative gas saving potential in 2033 is shown in Figure 47. Negative-cost measures account for 9.2 MMtherms and are associated with efficient showerheads. These showerheads have negative levelized cost of energy because their non-energy benefits exceed their costs. An additional 31 MMtherms of potential from condensing furnaces and absorption gas heat pump water heaters can be achieved at almost zero cost. Nearly 59 MMtherms of gas potential are available at costs below \$0.40 per therm, which is the lower bound of avoided cost forecasts in 2033. Approximately 147 MMtherms of cumulative gas savings can be achieved at costs below \$30 per therm. Beyond 147 MMtherms of potential, costs begin to increase quickly.

Figure 47. Gas Savings Supply Curve (2033)²⁷

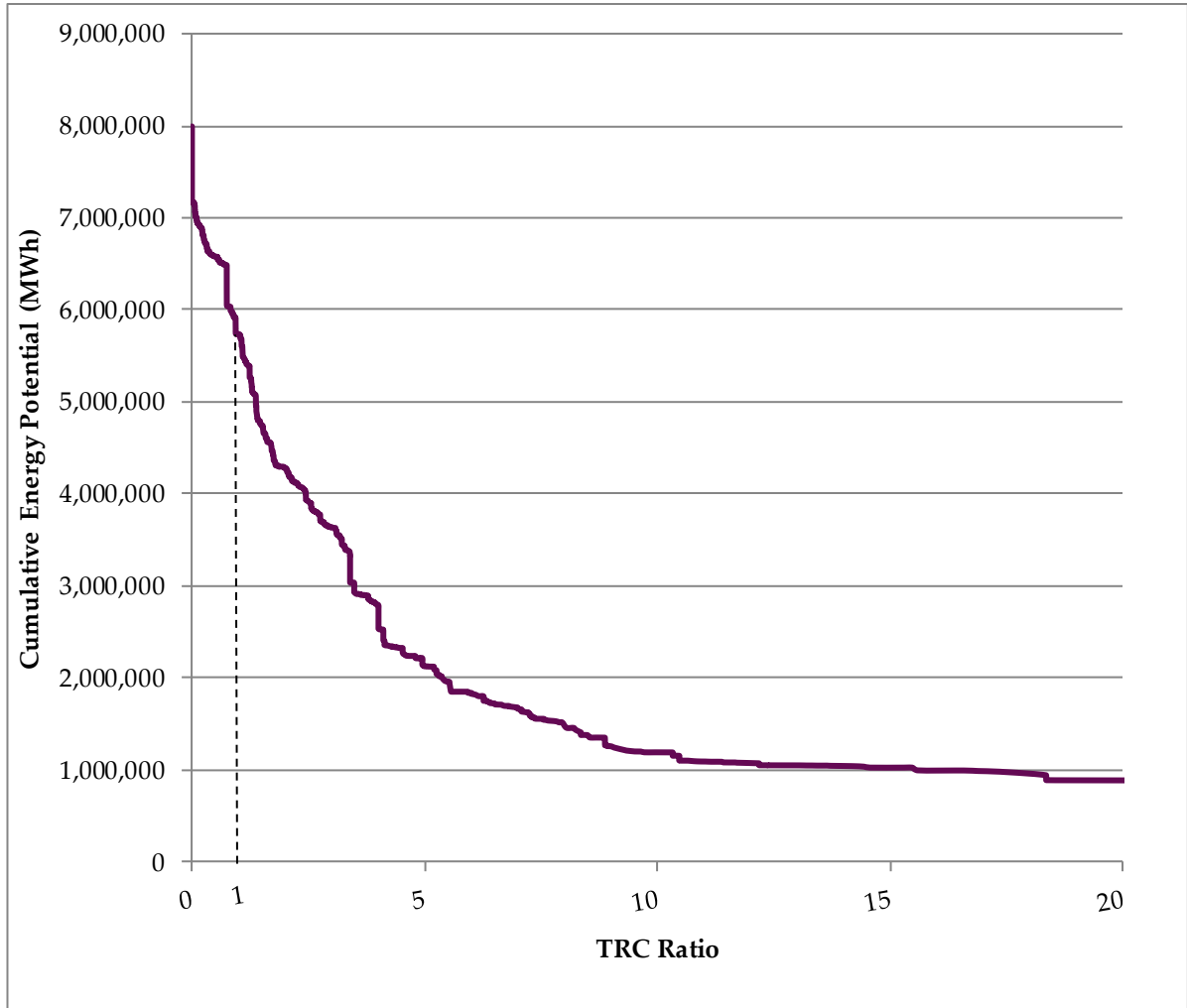


Source: Navigant analysis, 2014

²⁷ Graph has been scaled to show the area of interest, but additional potential above a levelized cost of \$5 per therm is not shown.

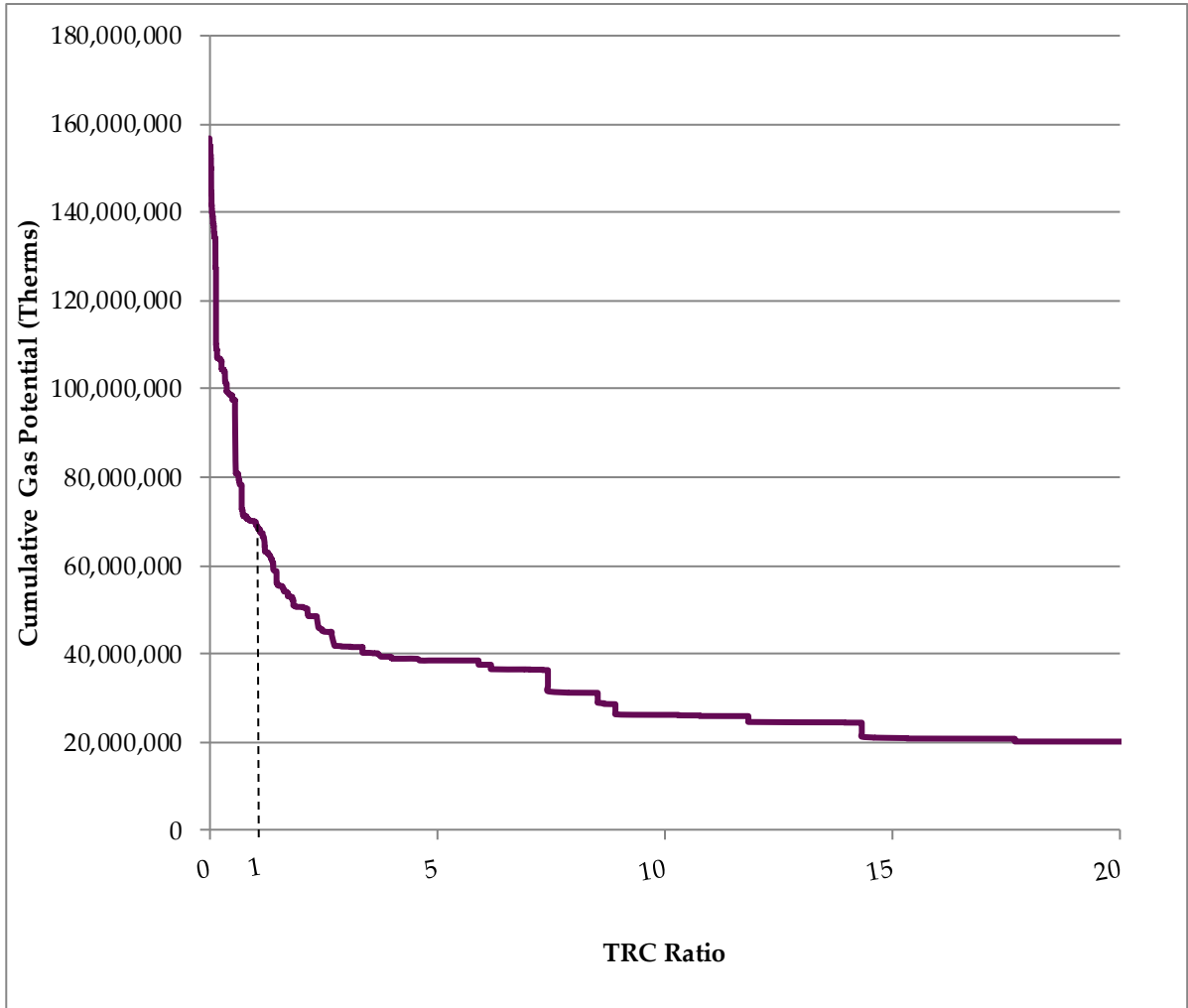
Figure 48 and Figure 49 plot TRC ratio as a function of cumulative technical potential in 2033, for electric and gas savings measures respectively. The curves shown are constructed using individual efficiency measures that are sorted based on their TRC ratio, and savings that are calculated on an incremental basis relative to the measures that precede them. These graphically provide a sense of how much potential is available at different levels of cost-effectiveness. Overall, Figure 48 shows that up to 5,734,340 MWh of cumulative technical potential can be realized as cost-effective potential with a TRC ratio of 1 or above. This reflects the cost-effective part of the curve, while just over 2,260,307 MWh of technical potential is shown to be not cost-effective. In particular, fan variable frequency drives, screw-in CFLs, and specialty CFLs represent the measures, across all sectors with a TRC greater than 1, that offer the largest electric savings. Regarding the gas supply curve, Figure 49 shows that 70 MMtherms, which equates to about 44% of technical potential, is considered to be cost-effective by 2033, and a slight majority of the technical potential lies below the TRC threshold of 1. The gas measures with a TRC greater than 1 that constitute a large portion of the savings across all sectors include burner upgrades, showerheads, and boiler tune-ups. Finally, these curves also offer the ability to gauge the sensitivity of cumulative potential to avoided cost assumptions, a key driver of cost-effectiveness, by way of a first order of approximation.

Figure 48. Tiered TRC versus Cumulative Electric Savings Potential (2033)



Source: Navigant analysis, 2014

Figure 49. Tiered TRC versus Cumulative Gas Savings Potential (2033)



Source: Navigant analysis, 2014

Appendix A Measure Characterization Data

This appendix provides a list of all the conventional and emerging technology measures characterized in this study. Additionally, this appendix is also provided as a set of separate Excel spreadsheets that contain all characterization data (i.e., consumption, costs, and measure lifetimes) for every measure at the customer segment and replacement type level.

A.1 Residential Measures

	Conventional Measures	Implementation Type	End Use
1	AFUE 95 Furnace, Z1	ROB/NEW	Heating
2	AFUE 95 Furnace, Z2	ROB/NEW	Heating
3	CFL (Screw-In)	ROB/NEW	Lighting
4	Heat Pump Controls, Z1	ROB/NEW	Heating
5	Heat Pump Controls, Z2	ROB/NEW	Heating
6	Duct Sealing, Elec SH, Z1	RET	Heating
7	Duct Sealing, Elec SH, Z2	RET	Heating
8	Duct Sealing, Gas SH, Z1	RET	Heating
9	Duct Sealing, Gas SH, Z2	RET	Heating
10	Elec Hi-eff Clothes Washer - Elec DHW	ROB/NEW	Appliance
11	Elec Hi-eff Clothes Washer - Gas DHW	ROB/NEW	Appliance
12	Elec Hi-eff Dishwasher - Elec DHW	ROB/NEW	Appliance
13	Elec Hi-eff Dishwasher - Gas DHW	ROB/NEW	Appliance
14	ENERGY STAR (0.67 EF) Storage - Gas DHW	ROB/NEW	DHW
15	ENERGY STAR Manufactured Home	NEW	Heating
16	ENERGY STAR New Home BOP 1 - ER SH	NEW	Heating
17	ENERGY STAR New Home BOP 1 - HP SH	NEW	Heating
18	ENERGY STAR New Home BOP 1 - Gas SH	NEW	Heating
19	LowPowerMode Appliances	ROB/NEW	Appliance
20	ER SH to Heat Pump, Z1	RET	Heating
21	ER SH to Heat Pump, Z2	RET	Heating
22	ER SH to Mini-split ductless heat pump, Z1	RET	Heating
23	ER SH to Mini-split ductless heat pump, Z2	RET	Heating
24	Faucet Aerators, Bath, Elec DHW	RET	DHW
25	Faucet Aerators, Kitchen, Elec DHW	RET	DHW

	Conventional Measures	Implementation Type	End Use
26	Faucet Aerators, Bath, Gas DHW	RET	DHW
27	Faucet Aerators, Kitchen, Gas DHW	RET	DHW
28	Heat Recovery Ventilation, ER SH, Z1	NEW	Weatherization
29	Heat Recovery Ventilation, ER SH, Z2	NEW	Weatherization
30	Heat Recovery Ventilation, Gas SH, Z1	NEW	Weatherization
31	Heat Recovery Ventilation, Gas SH, Z2	NEW	Weatherization
32	LED (Screw-In)	ROB/NEW	Lighting
33	Lighting Controls	RET	Lighting
34	Linear Fluorescent - T8 (Premium Reduced Wattage and 800 Series)	RET	Lighting
35	OPower/Behavior Savings	RET	Behavioral
36	Recycle Freezer	RET	Appliance
37	Recycle Refrigerator	RET	Appliance
38	Showerheads - Elec DHW	ROB/NEW	DHW
39	Showerheads - Gas DHW	ROB/NEW	DHW
40	Solar DHW (50 gal) - Elec DHW	ROB/NEW	DHW
41	Solar DHW (50 gal) - Gas DHW	ROB/NEW	DHW
42	Specialty Lights	ROB/NEW	Lighting
43	Tankless Gas DHW	ROB/NEW	DHW
44	Tier I Heat pump water heater- Elec DHW	ROB/NEW	DHW
45	Tier II Heat pump water heater - Elec DHW	ROB/NEW	DHW
46	Windows, Replacement, (U=.30), Elec SH, Z1	ROB/NEW	Weatherization
47	Windows, Replacement, (U=.30), Elec SH, Z2	ROB/NEW	Weatherization
48	Windows, Replacement, (U=.30), Gas SH, Z1	ROB/NEW	Weatherization
49	Windows, Replacement, (U=.30), Gas SH, Z2	ROB/NEW	Weatherization
50	Windows, Replacement, (U=.25), Elec SH, Z1	ROB/NEW	Weatherization
51	Windows, Replacement, (U=.25), Elec SH, Z2	ROB/NEW	Weatherization
52	Windows, Replacement, (U=.25), Gas SH, Z1	ROB/NEW	Weatherization
53	Windows, Replacement, (U=.25), Gas SH, Z2	ROB/NEW	Weatherization
54	Wx insulation (ceiling), Elec SH, Z1	RET	Weatherization
55	Wx insulation (ceiling), Elec SH, Z2	RET	Weatherization
56	Wx insulation (ceiling), Gas SH, Z1	RET	Weatherization
57	Wx insulation (ceiling), Gas SH, Z2	RET	Weatherization
58	Wx insulation (floor), Elec SH, Z1	RET	Weatherization
59	Wx insulation (floor), Elec SH, Z2	RET	Weatherization

Conventional Measures		Implementation Type	End Use
60	Wx insulation (floor), Gas SH, Z1	RET	Weatherization
61	Wx insulation (floor), Gas SH, Z2	RET	Weatherization
62	Wx insulation (walls), Elec SH, Z1	RET	Weatherization
63	Wx insulation (walls), Elec SH, Z2	RET	Weatherization
64	Wx insulation (walls), Gas SH, Z1	RET	Weatherization
65	Wx insulation (walls), Gas SH, Z2	RET	Weatherization
66	Gas Hearth	ROB/NEW	Heating
67	Heat Pump (HP Upgrade), Z1	RET	Heating
68	Heat Pump (HP Upgrade), Z2	RET	Heating

Source: Navigant analysis, 2014

Emerging Technology Measures		Implementation Type	End Use
1	Solar hot water heater (gas and electric)	ROB/NEW	Water Heating
2	CO2 Heat Pump Water Heater	ROB/NEW	Water Heating
3	Absorption Gas Water Heater	ROB/NEW	Water Heating
4	R-10 Windows	RET	Weatherization
5	R-30 Wall Insulation	RET	Weatherization
6	R-75 Attic Insulation	RET	Weatherization
7	High Efficiency Condensing Furnace	ROB/NEW	Heating
8	Advanced Heat Pumps	RET	Heating
9	LED Lighting	ROB/NEW	Lighting
10	Home Automation/Smart Devices	RET	Behavioral

Source:

A.2 Commercial Measures

Conventional Measures		Implementation Type	End Use
1	Hot Water Temperature Reset	RET	Heating
2	Steam Balance	RET	Heating
3	Steam Trap Maintenance	RET	Heating
4	SPC High Efficiency Boiler	NEW/ROB	Heating
5	ENERGY STAR Fryer	ROB	Cooking
6	ENERGY STAR Convection Oven	ROB	Cooking

	Conventional Measures	Implementation Type	End Use
7	DHW High Efficiency Tankless	NEW/ROB	DHW
8	DHW High Efficiency Tank	NEW/ROB	DHW
9	DDC HVAC Controls	NEW	Heating
10	Demand Control Ventilation	RET	Heating
11	VSD on HVAC Motors	ROB	Ventilation
12	High Efficiency Chiller	NEW/ROB	Cooling
13	Condensing Furnace	ROB	Heating
14	High Efficiency Heat Pump	ROB	Heating
15	High Efficiency Unit Heater	NEW/ROB	Heating
16	Economizer Diagnostic, Damper Repair & Reset	RET	Cooling
17	HVAC System Commissioning	NEW	Heating
18	Halogen/CFL to 9W CFL	RET	Lighting
19	Halogen/CFL to LED	RET	Lighting
20	Ceramic Metal Halide	NEW/ROB	Lighting
21	Troffer LEDs	RET	Lighting
22	Exterior LED Lighting	NEW	Lighting
23	Exit Signs	RET	Lighting
24	T12 to HP T8	RET	Lighting
25	T8 to HP T8	RET	Lighting
26	High Bay HID to T8	RET	Lighting
27	High Bay HID to T5	RET	Lighting
28	High Bay HID to LED	RET	Lighting
29	LED Street Lights	RET	Street Lighting
30	Lighting Scheduling/Controls/Occupancy Sensor	ROB/NEW	Lighting
31	Daylight Control	NEW	Lighting
32	Efficient Standalone Refrigeration Cases	ROB	Refrigeration
33	Refrigeration Bundle (ASHC, FHPC, Eff Light, Eff Motor)	ROB/NEW	Refrigeration
34	Refrigeration Auto Closers (Walk-ins)	RET	Refrigeration
35	Refrigeration Auto Closers (Reach-ins)	RET	Refrigeration
36	Floating Head Control	RET	Refrigeration
37	Roof Insulation - Rigid R0-11	ROB	Heating
38	Wall Insulation - Blown R11	RET	Heating
39	Windows Upgrade (RET)	RET	Heating
40	Windows Upgrade (NEW)	NEW only	Heating

Conventional Measures		Implementation Type	End Use
41	Window Films	RET	Heating
42	EMS (RET)	RET	Total
43	EMS (NEW)	NEW only	Total
44	Transformers	RET	Total
45	Desktop/Laptop Power Management	RET	Misc.
46	Work Station Plug Load Occupancy Sensor	RET	Misc.
47	Smart Plug Power Strips	RET	Misc.
48	Server Virtualization	RET	Misc.
49	Efficient Datacenter	RET	Misc.

