

Appendix D

Demand Side Management

2018 OR IRP Final

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Introduction

Cascade Natural Gas Corporation has developed this Conservation Plan in consultation with its Conservation Advisory Group (CAG) as a roadmap to the 2017 and 2018 near term conservation strategy for reducing consumption through its Conservation Incentive Programs.

In this second rendition of the Conservation Plan, the Company has completed transitioning from its traditional planning document housed in the Integrated Resource Plan (IRP) to this standalone plan. Several Conservation Advisory Group (CAG) meetings have been held in the past year to clarify the elements of the Company's DSM efforts that stakeholders would like to see addressed in the IRP, and those which are more appropriately housed within the Conservation Plan. As a result, the following allocation of planning information can be found between these two documents:

1) An executive summary of the potential forecasting of the Company's energy-efficiency efforts remains in the Demand Side Management (DSM) chapter of the IRP. 2) General discussion around DSM including environmental externalities, regional energy planning and legislative impacts have also remained a part of the IRP. In contrast, the Conservation Plan places its focus on potential and near-term conservation program planning versus the long term 20 year outlook inherent in the IRP.

The Company's Conservation Plan, provided below, will discuss the potential savings determined for the Cascade Natural Gas Corporation (CNGC) Washington service territory through the Company's TEA-Pot (**T**echnical **E**conomic **A**chievable **P**otential) modeling tool provided by Nexant Inc. In order to parallel the format of Conservation Plans provided by other utilities in Washington State, this document will demonstrate the Company's immediate (two year) conservation goals as well as the 10 year forecast of savings.

The Company is approaching the 2017 Calendar Year as an opportunity to further refine a significantly matured program by incorporating improvements that were introduced in 2016 and will continue into early 2017. Updated elements to the CIP include enhancements to program reporting, increased transparency in potential planning, strategic process development and tracking and the implementation of a new software platform to support in-house residential rebate processing activities. As mentioned in the previous Conservation Plan, the Company transitioned from a third party residential program delivery vendor in January 2016 to an internal delivery model for the residential incentive programs. The Company additionally purchased a companion software platform to enable processing of applications. This significant evolution in the Company's approach to residential program delivery has allowed more direct control of the customer experience throughout the CIP rebate process, while providing greater insight into areas of opportunity for further penetration of the Conservation program throughout our Washington territory. This move toward internal

implementation has enabled the Company to tailor its reporting and tracking to more succinctly align with program strategy. Changes to the Company's program delivery strategy are further described under the [Residential Program Delivery Changes from 2016](#) heading in this document.

Overview

Demand Side Management refers to resources acquired through the reduction of natural gas consumption due to increases in efficiency of energy use and/or load management. Unlike supply side resources, which are purchased directly from a supplier, demand side resources are purchased from individual customers in the form of energy that remains unused as the result of energy efficiency. The Washington Utility and Transportation Commission requires gas utilities to consider cost-effective DSM resources in their energy portfolio on an equal and comparable basis with supply side resources. In the gas industry, DSM resources are conservation measures that include, but are not limited to ceiling, wall and floor insulation, higher efficiency gas appliances, insulated doors, ventilation heat recovery systems and weather stripping. By incenting customers to reduce their demand for gas, Cascade can displace the need to purchase additional gas supplies, displace or delay contracting for incremental pipeline capacity, and possibly displace or delay the need for reinforcements on the Company's distribution system. It's also important to acknowledge the Company can prompt and encourage customers to reduce their use, but in due course it's up to the end user to elect to reduce their usage and recognize the values inherent in energy efficiency - ultimately resulting in reduced consumption and load management as encouraged by Company messaging and incentives.

There are two basic types of demand side resources: baseload resources and heat sensitive resources. Baseload resources displace the need for baseload supply-side resources. They will offset gas supply requirements throughout the year, regardless of the weather and outside conditions. Baseload DSM resources include equipment like high efficiency water heaters, higher efficiency cooking equipment and Ozone Injection Laundry systems. Heating load sensitive DSM resources are measures whose therm savings increase during cold weather (meaning the measure is used more often during colder weather). For example, a high efficiency furnace will lower therm usage in the winter months when the furnace is utilized the most and will provide little if any savings in the summer months when the furnace is rarely used. Examples of heating load sensitive DSM measures include ceiling, floor, and wall insulation measures, high efficiency gas furnaces, and improvements to ducts and air sealing. These types of heat sensitive measures offset more of the peaking or seasonal gas supply resources, which are typically more expensive than baseload supplies.