Source: Navigant analysis, 2014

Emerging Technology Measures		Implementation Type	End Use
1	Advanced Package A/C RTU	ROB/NEW	Cooling
2	Hybrid Indirect-Direct Evaporative Cooler	ROB/NEW, RET	Cooling
4	Energy Recovery Ventilator	RET	Cooling & Heating
5	Advanced Refrigeration Controls	RET	Refrigeration
6	Supermarket Max Tech Refrigeration	ROB/NEW	Refrigeration
7	Advanced Ventilation Controls	RET	Ventilation
8	Absorption Heat Pump	ROB/NEW	Heating
9	ET, Halogen/CFL to LED	RET	Lighting
10	ET, Troffer LEDs	RET	Lighting
11	ET, Exterior LED Lighting	NEW	Lighting
12	ET, High Bay HID to LED	RET	Lighting
13	Wall insulation R-35, Vacuum insulated panels	RET, NEW	Weatherization
14	Highly Insulated Windows	RET, NEW	Weatherization
15	Smart/Dynamic Windows	RET, NEW	Weatherization
16	Absorption Heat Pump Water Heater	ROB/NEW	Water Heating
17	A/C Heat Recovery for Water Heating	RET	Water Heating

Source: Navigant analysis, 2014

A.3 Industrial Measures

	Conventional Measures	Implementation Type	End Use
1	Air Compressor- VFD and controls	RET	Compressed Air
2	Air Compressor Equipment Upgrade	ROB and NEW	Compressed Air
3	Air Compressor Heat Recovery	RET	Compressed Air
4	Strategic Energy Management	RET	Other
5	Green Motor Rewind	ROB	Motors
6	Fan System- VFD	RET	Fans
7	Air Abatement	RET	Fans
8	Fan Equipment Upgrade	ROB and NEW	Fans
9	Efficient Chiller Upgrade	ROB and NEW	HVAC
10	Chiller Heat Recovery	RET	HVAC
11	Clean Room Upgrade	RET	HVAC
12	HVAC O&M	RET	HVAC
13	Demand Control Ventilation	RET	HVAC
14	Efficient Lighting Retrofits	RET	Lighting
15	Lighting Controls	RET	Lighting
16	Pneumatic Conveyor	RET	Material Handling
17	Mechanical Conveyor	RET	Material Handling
18	Steam Line Pipe Insulation	RET	Process Heating
19	Process Boiler Insulation	RET	Process Heating
20	Steam Trap Maintenance	RET	Process Heating
21	Steam Balance	RET	Process Heating
22	Boiler Load Control	RET	Process Heating
23	Pump Equipment Upgrade	ROB and NEW	Pumps
24	Pump VFD	RET	Pumps
25	Pump Systems - Sequencing Controls	RET	Pumps
26	Agriculture: Impact Sprinkler Nozzles	ROB and NEW	Pumps
27	Agriculture: Pump Systems Replacement	ROB and NEW	Pumps
28	Agriculture: Replace Ditch with Pipes	RET	Pumps
29	Agriculture: Gasket Replacement	ROB and NEW	Pumps
30	Agriculture: Pipe Repair	RET	Pumps
31	Refrigeration System Upgrade	RET	Refrigeration
32	Refrigeration O&M	RET	Refrigeration
33	Roof Insulation - R0-R30	RET	HVAC

Conventional Measures		Implementation Type	End Use
34	Wall Insulation - R0- R11	RET	HVAC
35	Burner Upgrades	RET	Process Heating
36	Boiler Tune-up	RET	Process Heating
37	Boiler Heat Recovery	RET	Process Heating
38	Vent Damper Control	RET	Process Heating
39	High Efficiency Boiler	ROB and NEW	Process Heating
40	High Efficiency Unit Heater	ROB and NEW	HVAC
41	Greenhouse Upgrade	ROB and NEW	Other

Source: Navigant analysis, 2014

Emerging Technology Measures		Implementation Type	End Use
1	Adv LED Lighting Retrofits	RET	Lighting
2	Wall Insulation - VIP, R0-R35	RET	HVAC
3	Gas-fired HP Water Heater	ROB and NEW	Water Heating
4	Switched reluctance motors	ROB and NEW	Motors
5	Advanced Refrigeration Controls - Industrial	RET	Refrigeration

Source: Navigant analysis, 2014

Appendix B Detailed Potential Output

This appendix is provided in a separate Excel file entitled "Appendix B – Detailed Potential Output.xlsx," as well the standalone Analytica model entitled "ETO Resource Assessment Model.ana."

Appendix E
Supply Resources

MODEL NAME	CONTRACT LOCATION TYPE	PIPELINE	PRICE TYPE	XPIRY DATE	OTHER COMMENTS	PRICE OR INDEX BASIS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SAT LNG 30-5	Satellite LNG Zone 30-5	CNG	NYMEX		RUN AT VARIABLE VOLUMES UP TO THE AMOUNT		1,000	1,000	1,000								1,000	1,000
SAT LNG OR	Satellite LNG Zone Oregon	CNG	NYMEX		RUN AT VARIABLE VOLUMES UP TO THE AMOUNT		1,000	1,000	1,000								1,000	1,000
BNG 10	Bio-natural gas Zone 10	CNG	NYMEX		RUN AT VARIABLE VOLUMES UP TO THE AMOUNT		1,000	1,000	1,000								1,000	1,000
BNG 20	Bio-natural gas Zone 20	CNG	NYMEX		RUN AT VARIABLE VOLUMES UP TO THE AMOUNT		1,000	1,000	1,000								1,000	1,000
BNG ME-OR	Bio-natural gas Zone Meacham-Oregon	CNG	NYMEX		RUN AT VARIABLE VOLUMES UP TO THE AMOUNT		1,000	1,000	1,000								1,000	1,000

Supply Inputs

MODEL NAME	CATEGORY	RECEIPT PT(S)	DELIVERY PT(S)	PRICE INDEX	INDEX DIFFERENTIAL/E/ST PRICE	DEMAND CHARGE	DEAL START DATE	DEAL END DATE	MDQ IN DTHS
FIRM SPT SUM	SEASONAL	SUMAS	NWP, GTN	IFERC SUMAS			11/1/2015	INCREMENTAL	VARIABLE
FIRM SPT NIT	SEASONAL	AECO	GTN	AECO (CGPR)			11/1/2015	INCREMENTAL	VARIABLE
FIRM SPT RM	SEASONAL	ROCKIES	NWP, GTN	IFERC ROCKIES			11/1/2015	INCREMENTAL	VARIABLE
INCR SUM A	ANNUAL	SUMAS	NWP, GTN	IFERC SUMAS			11/1/2015	INCREMENTAL	VARIABLE
INCR RM A	ANNUAL	ROCKIES	NWP, GTN	IFERC ROCKIES			11/1/2015	INCREMENTAL	VARIABLE
INCR NIT A	ANNUAL	AECO	GTN	AECO (CGPR)			11/1/2015	INCREMENTAL	VARIABLE
INCR SUM S	SEASONAL	SUMAS	NWP, GTN	IFERC SUMAS			11/1/2015	INCREMENTAL	VARIABLE
INCR RM S	SEASONAL	ROCKIES	NWP, GTN	IFERC ROCKIES			11/1/2015	INCREMENTAL	VARIABLE
INCR NIT S	SEASONAL	AECO	GTN	AECO (CGPR)			11/1/2015	INCREMENTAL	VARIABLE
INCR ST2	SEASONAL	STATION 2	NWP, GTN	GD SUMAS			11/1/2015	INCREMENTAL	VARIABLE
INCR STRU SU	ANNUAL	SUMAS	NWP, GTN	STRUCTURED	Index Ls \$0.25 if Index >4		11/1/2015	INCREMENTAL	VARIABLE
INCR STRU RM	ANNUAL	ROCKIES	NWP, GTN	STRUCTURED	Index Ls \$0.25 if Index >4		11/1/2015	INCREMENTAL	VARIABLE
INCR STRU AE	ANNUAL	AECO	GTN	STRUCTURED	Index Ls \$0.25 if Index >4		11/1/2015	INCREMENTAL	VARIABLE
INCR SUM FX	ANNUAL	SUMAS	NWP, GTN	FIXED			11/1/2015	INCREMENTAL	VARIABLE
INCR RM FX	ANNUAL	ROCKIES	NWP, GTN	FIXED			11/1/2015	INCREMENTAL	VARIABLE
INCR NIT FX	ANNUAL	AECO	GTN	FIXED			11/1/2015	INCREMENTAL	VARIABLE
INCR MAL	SEASONAL	MALIN	BACKHAULS NWP, GTN	MALIN			11/1/2015	INCREMENTAL	VARIABLE
SAT LNG	SEASONAL	ZONAL	ZONAL	NYMEX HH			11/1/2015	INCREMENTAL	VARIABLE
IMP LNG NOR	SEASONAL	PALOMAR	BACKHAULS NWP, GTN	NYMEX HH			11/1/2018	INCREMENTAL	VARIABLE
IMP LNG SOR	SEASONAL	PACIFIC CONNECTOR	BACKHAULS NWP, GTN	NYMEX HH			11/1/2018	INCREMENTAL	VARIABLE
SAT PROP	SEASONAL	ZONAL	ZONAL	NYMEX HH			11/1/2016	INCREMENTAL	VARIABLE
INCR CG NWP	SEASONAL	CITYGATE	NWP	NYMEX HH		0.05	11/1/2016	INCREMENTAL	VARIABLE
INCR CG GTN	SEASONAL	CITYGATE	GTN	NYMEX HH		0.05	11/1/2016	INCREMENTAL	VARIABLE
SUPPLY MDQS ARE CAPPED AT 20,000 DTHS/DAY									

Storage Account	MSQ (Maximum Storage Quantity) or Working Inventory	Estimated Annual MSQ Demand Costs	Est Per Unit Rate for MSQ related	Est Daily Charges	Avg Daily MSQ Unit Rate of Services	Transport	Total Transport Needed to cycle storage once	Est Per Unit Rate for Upstream Pipe Transport	Storage Associated MSQ Charges
Jackson Prairie 1 (original, vintage account acquired in 1994)	604,351	\$ 263,773	\$ 0.43646	\$ 723	\$ 0.00120	16,587 NWP	\$ 343,503 \$ 607,276 \$	1.0048 \$	0.56838 \$ 0.43646
Jackson Prairie 2 (expansion contract acquired in 2007 with full rights in 2012)	350,000	\$ 529,313	\$ 1.51232	\$ 1,450	\$ 0.00414	30,000 NWP	\$ 587,632 \$ 1,116,945 \$	3.19127 \$	1.67895 \$ 1.51232
Jackson Prairie 3 and 4 (acquired from PSE in 2012 as part of the JP/Wenatchee exchange)	218,242	\$ 127,759	\$ 0.58540	\$ 350	\$ 0.00160	9,077 NWP	\$ 169,911 \$ 297,669 \$	1.36394 \$	0.77854 \$ 0.58540
Plymouth LNG	562,200	\$ 1,205,032	\$ 2.14342	\$ 3,301	\$ 0.00587	60,000 NWP	\$ 19,036 \$ 1,224,069 \$	2.17728 \$	0.03386 \$ 2.14342
Proposed Ryckman Creek Storage	-	\$ -	#DIV/0!	\$ -	#DIV/0!	15,000 Ruby, GTN	\$ 693,500 \$ 693,500	#DIV/0!	#DIV/0! #DIV/0!
Proposed Gill Ranch Storage	0	\$ -	\$ -	\$ -	\$ -	15,000 PG&E, GTN	\$ 693,500 \$ 693,500 \$	7,885,592 \$	7,885,592 \$ -
Proposed Wild Goose Storage	-	\$ -	#DIV/0!	\$ -	#DIV/0!	15,000 PG&E GTN	\$ 693,500 \$ 693,500	#DIV/0!	#DIV/0! #DIV/0!
Proposed Incremental Plymouth LNG	350,000	\$ -	\$ -	\$ -	\$ -	15,000 NWP, GTN	\$ - \$ - \$	- \$	- \$ -

TRANSPORT RATES

Ln #	Pipeline	Rate	Rate Change
Westcoast - T-South Service			
1	Huntington Delivery Rate (5yr Service term)	\$ 0.50950	Every three years
2	Motor Fuel Tax (Average 2010)	\$ 0.41632 \$7175 per month	
3	Carbon Tax (Average 2010)	\$ 0.75935 \$13087per month	
Foothills - BC			
FT Firm Service (A/BC to Kingsgate)			
4	FT Rate	\$ 0.10430	Every three years
5	Fuel	1.100%	
Nova Gas Transmission			
6	Firm Transportation Rate	\$ 0.22920	Every three years
TransCanada GTN			
FTS-1 Rate			
7	Daily Mileage	\$ 0.000498 (Dth-Mile)	Every five years
8	Daily Non-Mileage	\$ 0.003922 (Dth)	\$0.21 for backhaul
9	Delivery	\$ 0.000016 (Dth-Mile)	
10	Fuel %	0.2500% (Dth)	
Charge to Delivery locations			
11	Starr Road	108.29 \$	0.053928
12	Stanfield	277.37 \$	0.138130
13	Bend	454.51 \$	0.226346
14	Malin	612.46 \$	0.305005

TRANSPORT RATES

Ln #	Pipeline	Rate	Rate Change
Northwest Pipeline			
TF-1 Rate			
15	Reservation (System-Wide)	\$ 0.37883 (\$/Dth)	Every five years
16	Volumetric (System-Wide)	\$ 0.03000 (\$/Dth)	
17	Fuel	1.85%	
TF-2 Rate (Storage)			
18	Reservation	\$ 0.37883 (\$/Dth)	
19	Volumetric	\$ 0.03000 (\$/Dth)	
SGS-2F			
20	Capacity Demand Charge (Pre-Exp Shipper)	\$ 0.00056 (\$/Dth)	
21	Capacity Demand Charge (Exp Shipper)	\$ 0.00232 (\$/Dth)	
22	Demand Charge (Pre-Exp Shipper)	\$ 0.01547 (\$/Dth)	
23	Demand Charge (Exp Shipper)	\$ 0.08453 (\$/Dth)	
LS-2F			
24	Capacity Demand Charge	\$ 0.00390 (\$/Dth)	
25	Demand Charge	\$ 0.03054 (\$/Dth)	
26	Liquefaction	\$ 0.64110 (\$/Dth)	
27	Vaporization	\$ 0.04184 (\$/Dth)	
Ruby			
28	Reservation Rate (seasonal)	\$ 0.75 (\$/Dth)	Every five years
30	Reservation Rate (max rate)	\$ 0.95 (\$/Dth)	
31	Commodity Rate	\$ 0.01 (\$/Dth)	
32	Fuel	0.44% (Dth)	

We use standard escalation factor in SENDOUT: 3% first year, 4% each subsequent renewal period

Transport Inputs

CONTRACT DESCRIPTION	RECEIPT	DELIVERY	PIPELINE	TERMINATION DATE	RATE PER DAY	Contract Demand
TF-1 Contract #100002 April 31, 1991	all rec	all del	NWP	10/31/2032	0.41	205123
Contract #135384 (JP/Bremerton), March 26, 2007	jackson prairie	bremerton/mt vernon	NWP	10/31/2029	0.246	30420
Contract #135558 (Sumas/Prtld), 4/1/2007)	sumas	stanfield/portland west	NWP	4/30/2020	0.41	25400
Contract 139382 Sumas/Sedro Wooley	sumas	sedro wooley	NWP	10/31/2050	0.41	6191
Contract 139383 Sumas/Sedro Wooley	sumas	sedro wooley	NWP	10/31/2050	0.41	1050
Contract 139384 Sumas/Sedro Wooley	sumas	sedro wooley	NWP	10/31/2050	0.41	3259
Contract #100134 January 15, 1993	sumas/ignacio	burbank/yakima/aberdeen	NWP	11/30/2019	0.41	330
Contract #100149 February 15, 1996	sumas/ignacio	walla walla	NWP	11/30/2019	0.41	75
Contract #100150 May 15, 1996	sumas/ignacio	menan starch	NWP	11/30/2019	0.41	160
Contract #100064 May 8, 1995	sumas	hermiston/pasco	NWP	3/31/2020	0.41	1078
Weyer Release Contract #132329 July 1, 2004	sumas	kern river	NWP	1/31/2021	0.41	5000
Contract #139090 June 2, 2011	sumas	plymouth/umatilla/bellingham	NWP	3/31/2052	0.41	27063
Contract #139537 Jan 1, 2013	sumas	hermiston/oak harbor/selawik	NWP	10/31/2050	0.41	7241
Contract #139530 Sep 1, 2012	stanfield	durkee/pendelton/mission	NWP	10/31/2050	0.41	7450
Contract #140047	sumas	bellingham/femdale	NWP	10/31/2034	0.41	15000
TF-2						
Contract #100302 TF-2 January 12, 1994	jackson prairie	Stanfield, Wenatchee, Longview	NWP	10/31/2019	0.41	16789
Contract #100304 TF-2 January 12, 1994	plymouth		NWP	10/31/2019	0.41	60000
Jackson Prairie Expansion Precident Agreement # 135365 SGS-2F	jackson prairie	jackson prairie	NWP	10/31/2060	0.04056	30000
Contract # 100401 SGS-2F	jackson prairie	jackson prairie	NWP	10/31/2019	0.03562	16789
Contract #100501 LS-2F	plymouth	plymouth	NWP	10/31/2019	0.02587	50000
Contract #139627 TF-2	jackson prairie	bellingham	NWP	3/31/2020	0.41	489
Contract #139624 TF-2	jackson prairie	bellingham	NWP	3/31/2020	0.41	282
Contract #139622 SGS-2F	jackson prairie	jackson prairie	NWP	3/31/2026	0.03562	3500
Contract #139626 SGS-2F	jackson prairie	jackson prairie	NWP	3/31/2020	0.03562	6077
					0.16381	
2003 Expansion, #08488	kingsgate	malin	GTN	10/31/2028	0.34422	20380
Firm Transportation #02812 (November 4, 1994)	kingsgate	malin	GTN	4/30/2016	0.34422	3600
Firm Transportation #00179 (October 7, 1993)	kingsgate	system	GTN	10/31/2023	0.19811	31335
Firm Transportation #00152 (December 1, 1997)	kingsgate	system	GTN	10/31/2023	0.25432	7446
Firm South-to-North Transportation #12094 11/1/12 - 3/31/18	turquoise flats	stanfield	GTN	3/31/2018	0.16381	10000
Firm South-to-North Transportation #13687 4/1/18 - 10/31/39	turquoise flats	stanfield	GTN	10/31/2039	0.20477	10000
Firm South-to-North Transportation #13688 11/1/14 - 10/31/39	turquoise flats	stanfield	GTN	10/31/2039	0.20477	5000
Service Agreement (NOVA) September 4, 2001 (#2003039348-1)	AECO	AB/C border	NOVA	10/31/2028	0.1591	21973
2002 Service Agreement (CNG FS-2)	AB/C border	kingsgate	Foothills	11/1/2017	0.076	3126
Service Agreement (ANG) September 11, 2001 (#CNG FS-3)	AB/C border	kingsgate	Foothills	10/31/2028	0.076	21583
FS-1 Transportation (ANG) June 12, 1991 (CNG FS-1)	AB/C border	kingsgate	Foothills	10/31/2023	0.076	7602
Westcoast Service Agreement January 3, 2002 (#FI-2583-B-00)	station 2	huntingdon	Westcoast	10/31/2019	0.4833	20000
Firm Service Agreement #61036000B January 9, 2012	pearl creek	turquoise flats	Ruby	10/31/2039	0.75	15000

POTENTIAL ADDITIONAL PIPELINE TRANSPORT RESOURCES										
Model Name	Start Date	End Date	Daily MDQ	Description	Cost Dths	Lead Time	Pipeline	VARIABLE < \$.10	FUEL < 3%	
3	Incremental NOVA-Foothills-GTN	2017	OPEN	Approx 16,000 dths/day ea pipeline	AECO NIT, Foothills to Kingsgate	NOVA, Foothills, GTN (approx \$0.41)	2017	NOVA, Foothills, GTN	YES	YES
4	INCR-NWP	2017	OPEN	Approximately 10,000 dths/day	Sumas to WA and OR citygates	NWP Rate X 3 (min approx \$1.14)	2018	NWP	YES	YES

GAS SUPPLY 20 YEAR PRICE FORECAST IN BOLD

PERIOD	YEAR	NYMEX CURRENT MARKET	CASCADE	NYMEX	CASCADE	CASCADE	SUMAS
			NYMEX LO PROJECTED PRICE	CASCADE PROJECTED PRICE	NYMEX HI PROJECTED PRICE	SUMAS LO FORECAST PRICE	CASCADE FORECAST PRICE
Jan-15	2015	3.354	3.401291194	3.618394887	3.799314631	3.534156416	3.759740868
Feb-15	2015	3.226	3.289992599	3.499992127	3.674991733	3.543531491	3.769714352
Mar-15	2015	3.427	3.409318801	3.626934895	3.80828164	3.484646961	3.707071235
Apr-15	2015	3.976	3.758808291	3.998732225	4.198668836	3.762957328	4.003146094
May-15	2015	2.517	2.646297055	2.815209633	2.955970115	2.427292707	2.582226284
Jun-15	2015	2.537	2.843452974	3.024949972	3.176197471	2.617063536	2.784110144
Jul-15	2015	2.591	2.880940586	3.064830411	3.218071931	2.652982291	2.822321586
Aug-15	2015	2.617	2.90142406	3.086621341	3.240952408	2.673158308	2.843785434
Sep-15	2015	2.634	2.920896623	3.107336833	3.262703674	2.642407022	2.8110713
Oct-15	2015	2.679	2.951858203	3.140274684	3.297288418	2.828755987	3.00931488
Nov-15	2015	2.804	3.049698511	3.244360119	3.406578125	3.083167991	3.279965948
Dec-15	2015	2.994	3.1914819	3.39519351	3.564953186	3.050333036	3.245035144
Jan-16	2016	3.099	3.659367741	3.892944405	4.087591625	3.436594742	3.655951853
Feb-16	2016	3.092	3.617043065	3.847918155	4.040314062	3.422814665	3.641292197
Mar-16	2016	3.047	3.449201645	3.669363452	3.852831624	3.168246898	3.370475424
Apr-16	2016	2.921	3.357516305	3.571825857	3.750417149	2.895954923	3.08080311
May-16	2016	2.934	3.431141623	3.650150662	3.832658195	2.957304696	3.146068826
Jun-16	2016	2.967	3.458873497	3.679652657	3.86363529	3.042033584	3.236205941
Jul-16	2016	3.004	3.48009654	3.702230361	3.887341879	3.091516902	3.288847768
Aug-16	2016	3.018	3.482912587	3.705226156	3.890487464	3.125538885	3.325041367
Sep-16	2016	3.012	3.473599264	3.695318366	3.880084284	3.035018386	3.228742964
Oct-16	2016	3.041	3.507246506	3.731113304	3.91766897	3.288952405	3.498885538
Nov-16	2016	3.123	3.582058996	3.810701059	4.001236112	3.514387127	3.73870971
Dec-16	2016	3.308	3.71804864	3.955370894	4.153139438	3.479110826	3.70118173
Jan-17	2017	3.445	3.952244444	4.204515366	4.414741134	3.610883231	3.84136514
Feb-17	2017	3.433	3.879389513	4.12701012	4.333360626	3.66014684	3.893773235
Mar-17	2017	3.379	3.791217364	4.033209961	4.234870459	3.4473947	3.66744117
Apr-17	2017	3.154	3.645592341	3.878289724	4.07220421	3.209406351	3.414262075
May-17	2017	3.159	3.779293755	4.020525271	4.221551535	3.297547243	3.508028982
Jun-17	2017	3.197	3.813126421	4.056517469	4.259343343	3.396686758	3.613496551
Jul-17	2017	3.238	3.827980041	4.072319192	4.275935152	3.421735137	3.640143763
Aug-17	2017	3.25	3.822000344	4.065957813	4.269255704	3.415651558	3.633671871
Sep-17	2017	3.239	3.813908222	4.057349173	4.260216631	3.308177059	3.519337297
Oct-17	2017	3.262	3.843781341	4.089129086	4.29358554	3.728693142	3.966694832
Nov-17	2017	3.337	3.93136078	4.182298702	4.391413637	4.025556606	4.282507028
Dec-17	2017	3.509	4.069749327	4.329520561	4.545996589	4.024440464	4.281319642
Jan-18	2018	3.644	4.317914046	4.593525581	4.82320186	4.161176905	4.426783942
Feb-18	2018	3.624	4.102874356	4.364759953	4.582997951	4.012903444	4.269046217
Mar-18	2018	3.564	4.01827026	4.274755596	4.488493376	4.135933306	4.399929049

GAS SUPPLY 20 YEAR PRICE FORECAST IN BOLD

PERIOD	YEAR	NYMEX CURRENT MARKET	CASCADE	NYMEX	CASCADE	CASCADE	SUMAS
			NYMEX LO PROJECTED PRICE	CASCADE PROJECTED PRICE	NYMEX HI PROJECTED PRICE	SUMAS LO FORECAST PRICE	CASCADE FORECAST PRICE
Apr-18	2018	3.259	3.814121923	4.057576514	4.26045534	3.351191126	3.565096943
May-18	2018	3.261	3.942003451	4.193620692	4.403301727	3.453203248	3.673620477
Jun-18	2018	3.293	3.975381662	4.229129428	4.440585899	3.565166636	3.792730464
Jul-18	2018	3.329	4.004461721	4.260065661	4.473068944	3.598448348	3.82813654
Aug-18	2018	3.34	4.012566548	4.268687817	4.482122208	3.620831697	3.851948614
Sep-18	2018	3.333	4.003160026	4.258680879	4.471614923	3.538040184	3.763872536
Oct-18	2018	3.356	4.046081921	4.304342469	4.519559593	3.968307902	4.221604151
Nov-18	2018	3.431	4.179422789	4.446194457	4.66850418	4.238876003	4.509442557
Dec-18	2018	3.603	4.339263687	4.616237965	4.847049863	4.257263924	4.529004175
Jan-19	2019	3.738	4.67586737	4.974326989	5.223043339	4.483973655	4.77018474
Feb-19	2019	3.718	4.601662958	4.895386125	5.140155432	4.489249214	4.775797036
Mar-19	2019	3.658	4.458422044	4.743002174	4.980152283	4.533587903	4.822965855
Apr-19	2019	3.356	4.244730708	4.515670966	4.741454514	3.701109058	3.937350062
May-19	2019	3.356	4.416234965	4.698122303	4.933028418	3.83195641	4.076549372
Jun-19	2019	3.389	4.453966852	4.738262609	4.975175739	3.920197768	4.170423158
Jul-19	2019	3.423	4.480497365	4.766486558	5.004810886	4.000592654	4.255949632
Aug-19	2019	3.44	4.486168679	4.772519871	5.011145865	4.020253495	4.27686542
Sep-19	2019	3.432	4.468507246	4.753731112	4.991417668	3.919899883	4.170106258
Oct-19	2019	3.456	4.50417064	4.791670894	5.031254438	4.351570621	4.629330448
Nov-19	2019	3.538	4.613327483	4.907795194	5.153184954	4.605438303	4.899402451
Dec-19	2019	3.72	4.794535241	5.100569405	5.355597876	4.620053055	4.914950059
Jan-20	2020	3.858	5.188987731	5.520199714	5.7962097	4.914562913	5.228258418
Feb-20	2020	3.838	5.084650242	5.409202385	5.679662504	4.820837504	5.128550536
Mar-20	2020	3.778	4.905481486	5.218597326	5.479527192	4.921576548	5.235719732
Apr-20	2020	3.48	4.683440778	4.982383806	5.231502997	3.988921179	4.243533169
May-20	2020	3.48	4.898520202	5.211191704	5.47175129	4.129943293	4.393556694
Jun-20	2020	3.51	4.939505777	5.25479338	5.517533049	4.238749343	4.509307812
Jul-20	2020	3.542	4.963263961	5.280068044	5.544071446	4.351391877	4.629140295
Aug-20	2020	3.566	4.971896017	5.289251082	5.553713636	4.297115111	4.571399054
Sep-20	2020	3.56	4.950004564	5.265962302	5.529260417	4.209136537	4.477804827
Oct-20	2020	3.59	4.991185979	5.309772319	5.575260935	4.705207076	5.005539442
Nov-20	2020	3.676	5.09663679	5.421954032	5.693051734	4.971716766	5.289060389
Dec-20	2020	3.865	5.264306756	5.600326336	5.880342653	4.957641143	5.274086323
Jan-21	2021	4.004	5.587200538	5.94383036	6.241021878	5.065734506	5.389079262
Feb-21	2021	3.982	5.464520153	5.813319312	6.103985278	4.940082474	5.255406887
Mar-21	2021	3.919	5.101645743	5.427282705	5.69864684	4.974308213	5.291817248
Apr-21	2021	3.629	4.911796002	5.225314896	5.48658064	4.152989029	4.418073435
May-21	2021	3.629	5.128649449	5.456010052	5.728810554	4.230050743	4.500053982
Jun-21	2021	3.659	5.180287531	5.510944182	5.786491391	4.354803906	4.632770113

GAS SUPPLY 20 YEAR PRICE FORECAST IN BOLD

PERIOD	YEAR	NYMEX CURRENT MARKET	CASCADE	NYMEX	CASCADE	CASCADE	SUMAS
			NYMEX LO PROJECTED PRICE	CASCADE PROJECTED PRICE	NYMEX HI PROJECTED PRICE	SUMAS LO FORECAST PRICE	CASCADE FORECAST PRICE
Jul-21	2021	3.696	5.220413031	5.553630884	5.831312428	4.596869325	4.890286516
Aug-21	2021	3.726	5.229263829	5.563046627	5.841198958	4.501258518	4.788572891
Sep-21	2021	3.723	5.18276498	5.513579766	5.789258754	4.369795488	4.648718604
Oct-21	2021	3.759	5.227973798	5.561674253	5.839757965	4.746559121	5.04953098
Nov-21	2021	3.844	5.385930531	5.729713331	6.016198997	5.027022042	5.34789579
Dec-21	2021	4.032	5.55061165	5.90490601	6.200151311	5.047085639	5.369240041
Jan-22	2022	4.168	5.657676445	6.018804728	6.319744965	5.076446774	5.400475291
Feb-22	2022	4.145	5.538355083	5.891867109	6.186460465	5.06079794	5.383827596
Mar-22	2022	4.08	5.230456063	5.56431496	5.842530708	5.091294673	5.416270929
Apr-22	2022	3.775	5.028354954	5.349313781	5.61677947	4.280792601	4.554034682
May-22	2022	3.767	5.249757817	5.584848742	5.864091179	4.342382445	4.619555792
Jun-22	2022	3.797	5.328402943	5.668513769	5.951939458	4.466342234	4.751427909
Jul-22	2022	3.835	5.360231946	5.702374411	5.987493131	4.752029042	5.055350044
Aug-22	2022	3.873	5.375281322	5.718384385	6.004303604	4.662855397	4.960484465
Sep-22	2022	3.879	5.314096	5.653293617	5.935958297	4.501987311	4.789348203
Oct-22	2022	3.924	5.356111829	5.697991308	5.982890873	4.932378074	5.247210717
Nov-22	2022	4.014	5.57690997	5.932882947	6.229527094	5.27997869	5.616998607
Dec-22	2022	4.205	5.791912671	6.161609224	6.469689686	5.33674085	5.677383883
Jan-23	2023	4.31	5.931510983	6.310118067	6.62562397	5.410937096	5.75631606
Feb-23	2023	4.287	5.852322147	6.225874624	6.537168356	5.313867839	5.653050892
Mar-23	2023	4.219	5.625745908	5.984836073	6.284077876	5.471463834	5.820706207
Apr-23	2023	3.919	5.411947494	5.757390951	6.045260499	4.571445775	4.863240186
May-23	2023	3.907	5.630703079	5.990109659	6.289615142	4.714569893	5.015499886
Jun-23	2023	3.937	5.712901928	6.077555243	6.381433005	4.862144774	5.172494441
Jul-23	2023	3.978	5.744881817	6.111576401	6.417155221	4.866094612	5.176696396
Aug-23	2023	4.017	5.758328532	6.125881417	6.432175488	4.902426852	5.215347715
Sep-23	2023	4.027	5.705216375	6.069379122	6.372848078	4.841204359	5.150217403
Oct-23	2023	4.079	5.749472919	6.116460552	6.42228358	5.211953163	5.544631025
Nov-23	2023	4.169	5.988153768	6.370376349	6.688895166	5.615136259	5.973549212
Dec-23	2023	4.359	6.19604935	6.591541862	6.921118955	5.663980122	6.025510768
Jan-24	2024	4.457	6.314451729	6.71750184	7.053376932	5.708620317	6.073000337
Feb-24	2024	4.432	6.23222641	6.630028096	6.961529501	5.625795393	5.984888715
Mar-24	2024	4.362	5.877895442	6.253080257	6.56573427	5.54846633	5.902623756
Apr-24	2024	4.042	5.672850459	6.034947297	6.336694662	4.870152906	5.18101373
May-24	2024	4.027	5.903841309	6.280682244	6.594716356	4.988979045	5.307424516
Jun-24	2024	4.059	5.98885673	6.371124181	6.68968039	5.030503129	5.351599074
Jul-24	2024	4.104	6.041886415	6.427538739	6.748915676	5.148608294	5.477242866
Aug-24	2024	4.146	6.057093683	6.443716684	6.765902518	5.135992328	5.463821625
Sep-24	2024	4.159	6.008990096	6.392542656	6.712169788	5.009269474	5.329010079