Program Goals & Budgets– at a glance 2017 & 2018

Table 1
CIP Goals 2017 & 2018

	Calendar Year 2017				Calendar Year 2018			
	Residential	Commercial Industrial	Low Income ³	Total	Residential	Commercial Industrial	Low Income ³	Total
Administrative Budget¹	\$550,000	\$1,000,000	\$8,911	\$1,558,911	\$566,500	\$1,03,000	\$8,911	\$1,605,411
Therm Targets²	323,878	515,998	15,000	854,876	331,357	545,217	15,000	891,574
NEEA Natural Gas Market Transformation				\$313,174				\$452,285

¹ Note budgets are estimates and are referring to administrative budgets for program implementation, not rebate payments to customers.

² Therm targets from this graph have been developed through the TEA-Pot modeling tool inclusive of administrative costs. These targets are aspirational targets. The Company will actively work toward achievement of these goals, but it is important to recognize program cost-effectiveness is the primary metric of success

³Following the submission and approval of a revised LI-WIP tariff to the WUTC, Cascade will refine the anticipated therm savings and budgetary targets for the LI program as appropriate

For reference, the Company has provided a comparison of the past three years of achieved overall savings contrasted with the IRP goals below. Please note 2016 achievements will be provided as part of the Company's Annual Conservation Report which is released on June 1 of the following calendar year. It should also be noted 2014 IRP goals were not officially acknowledged by the WUTC. The last set of acknowledged goals was provided as part of the 2012 IRP. The 2012 IRP goals for CY 2015 (843,000 therms) and CY 2016 (927,000 therms) were developed prior to the development of the Company's TEA-Pot model. Use of the TEA-Pot modeling tool has enabled the Company to significantly refine the forecast inputs to reflect the Company's distinct customer service territory.

Table 2
Historic Program Achievements compared to Goal

	Year	Goal	Actual	Difference
2012 IRP	2013	510,511	471,431	-8%
	2014	566,150	641,615	13%
2014 IRP	2015	584,449	831,501	42%
	2016	620,020	Not yet available	Not yet available

Program Cost Effectiveness

Conservation program offerings are affected by declines and increases in the costs of natural gas in the marketplace. A decrease in the cost of gas makes it difficult to maintain

robust conservation programs as a utility, whereas gas price increases make conservation efforts more viable from a cost/benefit perspective. Despite these ongoing considerations, the Company continues its commitment to offering meaningful conservation programs to help drive customer decisions toward higher-efficiency appliances and upgrades. In CY 2013/2014 the Company had a fully customized Conservation Potential Assessment performed by Nexant Inc. which specifically included analysis on its potential from both the Total Resource Cost (TRC) test, and Utility Cost Test (UCT). While the Company had previously assessed program cost effectiveness under both tests, this was the first time the Company utilized both the TRC and UCT at the potential modeling phase of program development. This approach reflected guidance from the UG-121207 Conservation Policy Statement from the Washington Utility and Transportation Commission (WUTC), which stated program valuation under the UCT was acceptable in the absence of a fully refined and sophisticated TRC instrument. The Company held multiple discussions with its CAG related to the policy statement, and ultimately move towards the UCT as its primary valuation metric, with TRC as its secondary. This alteration allowed the Company to maintain its Washington programs despite fluctuations in the cost of gas, while recognizing the value of the efforts from a utility provider's perspective of decreasing demand.

Docket UG-121207 Policy Statement on the Evaluation of the Cost-Effectiveness of Natural Gas Conservation Programs

The Policy statement, released in October 2013, provided the Company with guidance on evaluating the cost effectiveness of its natural gas conservation programs. As per the policy's guidelines the Company elected to utilize the UCT in consultation with its CAG. The use of the UCT, as opposed to the traditional TRC method, allows the Company to maintain a continued, robust conservation portfolio of measures.