GAS SUPPLY 20 YEAR PRICE FORECAST IN BOLD

PERIOD	YEAR	NYMEX CURRENT MARKET	CASCADE	NYMEX	CASCADE	CASCADE	SUMAS
			NYMEX LO PROJECTED PRICE	CASCADE PROJECTED PRICE	NYMEX HI PROJECTED PRICE	SUMAS LO FORECAST PRICE	CASCADE FORECAST PRICE
Oct-24	2024	4.219	6.0623011	6.44925649	6.771719314	5.208355183	5.540803386
Nov-24	2024	4.309	6.260763107	6.660386284	6.993405598	5.553341838	5.907810466
Dec-24	2024	4.504	6.441563227	6.852726837	7.195363179	5.572087815	5.927752995
Jan-25	2025	4.599	6.570886342	6.990304619	7.33981985	5.612474991	5.970718075
Feb-25	2025	4.568	6.458619164	6.870871451	7.214415023	5.471418646	5.820658134
Mar-25	2025	4.487	6.090449104	6.479201175	6.803161233	5.451922855	5.799917931
Apr-25	2025	4.142	5.876187899	6.251263722	6.563826908	5.031290996	5.35243723
May-25	2025	4.127	6.12826677	6.519432734	6.84540437	5.158921963	5.488214854
Jun-25	2025	4.165	6.22050949	6.617563287	6.948441451	5.136766961	5.464645703
Jul-25	2025	4.213	6.257516581	6.656932533	6.989779159	5.265785938	5.601899934
Aug-25	2025	4.257	6.274700379	6.675213169	7.008973828	5.272632635	5.609183655
Sep-25	2025	4.272	6.223527026	6.620773432	6.951812104	5.216701786	5.549682751
Oct-25	2025	4.334	6.273294671	6.673717735	7.007403622	5.592334368	5.949291881
Nov-25	2025	4.439	6.458899308	6.871169476	7.21472795	5.93513164	6.31396983
Dec-25	2025	4.649	6.672116088	7.097995838	7.45289563	5.985869343	6.367946109
Jan-26	2026	4.759	6.85346426	7.290919425	7.655465396	6.090157692	6.478891162
Feb-26	2026	4.722	6.713705803	7.142240216	7.499352226	5.924766379	6.302942956
Mar-26	2026	4.634	6.424061117	6.834107572	7.17581295	5.97957391	6.361248841
Apr-26	2026	4.244	6.169214134	6.56299376	6.891143448	5.291449587	5.629201689
May-26	2026	4.229	6.460055344	6.872399302	7.216019268	5.527618438	5.880445147
Jun-26	2026	4.267	6.552209416	6.970435549	7.318957327	5.783209163	6.152350173
Jul-26	2026	4.315	6.588508815	7.00905193	7.359504527	6.036371841	6.421672171
Aug-26	2026	4.359	6.606309597	7.027988933	7.37938838	5.966395376	6.347229124
Sep-26	2026	4.374	6.555893982	6.9743553	7.323073065	5.881227152	6.25662463
Oct-26	2026	4.436	6.607454746	7.029207177	7.380667536	6.29533858	6.697168702
Nov-26	2026	4.556	6.729136344	7.158655686	7.51658847	6.565892378	6.984991891
Dec-26	2026	4.786	6.921546688	7.36334754	7.731514917	6.613468197	7.035604465
Jan-27	2027	4.911	6.975620988	7.420873391	7.791917061	6.592611831	7.013416842
Feb-27	2027	4.874	6.834738923	7.270998855	7.634548797	6.461052109	6.873459691
Mar-27	2027	4.786	6.378264052	6.78538729	7.124656654	6.315460897	6.718575422
Apr-27	2027	4.396	6.123887545	6.514773984	6.840512683	5.417522233	5.763321524
May-27	2027	4.381	6.414838342	6.824296109	7.165510914	5.617170073	5.975712844
Jun-27	2027	4.419	6.515658873	6.931551993	7.278129592	5.727180692	6.092745417
Jul-27	2027	4.467	6.544361437	6.962086635	7.310190967	5.941847821	6.321114703
Aug-27	2027	4.511	6.561602533	6.980428227	7.329449638	5.876826895	6.251943505
Sep-27	2027	4.526	6.507039041	6.922381959	7.268501057	5.791451217	6.161118316
Oct-27	2027	4.588	6.559184091	6.977855416	7.326748187	6.215191369	6.611905711
Nov-27	2027	4.708	6.734945406	7.164835539	7.523077316	6.562881537	6.981788869
Dec-27	2027	4.938	6.926021714	7.368108206	7.736513616	6.590534884	7.011207323

GAS SUPPLY 20 YEAR PRICE FORECAST IN BOLD

PERIOD	YEAR	NYMEX CURRENT MARKET	CASCADE	NYMEX	CASCADE	CASCADE	SUMAS
			NYMEX LO PROJECTED PRICE	CASCADE PROJECTED PRICE	NYMEX HI PROJECTED PRICE	SUMAS LO FORECAST PRICE	CASCADE FORECAST PRICE
Jan-28	2028	4.96011	6.90144392	7.341961617	7.709059698	6.486526261	6.900559852
Feb-28	2028	4.92274	6.826438502	7.262168619	7.62527705	6.44540824	6.856817277
Mar-28	2028	4.83386	6.429580745	6.839979516	7.181978492	6.312591427	6.715522795
Apr-28	2028	4.43996	6.175234596	6.569398507	6.897868432	5.394205754	5.738516759
May-28	2028	4.42481	6.466140457	6.878872826	7.222816468	5.644947758	6.005263572
Jun-28	2028	4.46319	6.569864305	6.989217345	7.338678213	5.755690484	6.123074983
Jul-28	2028	4.51167	6.600564972	7.02187763	7.372971511	5.918290648	6.296053881
Aug-28	2028	4.55611	6.616751802	7.039097662	7.391052545	5.848685477	6.222005826
Sep-28	2028	4.57126	6.556449705	6.974946494	7.323693819	5.795398331	6.165317373
Oct-28	2028	4.63388	6.607437334	7.029188653	7.380648086	6.212772305	6.60933224
Nov-28	2028	4.75508	6.880286595	7.319453824	7.685426515	6.651585629	7.076154924
Dec-28	2028	4.98738	7.077537111	7.529294799	7.905759539	6.685117849	7.111827498
Jan-29	2029	5.0097111	7.091991114	7.544671398	7.921904967	6.63688331	7.06051416
Feb-29	2029	4.9719674	7.00863838	7.455998277	7.828798191	6.634560473	7.058043057
Mar-29	2029	4.8821986	6.671124834	7.096941312	7.451788378	6.522238085	6.938551154
Apr-29	2029	4.4843596	6.408755778	6.817825296	7.158716561	5.58561119	5.942139564
May-29	2029	4.4690581	6.707822686	7.135981581	7.49278066	5.815558066	6.1867639
Jun-29	2029	4.5078219	6.806608357	7.241072721	7.603126357	5.969115207	6.35012256
Jul-29	2029	4.5567867	6.86799554	7.306378234	7.671697145	6.224707028	6.622028754
Aug-29	2029	4.6016711	6.888472892	7.328162651	7.694570784	6.11997621	6.51061299
Sep-29	2029	4.6169726	6.832977418	7.269124913	7.632581159	6.055738586	6.442275092
Oct-29	2029	4.6802188	6.8884196	7.328105958	7.694511256	6.481197124	6.894890558
Nov-29	2029	4.8026308	7.059550719	7.510160339	7.885668356	6.783615659	7.216612404
Dec-29	2029	5.0372538	7.261039203	7.72450979	8.11073528	6.834823819	7.271089169
Jan-30	2030	5.059808211	7.240979543	7.703169726	8.088328212	6.742570959	7.172947828
Feb-30	2030	5.021687074	7.163030451	7.620245161	8.001257419	6.766763294	7.198684355
Mar-30	2030	4.931020586	6.859921338	7.297788657	7.66267809	6.751725066	7.18268624
Apr-30	2030	4.529203196	6.604557775	7.026125292	7.377431557	5.799432791	6.169609352
May-30	2030	4.513748681	6.909024164	7.350025706	7.717526992	6.057611865	6.444267942
Jun-30	2030	4.552900119	7.023949408	7.472286605	7.845900935	6.261756717	6.661443316
Jul-30	2030	4.602354567	7.085251028	7.537501093	7.914376148	6.536282627	6.953492156
Aug-30	2030	4.647687811	7.107982758	7.561683785	7.939767974	6.420644362	6.830472726
Sep-30	2030	4.663142326	7.045257897	7.494955209	7.86970297	6.373021256	6.779809847
Oct-30	2030	4.727020988	7.104378162	7.557849109	7.935741564	6.800296125	7.23435758
Nov-30	2030	4.850657108	7.322159774	7.789531674	8.179008258	7.167216626	7.624698538
Dec-30	2030	5.087626338	7.52716993	8.007627585	8.408008965	7.200863664	7.660493259
Jan-31	2031	5.110406293	7.649646547	8.137921858	8.544817951	7.256361643	7.719533663
Feb-31	2031	5.071903945	7.552721861	8.034810491	8.436551015	7.21107466	7.671356021
Mar-31	2031	4.980330792	7.198736515	7.658230335	8.041141851	7.116122303	7.570342875

GAS SUPPLY 20 YEAR PRICE FORECAST IN BOLD

PERIOD	YEAR	NYMEX CURRENT MARKET	CASCADE	NYMEX	CASCADE	CASCADE	SUMAS
			NYMEX LO PROJECTED PRICE	CASCADE PROJECTED PRICE	NYMEX HI PROJECTED PRICE	SUMAS LO FORECAST PRICE	CASCADE FORECAST PRICE
Apr-31	2031	4.574495228	6.932117207	7.374592774	7.743322412	6.127669322	6.518797151
May-31	2031	4.558886168	7.250738355	7.713551441	8.099229013	6.408345191	6.817388502
Jun-31	2031	4.59842912	7.343703059	7.812450062	8.203072566	6.533098405	6.950104686
Jul-31	2031	4.648378113	7.377002962	7.847875492	8.240269266	6.820233607	7.255567667
Aug-31	2031	4.694164689	7.403432919	7.875992467	8.269792091	6.701286562	7.129028258
Sep-31	2031	4.709773749	7.382522286	7.853747113	8.246434469	6.692553814	7.1197381
Oct-31	2031	4.774291198	7.44604129	7.921320521	8.317386547	7.172696548	7.630528243
Nov-31	2031	4.899163679	7.854816417	8.356187678	8.773997062	7.770774826	8.26678173
Dec-31	2031	5.138502601	8.078048291	8.593668395	9.023351815	7.814799669	8.313616669
Jan-32	2032	5.161510356	7.912738108	8.417806498	8.838696823	7.90507297	8.409652096
Feb-32	2032	5.122622984	5.161865558	5.491346338	5.765913655	5.122566793	5.449539141
Mar-32	2032	5.0301341	5.107145934	5.433133972	5.704790671	5.312238573	5.651317631
Apr-32	2032	4.62024018	4.777229306	5.082158836	5.336266778	4.122720875	4.385873271
May-32	2032	4.604475029	5.183303843	5.514153025	5.789860676	4.467352248	4.752502391
Jun-32	2032	4.644413411	5.246163804	5.581025324	5.86007659	4.697195531	4.997016523
Jul-32	2032	4.694861894	5.257545614	5.593133632	5.872790313	4.707698791	5.008190203
Aug-32	2032	4.741106336	5.252281241	5.587533235	5.866909897	4.747116396	5.050123826
Sep-32	2032	4.756871487	5.218345393	5.551431269	5.829002832	4.756503315	5.060109909
Oct-32	2032	4.82203411	5.272298104	5.60882777	5.889269158	5.460358838	5.80889238
Nov-32	2032	4.948155316	5.337085291	5.67775031	5.961637826	5.749110875	6.116075399
Dec-32	2032	5.189887627	5.455137852	5.803338141	6.093505048	5.630673064	5.990077727
Jan-33	2033	5.21312546	8.391762083	8.927406472	9.373776795	8.383713397	8.91884404
Feb-33	2033	5.173849214	8.291412673	8.820651779	9.261684368	8.228912766	8.754162517
Mar-33	2033	5.080435441	8.203517515	8.727146293	9.163503608	8.529692419	9.074140871
Apr-33	2033	4.666442582	7.673578314	8.163381185	8.571550244	6.632662244	7.056023664
May-33	2033	4.65051978	8.325848608	8.857285753	9.300150041	7.187214656	7.645973039
Jun-33	2033	4.690857546	8.426819444	8.964701536	9.412936613	7.553752161	8.035906554
Jul-33	2033	4.741810513	8.445101841	8.984150895	9.43335844	7.570637332	8.053869502
Aug-33	2033	4.788517399	8.436645773	8.975155078	9.423912832	7.633242517	8.120470762
Sep-33	2033	4.804440202	8.382135224	8.917165132	9.363023389	7.647631561	8.135778256
Oct-33	2033	4.870254451	8.468798503	9.00936011	9.459828115	8.767886232	9.327538545
Nov-33	2033	4.997636869	8.572865008	9.120069158	9.576072616	9.228141596	9.81717191
Dec-33	2033	5.241786504	8.762490733	9.321798653	9.787888585	9.041658142	9.618785257
Jan-34	2034	5.265256714	8.791297457	9.352444103	9.820066309	8.782949054	9.343562823
Feb-34	2034	5.225587706	8.686170368	9.240606775	9.702637113	8.621343087	9.171641582
Mar-34	2034	5.131239795	8.594090485	9.142649452	9.599781925	8.932411504	9.50256543
Apr-34	2034	4.713107008	8.038920652	8.552043247	8.979645409	6.959242902	7.403449895
May-34	2034	4.697024978	8.722245813	9.278984908	9.742934153	7.541211358	8.022565274
Jun-34	2034	4.737766121	8.828023913	9.391514801	9.861090541	7.922445311	8.42813331

GAS SUPPLY 20 YEAR PRICE FORECAST IN BOLD

PERIOD	YEAR	CASCADE		NYMEX		CASCADE		SUMAS	
		NYMEX CURRENT MARKET	NYMEX LO PROJECTED PRICE	CASCADE PROJECTED PRICE	CASCADE NYMEX HI PROJECTED PRICE	CASCADE SUMAS LO FORECAST PRICE	CASCADE FORECAST PRICE		
Jul-34	2034	4.789228618	8.847176744	9.411890153	9.88248466	7.940148884	8.446966898		
Aug-34	2034	4.836402573	8.838318079	9.402466041	9.872589343	8.004997654	8.515954951		
Sep-34	2034	4.852484604	8.781212259	9.34171517	9.808800928	8.019357114	8.531230973		
Oct-34	2034	4.918956995	8.872001614	9.438299589	9.910214568	9.182226785	9.768326367		
Nov-34	2034	5.047613238	8.98102277	9.554279542	10.03199352	9.660700577	10.27734104		
Dec-34	2034	5.294204369	9.179676656	9.765613464	10.25389414	9.469239714	10.07365927		
Jan-35	2035	5.317909281	9.159651277	9.74430987	10.23152536	9.151039198	9.735148083		
Feb-35	2035	5.277843583	9.050119382	9.627786576	10.10917591	8.983244596	9.556643188		
Mar-35	2035	5.182552193	8.954181368	9.525724859	10.0020111	9.303187913	9.897008418		
Apr-35	2035	4.760238078	8.375750016	8.910372358	9.355890976	7.26197174	7.725501851		
May-35	2035	4.743995227	9.087706382	9.667772747	10.15116138	7.869370152	8.371670375		
Jun-35	2035	4.785143782	9.197916566	9.785017623	10.2742685	8.263736183	8.791208705		
Jul-35	2035	4.837120904	9.217871896	9.806246698	10.29655903	8.282196483	8.810847322		
Aug-35	2035	4.884766599	9.208642054	9.796427717	10.2862491	8.349002051	8.881917075		
Sep-35	2035	4.90100945	9.149143512	9.733131395	10.21978797	8.363225945	8.897048878		
Oct-35	2035	4.968146565	9.243736924	9.833762685	10.32545082	9.563760242	10.17421302		
Nov-35	2035	5.09808937	9.357326047	9.954602178	10.45233229	10.05847079	10.70050084		
Dec-35	2035	5.347146412	9.564303497	10.17479095	10.6835305	9.863012109	10.49256607		