Washington Utilities and Transportation Commission Docket UG-121207 offers guidance regarding the optimal method for the valuation of natural gas conservation efforts in the State of Washington. This document thoroughly addresses best practices for measuring cost-effectiveness as reflected in WUTC's guidance that: "[W]e are unwilling to allow utilities to end natural gas conservation programs as a result of an unbalanced or incomplete TRC analysis. Any TRC analysis without these values [conservation's risk reduction value, the downward price pressure from reduced demand, and non-energy benefits] is potentially biased against conservation programs. Accordingly, the UCT is an acceptable option when a properly balanced TRC is not available."¹

The Policy statement also addressed the use of discount rates in cost-effectiveness calculations. The Company has worked closely with its CAG to determine the appropriate

¹ Washington Utilities and Transportation Docket UG-121207 – Policy Statement on the Evaluation of the Cost-Effectiveness of Natural Gas Conservation Programs pg. 14-15

rate to use when calculating the net present value of its annual costs and benefits from the conservation programs. It was determined Cascade would initially use the long-term discount rate as had previously been used to enable the programs to remain in place at their existing levels and to prevent removal of a significant amount of measures due to a severe discounting scenario, as would have been the case had the Company utilized the Weighted Average Cost of Capital (WACC). As part of the Company's efforts to maintain consistency throughout its forecasting efforts and IRP documentation, the Company has transitioned to using the average 30 Year Mortgage Rate as the long term discount rate – which will be reevaluated annually as part of the Company's IRP process. For 2016, the long term discount rate used is 3.52%.

Measure Updates

As the energy efficiency market continues to develop and cost-effective conservation technologies become increasingly available, the equipment standards and accessibility to such measures will evolve over time. In order to ensure the Company's DSM offerings stay current, Cascade engages in a regular review of the measure-mix within its conservation portfolio. Measures are added, removed, replaced, or modified when it is determined new technologies of equal or greater cost-effectiveness are available to the market. However, the emergence of a high-performance natural gas conservation technology will only have positive energy-savings impacts if customers are willing to pay the initial higher costs associated with the purchase and installation of cutting edge efficiency measures. Therefore market transformation efforts are essential to increasing accessibility to purchasers while decreasing costs to the consumer. This paves the way for future higher-efficiency choices and actions. By monitoring and updating the measures and incentive levels within Cascade's Conservation Incentive Program (CIP), and amplifying the education and awareness outreach to customers, the Company can ensure ratepayers have access to an optimal level of behavior-motivating incentives and knowledge needed to encourage the purchase of cutting-edge, cost effective, gas conservation technologies with confidence they will accrue to advantages of increased efficiency. In conjunction with monitoring the viability of more "traditional" natural gas conservation measures, the Company engages in concurrent efforts to research and determine the feasibility of emerging high-efficiency gas technologies. The Company continues to monitor cutting edge measures and has made progress on this front thanks to the reassessment of the Company's conservation potential in CY 2013/2014 by Nexant. More details regarding both sets of efforts can be found below. Further discussion about the Nexant Conservation Potential study and Cascade's approach to the UCT will be provided in detail later in this plan.

Emerging Technologies

The Company evaluates emerging technologies with strong potential for deeper natural gas

savings. Such high performance measures include energy-efficient Natural Gas Heat Pumps (GHP) which have been identified as a promising and high-impact conservation measure by Oakridge National Laboratories.

Along with the natural gas heat pumps for use in commercial space heating applications as noted above, the Company continues the process of gathering more information regarding Gas-fired Heat Pump Water Heaters. This technology has been identified by the Northwest Energy Efficiency Alliance (NEEA) as a potentially viable technology with costs in a similar range to electric models currently available on the market.

Utility support for technologies like those noted above is important in the industry to demonstrate to manufacturers there is interest in supporting deployment through rate payer funded efficiency programs. The more interest displayed in emerging technologies, the more likely manufacturers are to increase production and market availability.

As mentioned previously, the Company is deeply invested in market transformation and has elected to partner through NEEA with other gas utilities in the region to participate in the first Regional Gas Market Transformation Collaborative in the nation. The goal is to increase market adoption of energy-efficient natural gas products and practices in the future. As part of the project the Collaborative is working toward creating pilots for five distinct technologies. Their goal is to increase the uptake and availability of these technologies in their members' collective service territory in the Northwest. They also seek to improve cost effectiveness of these natural gas technologies. This five year effort started in 2015 and should result in increased savings as the technology is adapted and uptake increases in future years for upgrades including residential natural gas ENERGY STAR[®] dryers and commercial condensing natural gas rooftop units (RTUs).

Already, Cascade's partnership with NEEA has proven beneficial to identifying opportunities for market transformation, standardization of ratings, and consumer education on available natural gas efficiency technologies. During a focus group discussion around natural gas dryers, it became apparent there is a significant lack of consumer awareness pertaining to natural gas dryers and their potential for energy savings. It was further discovered the residential marketplace does not currently provide a wide variety of high-efficiency natural gas ENERGY STAR dryers. NEEA has identified a need to improve the standardized testing processes for achieving an ENERGY STAR rating on residential natural gas dryers while increasing the performance of many of the models to a level commensurate with consumer expectations.

In 2016, NEEA engaged in the first set of pilots pertaining to the rooftop units which included installation of a test unit in Cascade's territory in Union Gap. Cascade, along with the other

funding partners, was instrumental in having the rooftop unit efforts prioritized. Feedback from NEEA and direct observation in the field has suggested that Cascade's service area could greatly benefit from high-efficiency alternatives to the standard RTUs currently used throughout commercial building stock in Cascade's service territory. The review and data collection process for these efforts will continue throughout the 2016/2017 winter season. Continued focus on the role of RTU's and other relevant technologies in Cascade's service area attests to the direct correlation to, and benefit from, the regional efforts partially funded by Cascade's rate payers.

Market Transformation efforts are a key element in increasing accessibility of new technologies to the region. The NEEA collaborative meets on a regular basis to discuss results and next steps of its pilot efforts in order to move toward these goals. It is important to recognize, however, that potential savings from market transformation are not realized immediately. Savings are achieved in future years once the market is able to support the higher-efficiency options and increased customer demand resulting in more advanced technological improvements. Cascade is committed to the continued partnership throughout the five year contract and The Company looks forward to 2017 and 2018 reviews of new technology that come as part of the regular discussions. A mid-cycle evaluation of the Collaborative's efforts will also occur in 2017 which will enable further refinements of next steps.

Cascade continues to participate with the Gas Technology Institute (GTI) Emerging Technology Program to evaluate new technological opportunities as they enter the market. Through these efforts, the Company will continue to stay apprised of proven cutting-edge efficiency options with significant savings potential for customers.

Potential DSM Measures and Their Costs

In order to understand the impact declining costs can have on the programmatic potential of natural gas conservation programs, it is important to understand how these programs work. Utility-run energy efficiency programs are designed to encourage the use of high-efficiency natural gas equipment and measures. The Avoided Cost of natural gas is the threshold used to verify if the amount paid by the utility is reasonable.

In short, a utility should not pay more than 100% of the avoided cost of a measure. Likewise, it is considered general industry best practice that a rebate should be no lower than around 1/3 the incremental cost of the measure, nor higher than is necessary to achieve maximum anticipated participation. This helps the utility avoid both the risk of free ridership and the hazards of skewing program cost effectiveness and triggering the law of diminishing returns by paying beyond the level of an appropriate market signal.

As of the latest IRP, Cascade is able to pursue a combined Residential and Commercial/Industrial conservation portfolio with a total avoided cost range of \$5.19 per dekatherm in 2017 to \$7.18 in 2037.

Utilizing the UCT, Company program management set the rebate thresholds to achieve an optimal balance between driving program participation and ensuring a broad breadth and depth of measures. The program incentive levels are frequently reviewed with the Conservation Advisory Group, most recently in July 2016, which resulted in current program offerings referenced here as of the time of writing for this Conservation Plan.