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	ROCKIES	CASCADE	CASCADE	AECO
		SUMAS HI FORECAST PRICE	ROCKIES LO FORECAST PRICE	CASCADE FORECAST PRICE	ROCKIES HI FORECAST PRICE	AECO LO FORECAST PRICE	CASCADE FORECAST PRICE
Jan-15	2015	3.947727911	3.327668015	3.540072356	3.717075974	3.176875765	3.379655069
Feb-15	2015	3.958200069	3.313858291	3.525381161	3.701650219	3.07241479	3.268526372
Mar-15	2015	3.892424796	3.270175869	3.478910499	3.652856024	3.027011785	3.220225304
Apr-15	2015	4.203303398	3.639496377	3.871804657	4.065394889	3.25688946	3.464776021
May-15	2015	2.711337598	2.466703391	2.624152543	2.755360171	2.208756816	2.349741294
Jun-15	2015	2.923315651	2.656690271	2.826266245	2.967579558	2.365423052	2.516407502
Jul-15	2015	2.963437665	2.699702497	2.872023933	3.015625129	2.427657072	2.582613906
Aug-15	2015	2.985974706	2.723945581	2.897814448	3.04270517	2.431131367	2.586309965
Sep-15	2015	2.951624865	2.736045401	2.910686597	3.056220927	2.446923556	2.603110166
Oct-15	2015	3.159780624	2.753531851	2.929289203	3.075753663	2.460572734	2.617630568
Nov-15	2015	3.443964246	2.875945764	3.05951677	3.212492609	2.464141159	2.621426765
Dec-15	2015	3.407286902	3.052699953	3.247553141	3.409930798	2.60867602	2.775187255
Jan-16	2016	3.838749446	3.513056617	3.737294273	3.924158987	3.054457746	3.249423134
Feb-16	2016	3.823356807	3.474543587	3.696322965	3.881139113	3.03087473	3.224334819
Mar-16	2016	3.538999195	3.303498933	3.514360567	3.690078595	2.851819694	3.033850738
Apr-16	2016	3.234843265	3.082241114	3.278979909	3.442928904	2.670306729	2.840751839
May-16	2016	3.303372267	3.150618614	3.35172193	3.519308027	2.743137762	2.918231662
Jun-16	2016	3.398016238	3.152792033	3.354034077	3.521735781	2.737643676	2.912386889
Jul-16	2016	3.453290157	3.254617177	3.462358699	3.635476634	2.813009025	2.992562792
Aug-16	2016	3.491293435	3.240340589	3.44717084	3.619529382	2.811558598	2.991019785
Sep-16	2016	3.390180112	3.201227224	3.405560877	3.575838921	2.799539577	2.978233593
Oct-16	2016	3.673829814	3.239176622	3.445932577	3.618229205	2.818682554	2.998598461
Nov-16	2016	3.925645196	3.387795466	3.60403773	3.784239616	2.886065911	3.070282884
Dec-16	2016	3.886240816	3.541410377	3.767457848	3.95583074	3.025534315	3.218653526
Jan-17	2017	4.033433397	3.782136335	4.023549293	4.224726758	3.248534007	3.455887242
Feb-17	2017	4.088461896	3.713260846	3.950277496	4.14779137	3.200916071	3.405229863
Mar-17	2017	3.850813228	3.629517565	3.861188899	4.054248344	3.118395201	3.317441703
Apr-17	2017	3.584975179	3.372395753	3.587655056	3.767037809	2.908922155	3.094598037
May-17	2017	3.683430431	3.457217287	3.677890731	3.861785268	3.029399491	3.222765416
Jun-17	2017	3.794171378	3.48113178	3.703331681	3.888498265	3.056905875	3.252027527
Jul-17	2017	3.822150951	3.552762062	3.779534109	3.968510814	3.099601313	3.297448205
Aug-17	2017	3.815355464	3.53156168	3.756980511	3.944829536	3.088713539	3.285865467
Sep-17	2017	3.695304162	3.504794656	3.728504954	3.914930201	3.079022369	3.275555711
Oct-17	2017	4.165029574	3.542080967	3.768171241	3.956579803	3.104814975	3.302994654
Nov-17	2017	4.496632379	3.77764482	4.018771085	4.219709639	3.193444066	3.397280921
Dec-17	2017	4.495385624	3.947056814	4.19899661	4.408946441	3.338487058	3.551581977
Jan-18	2018	4.648123139	4.192852885	4.460481793	4.683505882	3.59122437	3.820451458
Feb-18	2018	4.482498528	3.9809649	4.235069042	4.446822494	3.417531022	3.6356713
Mar-18	2018	4.619925502	3.904677419	4.153912147	4.361607755	3.343507441	3.556922809

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	ROCKIES	CASCADE	CASCADE	AECO
		SUMAS HI FORECAST PRICE	ROCKIES LO FORECAST PRICE	CASCADE FORECAST PRICE	ROCKIES HI FORECAST PRICE	AECO LO FORECAST PRICE	CASCADE FORECAST PRICE
Apr-18	2018	3.74335179	3.568613967	3.796397837	3.986217729	3.059234934	3.254505249
May-18	2018	3.857301501	3.652343964	3.885472302	4.079745917	3.154482673	3.355832631
Jun-18	2018	3.982366987	3.661419449	3.895127073	4.089883427	3.186201489	3.389576052
Jul-18	2018	4.019543368	3.777020204	4.018106601	4.219011931	3.26269158	3.470948489
Aug-18	2018	4.044546045	3.762670509	4.002840967	4.202983015	3.262803127	3.471067157
Sep-18	2018	3.952066163	3.726560275	3.964425824	4.162647115	3.245367507	3.452518624
Oct-18	2018	4.432684359	3.767625014	4.008111717	4.208517303	3.281742066	3.491214964
Nov-18	2018	4.734914685	4.011413403	4.267461067	4.48083412	3.410063884	3.627727537
Dec-18	2018	4.755454384	4.200609009	4.468732988	4.692169637	3.570179883	3.798063705
Jan-19	2019	5.008693977	4.535267637	4.824752806	5.065990446	3.89826668	4.147092213
Feb-19	2019	5.014586888	4.468444471	4.75366433	4.991347547	3.851714855	4.097568995
Mar-19	2019	5.064114147	4.332237493	4.60876329	4.839201455	3.669665223	3.903899173
Apr-19	2019	4.134217565	4.012976939	4.269124404	4.482580624	3.35936061	3.573787883
May-19	2019	4.280376841	4.116034147	4.378759731	4.597697718	3.481632008	3.703863838
Jun-19	2019	4.378944316	4.126882965	4.390301026	4.609816078	3.517352005	3.741863835
Jul-19	2019	4.468747113	4.27276431	4.545493947	4.772768644	3.640007553	3.872348461
Aug-19	2019	4.490708691	4.267264718	4.539643317	4.766625483	3.63852664	3.870773022
Sep-19	2019	4.378611571	4.193374039	4.461036212	4.684088022	3.603446781	3.833454023
Oct-19	2019	4.860796971	4.2280788	4.497956171	4.722853979	3.606939936	3.837170145
Nov-19	2019	5.144372573	4.378635866	4.658123262	4.891029425	3.706100161	3.942659745
Dec-19	2019	5.160697562	4.592608641	4.885753873	5.130041567	3.890401884	4.138725408
Jan-20	2020	5.489671339	4.994810238	5.313627913	5.579309309	4.278815455	4.551931335
Feb-20	2020	5.384978063	4.896144156	5.208663995	5.469097195	4.223370207	4.492947029
Mar-20	2020	5.497505719	4.702233587	5.002376156	5.252494964	4.017877541	4.274337809
Apr-20	2020	4.455709828	4.370587581	4.649561257	4.88203932	3.681274284	3.916249238
May-20	2020	4.613234529	4.497979762	4.785084853	5.024339096	3.838904055	4.083940484
Jun-20	2020	4.734773202	4.480998398	4.767019572	5.005370551	3.850797106	4.096592666
Jul-20	2020	4.860597309	4.647550455	4.944202612	5.191412742	3.982219204	4.236403409
Aug-20	2020	4.799969007	4.634545611	4.930367672	5.176886055	3.982224666	4.236409219
Sep-20	2020	4.701695068	4.498546318	4.785687572	5.024971951	3.872054614	4.119207036
Oct-20	2020	5.255816414	4.541037114	4.830890546	5.072435074	3.89852406	4.147366021
Nov-20	2020	5.553513408	4.682887584	4.981795302	5.230885067	3.996545896	4.25164457
Dec-20	2020	5.537790639	4.888922517	5.200981401	5.461030471	4.171641092	4.437916056
Jan-21	2021	5.658533225	5.139309504	5.467350536	5.740718063	4.462850398	4.74771319
Feb-21	2021	5.518177231	5.036346002	5.357814895	5.62570564	4.372142148	4.651215051
Mar-21	2021	5.556408111	4.776068676	5.080924123	5.33497033	4.007083223	4.262854493
Apr-21	2021	4.638977107	4.508202784	4.795960409	5.035758429	3.701752407	3.938034476
May-21	2021	4.725056681	4.552249206	4.842818304	5.084959219	3.86091016	4.107351235
Jun-21	2021	4.864408618	4.565689838	4.857116849	5.099972691	3.930768937	4.181669082

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	ROCKIES	CASCADE	CASCADE	AECO
		SUMAS HI FORECAST PRICE	ROCKIES LO FORECAST PRICE	CASCADE FORECAST PRICE	ROCKIES HI FORECAST PRICE	AECO LO FORECAST PRICE	CASCADE FORECAST PRICE
Jul-21	2021	5.134800841	4.843294949	5.152441435	5.410063507	4.182887099	4.449879893
Aug-21	2021	5.028001536	4.835263227	5.14389705	5.401091903	4.182597378	4.449571679
Sep-21	2021	4.881154535	4.656942653	4.954194311	5.201904027	4.039308902	4.297137129
Oct-21	2021	5.302007529	4.699991984	4.999991472	5.249991045	4.064042788	4.323449775
Nov-21	2021	5.615290579	4.871843291	5.182812011	5.441952612	4.197473961	4.465397831
Dec-21	2021	5.637702043	5.069418861	5.392998788	5.662648727	4.368252131	4.647076736
Jan-22	2022	5.670499056	5.209182545	5.541683558	5.818767736	4.539341546	4.829086752
Feb-22	2022	5.653018976	5.098405694	5.423835844	5.695027637	4.433817409	4.716827031
Mar-22	2022	5.687084475	4.894732415	5.207162143	5.467520251	4.082098228	4.34265769
Apr-22	2022	4.781736416	4.601425273	4.895133269	5.139889933	3.768138307	4.008657773
May-22	2022	4.850533582	4.660776591	4.958272969	5.206186618	3.944046605	4.195794261
Jun-22	2022	4.988999304	4.718465436	5.019644081	5.270626285	4.042007836	4.300008336
Jul-22	2022	5.308117546	4.977199359	5.294892935	5.559637581	4.333650629	4.610266627
Aug-22	2022	5.208508689	4.978141168	5.29589486	5.560689603	4.34213892	4.619296723
Sep-22	2022	5.028815613	4.786130853	5.091628567	5.346209995	4.164418188	4.430232115
Oct-22	2022	5.509571252	4.796877497	5.103061167	5.358214226	4.169219815	4.435340229
Nov-22	2022	5.897848537	5.045016769	5.367039116	5.635391072	4.372421505	4.651512239
Dec-22	2022	5.961253077	5.293209306	5.63107373	5.912627416	4.594200836	4.887447698
Jan-23	2023	6.044131863	5.483424748	5.833430583	6.125102112	4.80956566	5.116559212
Feb-23	2023	5.935703437	5.406242828	5.751322157	6.038888265	4.744662872	5.047513694
Mar-23	2023	6.111741517	5.272802357	5.60936421	5.88983242	4.421415637	4.703633656
Apr-23	2023	5.106402195	4.927375748	5.241889094	5.503983548	4.035328841	4.292903023
May-23	2023	5.266274881	5.1006446	5.42621766	5.697528543	4.215787789	4.484880627
Jun-23	2023	5.431119163	5.138226895	5.466198824	5.739508765	4.298939504	4.573339898
Jul-23	2023	5.435531215	5.33561984	5.676191319	5.960000885	4.556255353	4.847080163
Aug-23	2023	5.476115101	5.345424225	5.686621516	5.970952591	4.575040245	4.867064091
Sep-23	2023	5.407728273	5.180115963	5.510761663	5.786299746	4.494238042	4.7811043
Oct-23	2023	5.821862576	5.191566782	5.522943385	5.799090554	4.464207234	4.749156632
Nov-23	2023	6.272226673	5.467059613	5.816020864	6.106821908	4.695849656	4.99558474
Dec-23	2023	6.326786306	5.708769022	6.073158534	6.376816461	4.909902397	5.223300422
Jan-24	2024	6.376650354	5.872866951	6.247730799	6.560117339	5.101233632	5.426844289
Feb-24	2024	6.284133151	5.892396959	6.268507403	6.581932774	5.048613485	5.370865409
Mar-24	2024	6.197754944	5.591111071	5.947990501	6.245390026	4.563022732	4.854279503
Apr-24	2024	5.440064416	5.254626642	5.590028342	5.869529759	4.198949254	4.466967291
May-24	2024	5.572795742	5.375842405	5.718981282	6.004930346	4.35966332	4.637939702
Jun-24	2024	5.619179027	5.365531592	5.708012332	5.993412948	4.454863622	4.73921662
Jul-24	2024	5.751105009	5.621959543	5.980808025	6.279848426	4.83208629	5.14051733
Aug-24	2024	5.737012707	5.602741829	5.960363647	6.25838183	4.803273766	5.109865708
Sep-24	2024	5.595460583	5.433292096	5.780097975	6.069102874	4.659218773	4.956615715

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	ROCKIES	CASCADE	CASCADE	AECO
		SUMAS HI FORECAST PRICE	ROCKIES LO FORECAST PRICE	CASCADE FORECAST PRICE	ROCKIES HI FORECAST PRICE	AECO LO FORECAST PRICE	CASCADE FORECAST PRICE
Oct-24	2024	5.817843555	5.453462334	5.801555675	6.091633459	4.463103381	4.74798232
Nov-24	2024	6.203200989	5.675938114	6.038232036	6.340143638	4.637182791	4.933173182
Dec-24	2024	6.224140645	5.900789798	6.277435955	6.591307753	4.820630101	5.128329895
Jan-25	2025	6.269253979	6.062495539	6.449463339	6.771936506	5.007110871	5.326713692
Feb-25	2025	6.11169104	6.081367474	6.469539866	6.79301686	4.896640453	5.209191971
Mar-25	2025	6.089913828	5.737920306	6.104170538	6.409379065	4.462456828	4.747294498
Apr-25	2025	5.620059091	5.418646532	5.764517588	6.052743467	4.112079055	4.374552186
May-25	2025	5.762625597	5.550027581	5.904284661	6.199498894	4.427883639	4.71051451
Jun-25	2025	5.737877988	5.556978611	5.911679373	6.207263342	4.552915391	4.843527012
Jul-25	2025	5.881994931	5.803166736	6.173581634	6.482260715	4.945628641	5.261307065
Aug-25	2025	5.889642837	5.785904946	6.155218028	6.462978929	4.935462325	5.250491836
Sep-25	2025	5.827166888	5.61660181	5.975108309	6.273863724	4.859705914	5.169899908
Oct-25	2025	6.246756475	5.634506083	5.994155408	6.293863178	4.831605722	5.140006087
Nov-25	2025	6.629668322	5.853450751	6.227075267	6.53842903	5.004399167	5.323828901
Dec-25	2025	6.686343415	6.097061277	6.486235401	6.810547171	5.220623857	5.553855167
Jan-26	2026	6.80283572	6.335657657	6.740061337	7.077064404	5.464916299	5.813740744
Feb-26	2026	6.618090104	6.270562026	6.670810666	7.004351199	5.331745931	5.672070139
Mar-26	2026	6.679311283	6.035926171	6.421198054	6.742257957	4.977973111	5.295716075
Apr-26	2026	5.910661773	5.672935797	6.035038082	6.336789986	4.577294715	4.869462462
May-26	2026	6.174467404	5.889645391	6.265580203	6.578859213	5.1724553	5.502612021
Jun-26	2026	6.459967682	6.00072947	6.383754755	6.702942493	5.310939686	5.649935836
Jul-26	2026	6.74275578	6.208585081	6.604877746	6.935121633	5.612346341	5.970581214
Aug-26	2026	6.66459058	6.167680223	6.56136194	6.889430037	5.589229333	5.945988652
Sep-26	2026	6.569455862	6.054792066	6.441268155	6.763331563	5.486851637	5.83707621
Oct-26	2026	7.032027137	6.06415728	6.451231149	6.773792706	5.484686704	5.834773089
Nov-26	2026	7.334241486	6.239296916	6.637549911	6.969427407	5.598428584	5.955775089
Dec-26	2026	7.387384689	6.469224617	6.882153848	7.22626154	5.79770419	6.167770415
Jan-27	2027	7.364087684	6.561306999	6.980113828	7.32911952	5.938210519	6.317245233
Feb-27	2027	7.217132675	6.430549764	6.841010387	7.183060906	5.837109784	6.20969126
Mar-27	2027	7.054504193	6.009914603	6.393526173	6.713202482	5.393987274	5.738284334
Apr-27	2027	6.051487601	5.661785473	6.023176035	6.324334836	5.010703592	5.330535736
May-27	2027	6.274498486	5.906526563	6.283538897	6.597715842	5.252937986	5.5882319
Jun-27	2027	6.397382688	5.929626685	6.308113495	6.62351917	5.274981274	5.611682207
Jul-27	2027	6.637170438	6.13043514	6.521739511	6.847826487	5.524538179	5.877168275
Aug-27	2027	6.56454068	6.130141873	6.521427524	6.847498901	5.507313192	5.858843821
Sep-27	2027	6.469174232	6.021610444	6.405968557	6.726266985	5.404176044	5.749123451
Oct-27	2027	6.942500997	6.050002566	6.436172943	6.75798159	5.419533071	5.765460714
Nov-27	2027	7.330878313	6.26483821	6.6647215	6.997957576	5.59090783	5.947774287
Dec-27	2027	7.361767689	6.504025667	6.919176241	7.265135053	5.7881271	6.157582021

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	ROCKIES	CASCADE	CASCADE	AECO
		SUMAS HI FORECAST PRICE	ROCKIES LO FORECAST PRICE	CASCADE FORECAST PRICE	ROCKIES HI FORECAST PRICE	AECO LO FORECAST PRICE	CASCADE FORECAST PRICE
Jan-28	2028	7.245587844	6.508247299	6.923667339	7.269850706	5.841763111	6.214641607
Feb-28	2028	7.199658141	6.462506451	6.875006863	7.218757206	5.820619947	6.19214888
Mar-28	2028	7.051298934	6.073739489	6.461424988	6.784496237	5.397581688	5.742108179
Apr-28	2028	6.025442597	5.718228721	6.083222044	6.387383146	5.014046124	5.334091621
May-28	2028	6.305526751	5.9376139	6.316610532	6.632441059	5.278530409	5.615457882
Jun-28	2028	6.429228733	5.962128382	6.342689769	6.659824257	5.300665006	5.639005325
Jul-28	2028	6.610856575	6.128886001	6.52009149	6.846096065	5.500366661	5.851453894
Aug-28	2028	6.533106118	6.131236312	6.522591821	6.848721412	5.479262769	5.829002946
Sep-28	2028	6.473583242	6.030761915	6.415704165	6.736489373	5.406911079	5.752033062
Oct-28	2028	6.939798852	6.055198778	6.441700827	6.763785869	5.41334394	5.758876532
Nov-28	2028	7.42996267	6.352857039	6.758358552	7.096276479	5.674263267	6.036450284
Dec-28	2028	7.467418873	6.591921606	7.012682559	7.363316687	5.878675949	6.253910584
Jan-29	2029	7.413539868	6.662417288	7.087677966	7.442061864	5.986115314	6.368207781
Feb-29	2029	7.410945209	6.612536005	7.034612771	7.38634341	6.002490587	6.385628284
Mar-29	2029	7.285478712	6.275169141	6.675711852	7.009497445	5.592787833	5.94977429
Apr-29	2029	6.239246543	5.906524907	6.283537135	6.597713992	5.19753006	5.529287298
May-29	2029	6.496102095	6.137602449	6.529364307	6.855832523	5.442726927	5.790135029
Jun-29	2029	6.667628689	6.177768114	6.572093738	6.900698425	5.505198806	5.856594474
Jul-29	2029	6.953130191	6.3879787	6.795722022	7.135508123	5.752657778	6.1198487
Aug-29	2029	6.836143639	6.374838471	6.781743054	7.120830207	5.740489872	6.106904119
Sep-29	2029	6.764388846	6.279933203	6.680780003	7.014819003	5.657706053	6.018836227
Oct-29	2029	7.239635086	6.282768343	6.68379611	7.017985916	5.66657706	6.028273468
Nov-29	2029	7.577443024	6.501151934	6.916119079	7.261925033	5.808290657	6.179032614
Dec-29	2029	7.634643627	6.753941149	7.185043775	7.544295964	6.012672248	6.396459838
Jan-30	2030	7.53159522	6.76304252	7.194726085	7.554462389	6.082909648	6.471180477
Feb-30	2030	7.558618573	6.721505781	7.150538065	7.508064969	6.123783516	6.514663315
Mar-30	2030	7.541820552	6.457445398	6.869622763	7.213103902	5.815530316	6.186734378
Apr-30	2030	6.47808982	6.098007536	6.487242059	6.811604162	5.424347497	5.770582444
May-30	2030	6.766481339	6.346935062	6.752058577	7.089661505	5.676266182	6.038581044
Jun-30	2030	6.994515481	6.412046646	6.82132622	7.162392531	5.803137467	6.173550497
Jul-30	2030	7.301166764	6.594579572	7.015510183	7.366285692	6.060839439	6.447701531
Aug-30	2030	7.171996362	6.572188731	6.99169014	7.341274647	6.02968657	6.414560181
Sep-30	2030	7.118800339	6.470928548	6.88396654	7.228164868	5.963019504	6.343637771
Oct-30	2030	7.596075459	6.48696281	6.901024266	7.246075479	5.972368407	6.353583412
Nov-30	2030	8.005933465	6.734178153	7.164019312	7.522220277	6.156540601	6.549511278
Dec-30	2030	8.043517922	7.006598026	7.453827687	7.826519072	6.364221039	6.770447914
Jan-31	2031	8.105510346	7.14667083	7.602841309	7.982983374	6.564229726	6.983223112
Feb-31	2031	8.054923822	7.091434324	7.544079068	7.921283021	6.538073238	6.955397061
Mar-31	2031	7.948860019	6.753677767	7.184763582	7.544001761	6.140776201	6.532740639

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	ROCKIES	CASCADE	CASCADE	AECO
		SUMAS HI FORECAST PRICE	ROCKIES LO FORECAST PRICE	CASCADE FORECAST PRICE	ROCKIES HI FORECAST PRICE	AECO LO FORECAST PRICE	CASCADE FORECAST PRICE
Apr-31	2031	6.844737009	6.400425244	6.808963026	7.149411177	5.738283082	6.10455647
May-31	2031	7.158257927	6.607641756	7.029406124	7.38087643	6.012525475	6.396303697
Jun-31	2031	7.29760992	6.691531041	7.118650043	7.474582545	6.040694868	6.426271136
Jul-31	2031	7.61834605	6.864913661	7.30309964	7.668254622	6.328058281	6.731976894
Aug-31	2031	7.485479671	6.834032065	7.270246877	7.633759221	6.29336778	6.695072107
Sep-31	2031	7.475725005	6.780676529	7.213485669	7.574159953	6.265322718	6.665236934
Oct-31	2031	8.012054655	6.815402839	7.250428552	7.612949979	6.308749385	6.711435516
Nov-31	2031	8.680120816	7.291674645	7.757100686	8.144955721	6.716432663	7.145141131
Dec-31	2031	8.729297502	7.561628482	8.044285619	8.4464999	6.941530391	7.384606799
Jan-32	2032	8.8301347	7.840685808	8.341155115	8.758212871	6.88560958	7.325116575
Feb-32	2032	5.722016099	5.109467205	5.435603409	5.70738358	4.486732929	4.773120137
Mar-32	2032	5.933883513	5.039120158	5.360766125	5.628804431	4.42688817	4.7094555
Apr-32	2032	4.605166935	4.625234457	4.920462188	5.166485298	4.053444311	4.312174799
May-32	2032	4.990127511	4.976173193	5.293801269	5.558491333	4.395306804	4.675858302
Jun-32	2032	5.246867349	5.039453529	5.361120775	5.629176814	4.455468761	4.739860384
Jul-32	2032	5.258599713	5.128762753	5.456130588	5.728937118	4.473649939	4.759202063
Aug-32	2032	5.302630017	5.101618042	5.427253236	5.698615898	4.476808892	4.762562651
Sep-32	2032	5.313115405	5.037338402	5.358870641	5.626814173	4.45043695	4.734507394
Oct-32	2032	6.099336999	5.110478402	5.436679151	5.708513109	4.506934652	4.794611331
Nov-32	2032	6.421879169	5.237853999	5.572185105	5.850794361	4.582064589	4.874536796
Dec-32	2032	6.289581614	5.410991272	5.756373694	6.044192378	4.719361517	5.020597359
Jan-33	2033	9.364786242	8.316104434	8.846919611	9.289265591	7.313238146	7.780040581
Feb-33	2033	9.191870642	8.208079463	8.731999429	9.168599401	7.217696323	7.678400344
Mar-33	2033	9.527847914	8.09533079	8.612054032	9.042656734	7.121650262	7.576223683
Apr-33	2033	7.408824847	7.43184899	7.90622233	8.301533446	6.522486294	6.938815206
May-33	2033	8.028271691	7.996432496	8.506843081	8.932185235	7.072635139	7.524079935
Jun-33	2033	8.437701882	8.098071887	8.614970092	9.045718597	7.169315127	7.626930986
Jul-33	2033	8.456562977	8.240288361	8.766264214	9.204577425	7.198411094	7.657884143
Aug-33	2033	8.5264943	8.197034275	8.720249229	9.156261691	7.2033513	7.663139681
Sep-33	2033	8.542567169	8.094265618	8.61092087	9.041466913	7.160870226	7.617947049
Oct-33	2033	9.793915472	8.211443946	8.735578666	9.172357599	7.251581002	7.714447874
Nov-33	2033	10.30803051	8.415049705	8.952180537	9.399789564	7.372096392	7.842655737
Dec-33	2033	10.09972452	8.692280966	9.247107411	9.709462781	7.592327945	8.076944622
Jan-34	2034	9.810740964	8.712822465	9.268960069	9.732408073	7.672611396	8.162352549
Feb-34	2034	9.630223661	8.599733993	9.148653184	9.606085843	7.57247092	8.055820127
Mar-34	2034	9.977693702	8.481875097	9.02327138	9.474434949	7.471936609	7.948868733
Apr-34	2034	7.77362239	7.7881898	8.285308298	8.699573713	6.844964214	7.281876823
May-34	2034	8.423693538	8.380562889	8.915492435	9.361267057	7.422365123	7.89613311
Jun-34	2034	8.849539975	8.48703444	9.028760042	9.480198044	7.523692593	8.003928291

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	ROCKIES	CASCADE	CASCADE	AECO
		SUMAS HI FORECAST PRICE	ROCKIES LO FORECAST PRICE	CASCADE FORECAST PRICE	ROCKIES HI FORECAST PRICE	AECO LO FORECAST PRICE	CASCADE FORECAST PRICE
Jul-34	2034	8.869315243	8.63473641	9.185889798	9.645184288	7.554061669	8.036235818
Aug-34	2034	8.941752699	8.589783917	9.138067997	9.594971397	7.559098129	8.041593754
Sep-34	2034	8.957792521	8.482622951	9.024066969	9.475270317	7.514469738	7.994116743
Oct-34	2034	10.25674269	8.605063675	9.154323059	9.612039212	7.609457311	8.095167352
Nov-34	2034	10.79120809	8.817330732	9.380139077	9.849146031	7.735539877	8.229297741
Dec-34	2034	10.57734223	9.106852415	9.688140867	10.17254791	7.965939292	8.474403502
Jan-35	2035	10.22190549	9.078697732	9.658189077	10.14109853	8.005632653	8.516630481
Feb-35	2035	10.03447535	8.960953001	9.532928725	10.00957516	7.901244867	8.405579646
Mar-35	2035	10.39185884	8.838421771	9.402576352	9.87270517	7.796585401	8.294239788
Apr-35	2035	8.111776944	8.117100085	8.635212856	9.066973499	7.144083676	7.600089017
May-35	2035	8.790253893	8.735231749	9.292799733	9.75743972	7.74677028	8.241244979
Jun-35	2035	9.23076914	8.846157286	9.410805623	9.881345904	7.852389265	8.353605601
Jul-35	2035	9.251389688	8.99872185	9.573108351	10.05176377	7.883915095	8.387143718
Aug-35	2035	9.326012929	8.952258194	9.523678929	9.999862876	7.889019242	8.392573662
Sep-35	2035	9.341901322	8.841123563	9.405450599	9.875723129	7.842392214	8.34297044
Oct-35	2035	10.68292368	8.968368022	9.540817044	10.0178579	7.941316441	8.44820898
Nov-35	2035	11.23552588	9.188463963	9.774961663	10.26370975	8.072505842	8.587772172
Dec-35	2035	11.01719438	9.489179175	10.09487146	10.59961504	8.31223147	8.842799436

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	MALIN	CASCADE
		AECO HI	MALIN LO	CASCADE	MALIN HI
		FORECAST	FORECAST	FORECAST	FORECAST
		PRICE	PRICE	PRICE	PRICE
Jan-15	2015	3.548637822	3.420714156	3.639057612	3.821010493
Feb-15	2015	3.431952691	3.320831353	3.532799312	3.709439277
Mar-15	2015	3.381236569	3.473571483	3.695288812	3.880053252
Apr-15	2015	3.638014822	3.755726422	3.995453641	4.195226323
May-15	2015	2.467228359	2.532454296	2.694100315	2.828805331
Jun-15	2015	2.642227877	2.705563993	2.878259567	3.022172545
Jul-15	2015	2.711744602	2.748284575	2.923706995	3.069892345
Aug-15	2015	2.715625463	2.75323945	2.928978139	3.075427046
Sep-15	2015	2.733265674	2.767230676	2.943862421	3.091055542
Oct-15	2015	2.748512097	2.796135949	2.974612712	3.123343347
Nov-15	2015	2.752498103	2.939445832	3.127070034	3.283423536
Dec-15	2015	2.913946618	3.080668953	3.277307397	3.441172767
Jan-16	2016	3.41189429	3.549532616	3.776098528	3.964903454
Feb-16	2016	3.38555156	3.515598183	3.739998067	3.926997971
Mar-16	2016	3.185543275	3.368149598	3.58313787	3.762294763
Apr-16	2016	2.982789431	3.186058822	3.389424278	3.558895492
May-16	2016	3.064143245	3.254946688	3.462709243	3.635844705
Jun-16	2016	3.058006233	3.248617419	3.455975978	3.628774777
Jul-16	2016	3.142190932	3.297272245	3.507736431	3.683123253
Aug-16	2016	3.140570774	3.303632957	3.514503146	3.690228303
Sep-16	2016	3.127145272	3.282670688	3.49220286	3.666813003
Oct-16	2016	3.148528384	3.316561699	3.528257126	3.704669983
Nov-16	2016	3.223797029	3.448565619	3.668686828	3.85212117
Dec-16	2016	3.379586203	3.57953943	3.808020671	3.998421704
Jan-17	2017	3.628681604	3.822285817	4.066261507	4.269574583
Feb-17	2017	3.575491356	3.757879211	3.997743842	4.197631034
Mar-17	2017	3.483313788	3.684928074	3.920136249	4.116143061
Apr-17	2017	3.249327939	3.462699687	3.683723071	3.867909225
May-17	2017	3.383903687	3.577320893	3.805660525	3.995943551
Jun-17	2017	3.414628903	3.60107831	3.830934373	4.022481092
Jul-17	2017	3.462320615	3.627321327	3.858852476	4.0517951
Aug-17	2017	3.45015874	3.617022065	3.847895814	4.040290604
Sep-17	2017	3.439333497	3.609309547	3.839691007	4.031675558
Oct-17	2017	3.468144387	3.637708148	3.869902286	4.0633974
Nov-17	2017	3.567144967	3.8035532	4.046333191	4.248649851
Dec-17	2017	3.729161075	3.942950879	4.194628595	4.404360025
Jan-18	2018	4.011474031	4.194933932	4.462695673	4.685830456
Feb-18	2018	3.817454865	3.986317819	4.240763638	4.452801819
Mar-18	2018	3.73476895	3.904413115	4.153630974	4.361312523

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	MALIN	CASCADE
		AECO HI	MALIN LO	CASCADE	MALIN HI
		FORECAST	FORECAST	FORECAST	FORECAST
		PRICE	PRICE	PRICE	PRICE
Apr-18	2018	3.417230511	3.61249197	3.843076564	4.035230392
May-18	2018	3.523624263	3.722957769	3.960593371	4.15862304
Jun-18	2018	3.559054855	3.731887478	3.970093062	4.168597715
Jul-18	2018	3.644495914	3.801777862	4.044444534	4.24666676
Aug-18	2018	3.644620515	3.799128196	4.04162574	4.243707027
Sep-18	2018	3.625144555	3.784031818	4.025565764	4.226844052
Oct-18	2018	3.665775712	3.822578718	4.066573104	4.269901759
Nov-18	2018	3.809113913	4.024837084	4.281741578	4.495828657
Dec-18	2018	3.98796689	4.193577776	4.461252953	4.684315601
Jan-19	2019	4.354446823	4.532494104	4.821802239	5.062892351
Feb-19	2019	4.302447444	4.476352379	4.762076999	5.000180849
Mar-19	2019	4.099094132	4.318476308	4.594123732	4.823829918
Apr-19	2019	3.752477278	3.991991784	4.24679977	4.459139759
May-19	2019	3.88905703	4.12092012	4.383957574	4.603155453
Jun-19	2019	3.928957026	4.130862689	4.394534776	4.614261515
Jul-19	2019	4.065965884	4.22518853	4.494881415	4.719625485
Aug-19	2019	4.064311673	4.24329371	4.514142244	4.739849357
Sep-19	2019	4.025126724	4.223213837	4.492780677	4.717419711
Oct-19	2019	4.029028652	4.228732715	4.498651824	4.723584415
Nov-19	2019	4.139792733	4.395140259	4.675681126	4.909465182
Dec-19	2019	4.345661679	4.57342542	4.865346191	5.108613501
Jan-20	2020	4.779527902	4.975070691	5.292628395	5.557259814
Feb-20	2020	4.71759438	4.91342599	5.227048926	5.488401372
Mar-20	2020	4.4880547	4.720293037	5.021588337	5.272667754
Apr-20	2020	4.1120617	4.346824978	4.624281892	4.855495986
May-20	2020	4.288137508	4.502322324	4.7897046	5.02918983
Jun-20	2020	4.3014223	4.484047971	4.770263799	5.008776989
Jul-20	2020	4.448223579	4.630559144	4.926126749	5.172433086
Aug-20	2020	4.44822968	4.652680749	4.949660371	5.19714339
Sep-20	2020	4.325167388	4.53479666	4.824251766	5.065464354
Oct-20	2020	4.354734322	4.561881621	4.853065554	5.095718832
Nov-20	2020	4.464226798	4.739968399	5.042519573	5.294645552
Dec-20	2020	4.659811859	4.906894402	5.220100428	5.481105449
Jan-21	2021	4.985098849	5.184760923	5.51570311	5.791488265
Feb-21	2021	4.883775803	5.089248919	5.414094594	5.684799324
Mar-21	2021	4.475997218	4.831524448	5.139919625	5.396915606
Apr-21	2021	4.1349362	4.494343476	4.781216464	5.020277287
May-21	2021	4.312718796	4.562518976	4.853743592	5.096430771
Jun-21	2021	4.390752536	4.574808744	4.866817813	5.110158704

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	MALIN	CASCADE
		AECO HI	MALIN LO	CASCADE	MALIN HI
		FORECAST	FORECAST	FORECAST	FORECAST
		PRICE	PRICE	PRICE	PRICE
Jul-21	2021	4.672373887	4.862516243	5.172889621	5.431534102
Aug-21	2021	4.672050263	4.872007082	5.182986257	5.44213557
Sep-21	2021	4.511993986	4.714005983	5.014899982	5.265644981
Oct-21	2021	4.539622263	4.744810354	5.04767059	5.300054119
Nov-21	2021	4.688667723	4.953682343	5.269874833	5.533368575
Dec-21	2021	4.879430572	5.116956749	5.44357101	5.71574956
Jan-22	2022	5.070541089	5.260374688	5.596143285	5.875950449
Feb-22	2022	4.952668383	5.155120974	5.484171249	5.758379812
Mar-22	2022	4.559790574	4.932904887	5.247771156	5.510159714
Apr-22	2022	4.209090662	4.587567181	4.880390619	5.124410149
May-22	2022	4.405583974	4.670731071	4.968862841	5.217305983
Jun-22	2022	4.515008753	4.727382682	5.029130512	5.280587038
Jul-22	2022	4.840779958	5.012959467	5.332935603	5.599582383
Aug-22	2022	4.850261559	5.035614415	5.357036612	5.624888443
Sep-22	2022	4.651743721	4.847459978	5.156872317	5.414715933
Oct-22	2022	4.657107241	4.855412858	5.165332828	5.423599469
Nov-22	2022	4.884087851	5.129237808	5.456635966	5.729467764
Dec-22	2022	5.131820083	5.343770992	5.684862757	5.969105895
Jan-23	2023	5.372387173	5.536611736	5.890012486	6.18451311
Feb-23	2023	5.299889378	5.464563806	5.813365751	6.104034038
Mar-23	2023	4.938815339	5.3315482	5.671859787	5.955452776
Apr-23	2023	4.507548174	4.914136895	5.227805207	5.489195468
May-23	2023	4.709124658	5.112734845	5.439079622	5.711033603
Jun-23	2023	4.802006893	5.149216872	5.477890289	5.751784804
Jul-23	2023	5.089434171	5.295485062	5.633494747	5.915169484
Aug-23	2023	5.110417295	5.317542144	5.656959728	5.939807714
Sep-23	2023	5.020159515	5.200976939	5.532954191	5.8096019
Oct-23	2023	4.986614463	5.305709102	5.644371385	5.926589954
Nov-23	2023	5.245363977	5.60220928	5.959797106	6.257786962
Dec-23	2023	5.484465443	5.800781272	6.171043907	6.479596102
Jan-24	2024	5.698186504	5.847656097	6.220910741	6.531956278
Feb-24	2024	5.63940868	5.940132331	6.319289714	6.6352542
Mar-24	2024	5.096993478	5.638892509	5.998821818	6.298762908
Apr-24	2024	4.690315656	5.244445819	5.57919768	5.858157564
May-24	2024	4.869836687	5.39049666	5.734570915	6.02129946
Jun-24	2024	4.976177451	5.378137406	5.721422772	6.00749391
Jul-24	2024	5.397543197	5.582961754	5.939321015	6.236287065
Aug-24	2024	5.365358993	5.575780264	5.931681132	6.228265189
Sep-24	2024	5.204446501	5.424681756	5.770938038	6.05948494

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	MALIN	CASCADE
		AECO HI	MALIN LO	CASCADE	MALIN HI
		FORECAST	FORECAST	FORECAST	FORECAST
		PRICE	PRICE	PRICE	PRICE
Oct-24	2024	4.985381437	5.432936229	5.779719392	6.068705362
Nov-24	2024	5.179831841	5.681537598	6.044188934	6.346398381
Dec-24	2024	5.38474639	5.872951313	6.247820546	6.560211573
Jan-25	2025	5.593049377	6.038259431	6.423680246	6.744864258
Feb-25	2025	5.469651569	6.074881325	6.462639707	6.785771693
Mar-25	2025	4.984659223	5.756443462	6.123876023	6.430069824
Apr-25	2025	4.593279795	5.409199679	5.754467744	6.042191131
May-25	2025	4.946040236	5.565455947	5.920697816	6.216732707
Jun-25	2025	5.085703362	5.570225301	5.925771597	6.222060177
Jul-25	2025	5.524372418	5.764358442	6.132296215	6.438911025
Aug-25	2025	5.513016427	5.7592286	6.126838936	6.433180883
Sep-25	2025	5.428394904	5.608398073	5.966380929	6.264699976
Oct-25	2025	5.397006391	5.614321921	5.972682895	6.27131704
Nov-25	2025	5.590020346	5.859619705	6.233637984	6.545319883
Dec-25	2025	5.831547925	6.06961223	6.457034287	6.779886001
Jan-26	2026	6.104427781	6.311294832	6.714143439	7.049850611
Feb-26	2026	5.955673646	6.305148636	6.707604932	7.042985179
Mar-26	2026	5.560501879	6.074871062	6.46262879	6.785760229
Apr-26	2026	5.112935585	5.663563157	6.025067189	6.326320548
May-26	2026	5.777742622	5.905938692	6.282913502	6.597059177
Jun-26	2026	5.932432628	6.048918211	6.435019373	6.756770342
Jul-26	2026	6.269110275	6.313580649	6.716575158	7.052403916
Aug-26	2026	6.243288085	6.346519079	6.751616041	7.089196843
Sep-26	2026	6.12893002	6.185482072	6.580300077	6.90931508
Oct-26	2026	6.126511744	6.198181468	6.593810073	6.923500576
Nov-26	2026	6.253563843	6.381103833	6.788408333	7.127828749
Dec-26	2026	6.476158935	6.589051589	7.00962935	7.360110817
Jan-27	2027	6.633107495	6.706315597	7.134378295	7.49109721
Feb-27	2027	6.520175823	6.598862395	7.020066377	7.371069696
Mar-27	2027	6.025198551	6.18261355	6.577248457	6.90611088
Apr-27	2027	5.597062523	5.800371358	6.170607827	6.479138219
May-27	2027	5.867643495	5.946967902	6.326561598	6.642889678
Jun-27	2027	5.892266317	5.945431643	6.32492728	6.641173644
Jul-27	2027	6.171026689	6.216793107	6.613609689	6.944290173
Aug-27	2027	6.151786012	6.236012768	6.634056136	6.965758943
Sep-27	2027	6.036579624	6.131816713	6.523209269	6.849369733
Oct-27	2027	6.053733749	6.14757536	6.539973787	6.866972477
Nov-27	2027	6.245163001	6.38293781	6.790359372	7.129877341
Dec-27	2027	6.465461122	6.572389674	6.991903909	7.341499104

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	MALIN	CASCADE
		AECO HI	MALIN LO	CASCADE	MALIN HI
		FORECAST	FORECAST	FORECAST	FORECAST
		PRICE	PRICE	PRICE	PRICE
Jan-28	2028	6.525373687	6.60903585	7.030889203	7.382433663
Feb-28	2028	6.501756324	6.590076871	7.010720075	7.361256079
Mar-28	2028	6.029213588	6.173058016	6.567082996	6.895437146
Apr-28	2028	5.600796202	5.757777155	6.125294846	6.431559588
May-28	2028	5.896230776	5.978769933	6.360393546	6.678413224
Jun-28	2028	5.920955592	5.977112203	6.358630004	6.676561504
Jul-28	2028	6.144026589	6.228001611	6.625533628	6.95681031
Aug-28	2028	6.120453093	6.236023865	6.634067942	6.965771339
Sep-28	2028	6.039634716	6.144407484	6.536603706	6.863433892
Oct-28	2028	6.046820358	6.150324131	6.542898012	6.870042913
Nov-28	2028	6.338272798	6.474992004	6.888289366	7.232703834
Dec-28	2028	6.566606113	6.68877793	7.115721202	7.471507262
Jan-29	2029	6.68661817	6.764690997	7.196479784	7.556303773
Feb-29	2029	6.704909699	6.778729764	7.211414642	7.571985374
Mar-29	2029	6.247263004	6.381983331	6.78934397	7.128811168
Apr-29	2029	5.805751663	5.954555051	6.334633033	6.651364685
May-29	2029	6.07964178	6.154884127	6.547749072	6.875136525
Jun-29	2029	6.149424198	6.193370553	6.588692078	6.918126682
Jul-29	2029	6.425841135	6.498556056	6.913357507	7.259025382
Aug-29	2029	6.412249325	6.513398533	6.929147376	7.275604744
Sep-29	2029	6.319778038	6.40892203	6.818002159	7.158902267
Oct-29	2029	6.329687142	6.417243131	6.826854394	7.168197114
Nov-29	2029	6.487984245	6.623765133	7.046558652	7.398886585
Dec-29	2029	6.71628283	6.830867733	7.266880567	7.630224595
Jan-30	2030	6.794739501	6.872216804	7.31086894	7.676412387
Feb-30	2030	6.840396481	6.916440639	7.357915573	7.725811352
Mar-30	2030	6.496071097	6.594586029	7.015517052	7.366292904
Apr-30	2030	6.059111566	6.171039018	6.564935125	6.893181882
May-30	2030	6.340510097	6.398375861	6.80678283	7.147121972
Jun-30	2030	6.482228022	6.485796766	6.899783793	7.244772983
Jul-30	2030	6.770086607	6.763611121	7.19533098	7.555097529
Aug-30	2030	6.73528819	6.779219415	7.211935548	7.572532325
Sep-30	2030	6.660819659	6.677171268	7.10337369	7.458542374
Oct-30	2030	6.671262583	6.688130103	7.115032025	7.470783626
Nov-30	2030	6.876986842	6.948554619	7.392079382	7.761683351
Dec-30	2030	7.108970309	7.16861901	7.626190436	8.007499957
Jan-31	2031	7.332384268	7.382224053	7.853429844	8.246101336
Feb-31	2031	7.303166914	7.358885724	7.828601834	8.220031926
Mar-31	2031	6.859377671	6.951355386	7.395058921	7.764811867

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	MALIN	CASCADE
		AECO HI	MALIN LO	CASCADE	MALIN HI
		FORECAST	FORECAST	FORECAST	FORECAST
		PRICE	PRICE	PRICE	PRICE
Apr-31	2031	6.409784294	6.515017473	6.930869652	7.277413134
May-31	2031	6.716118881	6.760840479	7.192383489	7.552002663
Jun-31	2031	6.747584693	6.765932826	7.197800879	7.557690923
Jul-31	2031	7.068575739	7.064884336	7.5158344	7.89162612
Aug-31	2031	7.029825712	7.07714454	7.528877171	7.905321029
Sep-31	2031	6.998498781	7.025434816	7.473866825	7.847560166
Oct-31	2031	7.047007292	7.070596272	7.521910928	7.898006475
Nov-31	2031	7.502398187	7.553584975	8.035728697	8.437515132
Dec-31	2031	7.753837139	7.789667296	8.286880102	8.701224107
Jan-32	2032	7.691372404	7.744105066	8.238409645	8.650330127
Feb-32	2032	5.011776144	5.051022887	5.373428604	5.642100034
Mar-32	2032	4.944928275	4.995461823	5.314321089	5.580037143
Apr-32	2032	4.527783539	4.570433593	4.862163397	5.105271567
May-32	2032	4.909651217	4.958161832	5.274640247	5.538372259
Jun-32	2032	4.976853403	5.020250935	5.340692484	5.607727108
Jul-32	2032	4.997162166	5.033575421	5.354867469	5.622610843
Aug-32	2032	5.000690783	5.030717713	5.351827354	5.619418721
Sep-32	2032	4.971232763	4.99894298	5.318024447	5.58392567
Oct-32	2032	5.034341898	5.053622832	5.376194502	5.645004227
Nov-32	2032	5.118263636	5.218439181	5.551531044	5.829107596
Dec-32	2032	5.271627227	5.339515857	5.680336018	5.964352819
Jan-33	2033	8.16904261	8.214690989	8.739032967	9.175984616
Feb-33	2033	8.062320361	8.115130884	8.633117961	9.06477386
Mar-33	2033	7.955034867	8.025897519	8.53818885	8.965098292
Apr-33	2033	7.285755966	7.34469488	7.813505191	8.204180451
May-33	2033	7.900283932	7.967787617	8.476369805	8.900188296
Jun-33	2033	8.008277536	8.067532496	8.582481379	9.011605448
Jul-33	2033	8.04077835	8.088904485	8.605217537	9.035478414
Aug-33	2033	8.046296665	8.084275924	8.600293536	9.030308213
Sep-33	2033	7.998844401	8.033202368	8.545959966	8.973257964
Oct-33	2033	8.100170268	8.121022074	8.639385185	9.071354445
Nov-33	2033	8.234788524	8.384172797	8.919332763	9.365299401
Dec-33	2033	8.480791853	8.578608009	9.126178733	9.58248767
Jan-34	2034	8.570470176	8.607632582	9.157055938	9.614908735
Feb-34	2034	8.458611134	8.50332419	9.046089564	9.498394042
Mar-34	2034	8.34631217	8.409856267	8.946655603	9.393988383
Apr-34	2034	7.645970664	7.697790241	8.189138554	8.598595482
May-34	2034	8.290939765	8.350851331	8.883884394	9.328078614
Jun-34	2034	8.404124705	8.455357822	8.995061513	9.444814588

GAS SUPPLY 20 YEAR P

PERIOD	YEAR	CASCADE	CASCADE	MALIN	CASCADE
		AECO HI	MALIN LO	CASCADE	MALIN HI
		FORECAST	FORECAST	FORECAST	FORECAST
		PRICE	PRICE	PRICE	PRICE
Jul-34	2034	8.438047609	8.477715294	9.018846057	9.46978836
Aug-34	2034	8.443673442	8.472826664	9.013645388	9.464327657
Sep-34	2034	8.39382258	8.419285825	8.956687048	9.4045214
Oct-34	2034	8.49992572	8.51127467	9.054547521	9.507274897
Nov-34	2034	8.640762628	8.785304029	9.346068116	9.813371522
Dec-34	2034	8.898123677	8.988946499	9.562709042	10.04084449
Jan-35	2035	8.942462006	8.970185533	9.542750567	10.0198881
Feb-35	2035	8.825858628	8.861498193	9.427125737	9.898482024
Mar-35	2035	8.708951778	8.764128299	9.323540743	9.78971778
Apr-35	2035	7.980093468	8.023845348	8.536005689	8.962805973
May-35	2035	8.653307228	8.704581781	9.260193384	9.723203054
Jun-35	2035	8.771285881	8.813480194	9.37604276	9.844844898
Jul-35	2035	8.806500904	8.836741381	9.400788704	9.870828139
Aug-35	2035	8.812202345	8.831606965	9.395326559	9.865092887
Sep-35	2035	8.760118962	8.775785998	9.335942551	9.802739679
Oct-35	2035	8.870619429	8.871616786	9.437890198	9.909784708
Nov-35	2035	9.01716078	9.155425729	9.739814605	10.22680534
Dec-35	2035	9.284939408	9.367549321	9.965478001	10.4637519

Forecast Source Weights

Period	Current		WOOD	
	NYMEX	NWPCC	MAC	EIA
Jan-15	60.000%	0.000%	25.000%	15.000%
Feb-15	60.000%	0.000%	25.000%	15.000%
Mar-15	60.000%	0.000%	25.000%	15.000%
Apr-15	60.000%	0.000%	25.000%	15.000%
May-15	60.000%	0.000%	25.000%	15.000%
Jun-15	60.000%	0.000%	25.000%	15.000%
Jul-15	60.000%	0.000%	25.000%	15.000%
Aug-15	60.000%	0.000%	25.000%	15.000%
Sep-15	60.000%	0.000%	25.000%	15.000%
Oct-15	60.000%	0.000%	25.000%	15.000%
Nov-15	60.000%	0.000%	25.000%	15.000%
Dec-15	60.000%	0.000%	25.000%	15.000%
Jan-16	30.000%	0.000%	35.000%	35.000%
Feb-16	30.000%	0.000%	35.000%	35.000%
Mar-16	30.000%	0.000%	35.000%	35.000%
Apr-16	30.000%	0.000%	35.000%	35.000%
May-16	30.000%	0.000%	35.000%	35.000%
Jun-16	30.000%	0.000%	35.000%	35.000%
Jul-16	30.000%	0.000%	35.000%	35.000%
Aug-16	30.000%	0.000%	35.000%	35.000%
Sep-16	30.000%	0.000%	35.000%	35.000%
Oct-16	30.000%	0.000%	40.000%	30.000%
Nov-16	30.000%	0.000%	40.000%	30.000%
Dec-16	30.000%	0.000%	40.000%	30.000%
Jan-17	15.000%	0.000%	40.000%	45.000%
Feb-17	15.000%	0.000%	40.000%	45.000%
Mar-17	15.000%	0.000%	40.000%	45.000%
Apr-17	15.000%	0.000%	40.000%	45.000%
May-17	15.000%	0.000%	40.000%	45.000%
Jun-17	15.000%	0.000%	40.000%	45.000%
Jul-17	15.000%	0.000%	40.000%	45.000%
Aug-17	15.000%	0.000%	40.000%	45.000%
Sep-17	15.000%	0.000%	40.000%	45.000%
Oct-17	15.000%	0.000%	40.000%	45.000%
Nov-17	15.000%	0.000%	40.000%	45.000%
Dec-17	15.000%	0.000%	40.000%	45.000%
Jan-18	15.000%	0.000%	40.000%	45.000%
Feb-18	30.000%	0.000%	40.000%	30.000%
Mar-18	30.000%	0.000%	40.000%	30.000%
Apr-18	30.000%	0.000%	40.000%	30.000%
May-18	30.000%	0.000%	40.000%	30.000%
Jun-18	30.000%	0.000%	40.000%	30.000%
Jul-18	30.000%	0.000%	40.000%	30.000%

Forecast Source Weights

Period	Current		WOOD	
	NYMEX	NWPCC	MAC	EIA
Aug-18	30.000%	0.000%	40.000%	30.000%
Sep-18	30.000%	0.000%	40.000%	30.000%
Oct-18	30.000%	0.000%	40.000%	30.000%
Nov-18	30.000%	0.000%	40.000%	30.000%
Dec-18	30.000%	0.000%	40.000%	30.000%
Jan-19	20.000%	0.000%	40.000%	40.000%
Feb-19	20.000%	0.000%	40.000%	40.000%
Mar-19	20.000%	0.000%	40.000%	40.000%
Apr-19	20.000%	0.000%	40.000%	40.000%
May-19	20.000%	0.000%	40.000%	40.000%
Jun-19	20.000%	0.000%	40.000%	40.000%
Jul-19	20.000%	0.000%	40.000%	40.000%
Aug-19	20.000%	0.000%	40.000%	40.000%
Sep-19	20.000%	0.000%	40.000%	40.000%
Oct-19	20.000%	0.000%	40.000%	40.000%
Nov-19	20.000%	0.000%	40.000%	40.000%
Dec-19	20.000%	0.000%	40.000%	40.000%
Jan-20	10.000%	0.000%	40.000%	50.000%
Feb-20	10.000%	0.000%	40.000%	50.000%
Mar-20	10.000%	0.000%	40.000%	50.000%
Apr-20	10.000%	0.000%	40.000%	50.000%
May-20	10.000%	0.000%	40.000%	50.000%
Jun-20	10.000%	0.000%	40.000%	50.000%
Jul-20	10.000%	0.000%	40.000%	50.000%
Aug-20	10.000%	0.000%	40.000%	50.000%
Sep-20	10.000%	0.000%	40.000%	50.000%
Oct-20	10.000%	0.000%	40.000%	50.000%
Nov-20	10.000%	0.000%	40.000%	50.000%
Dec-20	10.000%	0.000%	40.000%	50.000%
Jan-21	0.000%	0.000%	50.000%	50.000%
Feb-21	0.000%	0.000%	50.000%	50.000%
Mar-21	0.000%	0.000%	50.000%	50.000%
Apr-21	0.000%	0.000%	50.000%	50.000%
May-21	0.000%	0.000%	50.000%	50.000%
Jun-21	0.000%	0.000%	50.000%	50.000%
Jul-21	0.000%	0.000%	50.000%	50.000%
Aug-21	0.000%	0.000%	50.000%	50.000%
Sep-21	0.000%	0.000%	50.000%	50.000%
Oct-21	0.000%	0.000%	50.000%	50.000%
Nov-21	0.000%	0.000%	50.000%	50.000%
Dec-21	0.000%	0.000%	50.000%	50.000%
Jan-22	0.000%	0.000%	50.000%	50.000%
Feb-22	0.000%	0.000%	50.000%	50.000%

Forecast Source Weights

Period	Current		WOOD	
	NYMEX	NWPCC	MAC	EIA
Mar-22	0.000%	0.000%	50.000%	50.000%
Apr-22	0.000%	0.000%	50.000%	50.000%
May-22	0.000%	0.000%	50.000%	50.000%
Jun-22	0.000%	0.000%	50.000%	50.000%
Jul-22	0.000%	0.000%	50.000%	50.000%
Aug-22	0.000%	0.000%	50.000%	50.000%
Sep-22	0.000%	0.000%	50.000%	50.000%
Oct-22	0.000%	0.000%	50.000%	50.000%
Nov-22	0.000%	0.000%	50.000%	50.000%
Dec-22	0.000%	0.000%	50.000%	50.000%
Jan-23	0.000%	0.000%	50.000%	50.000%
Feb-23	0.000%	0.000%	50.000%	50.000%
Mar-23	0.000%	0.000%	50.000%	50.000%
Apr-23	0.000%	0.000%	50.000%	50.000%
May-23	0.000%	0.000%	50.000%	50.000%
Jun-23	0.000%	0.000%	50.000%	50.000%
Jul-23	0.000%	0.000%	50.000%	50.000%
Aug-23	0.000%	0.000%	50.000%	50.000%
Sep-23	0.000%	0.000%	50.000%	50.000%
Oct-23	0.000%	0.000%	50.000%	50.000%
Nov-23	0.000%	0.000%	50.000%	50.000%
Dec-23	0.000%	0.000%	50.000%	50.000%
Jan-24	0.000%	0.000%	50.000%	50.000%
Feb-24	0.000%	0.000%	50.000%	50.000%
Mar-24	0.000%	0.000%	50.000%	50.000%
Apr-24	0.000%	0.000%	50.000%	50.000%
May-24	0.000%	0.000%	50.000%	50.000%
Jun-24	0.000%	0.000%	50.000%	50.000%
Jul-24	0.000%	0.000%	50.000%	50.000%
Aug-24	0.000%	0.000%	50.000%	50.000%
Sep-24	0.000%	0.000%	50.000%	50.000%
Oct-24	0.000%	0.000%	50.000%	50.000%
Nov-24	0.000%	0.000%	50.000%	50.000%
Dec-24	0.000%	0.000%	50.000%	50.000%
Jan-25	0.000%	0.000%	50.000%	50.000%
Feb-25	0.000%	0.000%	50.000%	50.000%
Mar-25	0.000%	0.000%	50.000%	50.000%
Apr-25	0.000%	0.000%	50.000%	50.000%
May-25	0.000%	0.000%	50.000%	50.000%
Jun-25	0.000%	0.000%	50.000%	50.000%
Jul-25	0.000%	0.000%	50.000%	50.000%
Aug-25	0.000%	0.000%	50.000%	50.000%
Sep-25	0.000%	0.000%	50.000%	50.000%

Forecast Source Weights

Period	Current		WOOD	
	NYMEX	NWPCC	MAC	EIA
Oct-25	0.000%	0.000%	50.000%	50.000%
Nov-25	0.000%	0.000%	50.000%	50.000%
Dec-25	0.000%	0.000%	50.000%	50.000%
Jan-26	0.000%	0.000%	50.000%	50.000%
Feb-26	0.000%	0.000%	50.000%	50.000%
Mar-26	0.000%	0.000%	50.000%	50.000%
Apr-26	0.000%	0.000%	50.000%	50.000%
May-26	0.000%	0.000%	50.000%	50.000%
Jun-26	0.000%	0.000%	50.000%	50.000%
Jul-26	0.000%	0.000%	50.000%	50.000%
Aug-26	0.000%	0.000%	50.000%	50.000%
Sep-26	0.000%	0.000%	50.000%	50.000%
Oct-26	0.000%	0.000%	50.000%	50.000%
Nov-26	0.000%	0.000%	50.000%	50.000%
Dec-26	0.000%	0.000%	50.000%	50.000%
Jan-27	0.000%	0.000%	50.000%	50.000%
Feb-27	0.000%	0.000%	50.000%	50.000%
Mar-27	0.000%	0.000%	50.000%	50.000%
Apr-27	0.000%	0.000%	50.000%	50.000%
May-27	0.000%	0.000%	50.000%	50.000%
Jun-27	0.000%	0.000%	50.000%	50.000%
Jul-27	0.000%	0.000%	50.000%	50.000%
Aug-27	0.000%	0.000%	50.000%	50.000%
Sep-27	0.000%	0.000%	50.000%	50.000%
Oct-27	0.000%	0.000%	50.000%	50.000%
Nov-27	0.000%	0.000%	50.000%	50.000%
Dec-27	0.000%	0.000%	50.000%	50.000%
Jan-28	0.000%	0.000%	50.000%	50.000%
Feb-28	0.000%	0.000%	50.000%	50.000%
Mar-28	0.000%	0.000%	50.000%	50.000%
Apr-28	0.000%	0.000%	50.000%	50.000%
May-28	0.000%	0.000%	50.000%	50.000%
Jun-28	0.000%	0.000%	50.000%	50.000%
Jul-28	0.000%	0.000%	50.000%	50.000%
Aug-28	0.000%	0.000%	50.000%	50.000%
Sep-28	0.000%	0.000%	50.000%	50.000%
Oct-28	0.000%	0.000%	50.000%	50.000%
Nov-28	0.000%	0.000%	50.000%	50.000%
Dec-28	0.000%	0.000%	50.000%	50.000%
Jan-29	0.000%	0.000%	50.000%	50.000%
Feb-29	0.000%	0.000%	50.000%	50.000%
Mar-29	0.000%	0.000%	50.000%	50.000%
Apr-29	0.000%	0.000%	50.000%	50.000%

Forecast Source Weights

Period	Current		WOOD	
	NYMEX	NWPCC	MAC	EIA
May-29	0.000%	0.000%	50.000%	50.000%
Jun-29	0.000%	0.000%	50.000%	50.000%
Jul-29	0.000%	0.000%	50.000%	50.000%
Aug-29	0.000%	0.000%	50.000%	50.000%
Sep-29	0.000%	0.000%	50.000%	50.000%
Oct-29	0.000%	0.000%	50.000%	50.000%
Nov-29	0.000%	0.000%	50.000%	50.000%
Dec-29	0.000%	0.000%	50.000%	50.000%
Jan-30	0.000%	0.000%	50.000%	50.000%
Feb-30	0.000%	0.000%	50.000%	50.000%
Mar-30	0.000%	0.000%	50.000%	50.000%
Apr-30	0.000%	0.000%	50.000%	50.000%
May-30	0.000%	0.000%	50.000%	50.000%
Jun-30	0.000%	0.000%	50.000%	50.000%
Jul-30	0.000%	0.000%	50.000%	50.000%
Aug-30	0.000%	0.000%	50.000%	50.000%
Sep-30	0.000%	0.000%	50.000%	50.000%
Oct-30	0.000%	0.000%	50.000%	50.000%
Nov-30	0.000%	0.000%	50.000%	50.000%
Dec-30	0.000%	0.000%	50.000%	50.000%
Jan-31	0.000%	0.000%	50.000%	50.000%
Feb-31	0.000%	0.000%	50.000%	50.000%
Mar-31	0.000%	0.000%	50.000%	50.000%
Apr-31	0.000%	0.000%	50.000%	50.000%
May-31	0.000%	0.000%	50.000%	50.000%
Jun-31	0.000%	0.000%	50.000%	50.000%
Jul-31	0.000%	0.000%	50.000%	50.000%
Aug-31	0.000%	0.000%	50.000%	50.000%
Sep-31	0.000%	0.000%	50.000%	50.000%
Oct-31	0.000%	0.000%	50.000%	50.000%
Nov-31	0.000%	0.000%	50.000%	50.000%
Dec-31	0.000%	0.000%	50.000%	50.000%
Jan-32	0.000%	0.000%	0.000%	100.000%
Feb-32	0.000%	0.000%	0.000%	100.000%
Mar-32	0.000%	0.000%	0.000%	100.000%
Apr-32	0.000%	0.000%	0.000%	100.000%
May-32	0.000%	0.000%	0.000%	100.000%
Jun-32	0.000%	0.000%	0.000%	100.000%
Jul-32	0.000%	0.000%	0.000%	100.000%
Aug-32	0.000%	0.000%	0.000%	100.000%
Sep-32	0.000%	0.000%	0.000%	100.000%
Oct-32	0.000%	0.000%	0.000%	100.000%
Nov-32	0.000%	0.000%	0.000%	100.000%

Forecast Source Weights

Period	Current		WOOD	
	NYMEX	NWPCC	MAC	EIA
Dec-32	0.000%	0.000%	0.000%	100.000%
Jan-33	0.000%	0.000%	0.000%	100.000%
Feb-33	0.000%	0.000%	0.000%	100.000%
Mar-33	0.000%	0.000%	0.000%	100.000%
Apr-33	0.000%	0.000%	0.000%	100.000%
May-33	0.000%	0.000%	0.000%	100.000%
Jun-33	0.000%	0.000%	0.000%	100.000%
Jul-33	0.000%	0.000%	0.000%	100.000%
Aug-33	0.000%	0.000%	0.000%	100.000%
Sep-33	0.000%	0.000%	0.000%	100.000%
Oct-33	0.000%	0.000%	0.000%	100.000%
Nov-33	0.000%	0.000%	0.000%	100.000%
Dec-33	0.000%	0.000%	0.000%	100.000%
Jan-34	0.000%	0.000%	0.000%	100.000%
Feb-34	0.000%	0.000%	0.000%	100.000%
Mar-34	0.000%	0.000%	0.000%	100.000%
Apr-34	0.000%	0.000%	0.000%	100.000%
May-34	0.000%	0.000%	0.000%	100.000%
Jun-34	0.000%	0.000%	0.000%	100.000%
Jul-34	0.000%	0.000%	0.000%	100.000%
Aug-34	0.000%	0.000%	0.000%	100.000%
Sep-34	0.000%	0.000%	0.000%	100.000%
Oct-34	0.000%	0.000%	0.000%	100.000%
Nov-34	0.000%	0.000%	0.000%	100.000%
Dec-34	0.000%	0.000%	0.000%	100.000%
Jan-35	0.000%	0.000%	0.000%	100.000%
Feb-35	0.000%	0.000%	0.000%	100.000%
Mar-35	0.000%	0.000%	0.000%	100.000%
Apr-35	0.000%	0.000%	0.000%	100.000%
May-35	0.000%	0.000%	0.000%	100.000%
Jun-35	0.000%	0.000%	0.000%	100.000%
Jul-35	0.000%	0.000%	0.000%	100.000%
Aug-35	0.000%	0.000%	0.000%	100.000%
Sep-35	0.000%	0.000%	0.000%	100.000%
Oct-35	0.000%	0.000%	0.000%	100.000%
Nov-35	0.000%	0.000%	0.000%	100.000%
Dec-35	0.000%	0.000%	0.000%	100.000%