The Utility Cost Test is the preferred valuation of these measures since it is a straightforward and clean calculation of the utility's investment in Demand Side Management and does not penalize customers for making independent determinations regarding the cost-benefit of an energy efficiency upgrade. The UCT instead treats the rebate from utility run natural gas efficiency programs as a leveraged partnership that drives positive market change and the installation of measures with the potential for long-lived and deeper energy savings.

In addition to the use of the Utility Cost Test, in 2014 the Company discussed with its Conservation Advisory Group and Staff the continuation of using its Long-Term Discount Rate of 4.17% to allow longer-lived measures to continue to thrive within its portfolio and prevent reductions and/or slowed momentum as a result of migrating the programs to the WACC. For the 2016 IRP, the Company is using the average 30 Year Mortgage Rate as mentioned earlier as its long term discount rate. For 2016, the long term discount rate is 3.52%. For context, an increased or higher discount rate lowers the therm savings potential while a lower discount rate raises the potential therm savings.

Based on the changes to avoided costs and the continued evolution of building codes and conservation technologies, and in light of the Policy Statement issued through UG 121207, the Company commissioned a study in 2013 to comprehensively reassess its conservation potential and perform evaluation, measurement and verification on previous conservation efforts performed through the Conservation Incentive Program (CIP). This study was noted as a commitment in the Company's 2012 IRP Action Plan. Cascade recognizes the study may require updating near the completion of the 2018 CY in order to maintain relevance.

Assessment of Cascade's Conservation Potential and EM&V Study

As of 2014 the Company discontinued use of its outdated potential assessment study by Stellar/Ecotope and adopted an updated and refined comprehensive reassessment of its potential performed by Nexant Inc. Because of the revised study performed by Nexant, the Company now has a much more nuanced understanding of its conservation potential and

is able to further refine and more accurately develop conservation targets and portfolios to optimize energy savings in its Washington service territory. The study provided new insights into the Company's overall technical, economic, and achievable potential. The vendor noted actual program potential (the on-the-ground portfolio based program offerings) was excluded from this study, but the vendor did provide guidance to Cascade staff as to how this could be manually developed by their program implementation team. In addition, Nexant provided the Company with a thorough planning tool for use by Cascade in drilling down to more precise conservation targets for IRP and program planning based on the actual measures included in the conservation portfolio.

The primary goal of the Nexant assessment was to develop a comprehensive analysis of technical, economic and achievable potential for natural gas energy efficiency for customers on Washington Rate Schedules 503, 504, 505, 511, 570 & 577 (residential, commercial and non-transport sales industrial customers). This third-party analysis illustrated the remaining savings potential by climate zone, market, segment and end use as a means to inform future program design. The study also integrated a detailed evaluation and measure savings review of Cascade's conservation portfolio. Key objectives of this study included:

- Provided a 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;
- Assessed and validated therm savings associated with key measures that qualified for, and received, a conservation incentive in the 2012 program year, and applied findings to determine realistic therm savings potential in Cascade's Washington Service area;
- Provided a user friendly, executable dynamic model that would support the potential assessment and allow for testing of sensitivity of all model inputs and assumptions;
- Developed a final report including summary data tables and graphs reporting incremental and cumulative potential by year from 2014 through 2034.

The Nexant study estimated energy efficiency savings in the form of technical potential, economic potential, and achievable potential. Market penetration rates were estimated and included in this assessment. Nexant analyzed this potential via a customized Microsoft Excel-based modeling tool, TEA-Pot (**T**echnical/**E**conomic/**A**chievable **P**otential) for the Cascade Conservation Potential Assessment.² This modeling tool was built on a platform

² To review the full study referenced in this section see:

Nexant, Inc. (February 25, 2014). Cascade Natural Gas Corporation, Assessment of Achievable Potential & Program Evaluation Volume 1: Executive Summary, Volume 2: Assessment of Achievable Potential & Program Evaluation, Volume 3: Appendices

that provides the ability to run multiple scenarios and re-calculate potential savings based on variable inputs such as volume, customer and load profile forecasts, natural gas prices, discount rates, transmission loss rates, inflation rates, multiple adoption curves and avoided costs. This model provides Cascade with the utmost transparency into the assumptions and calculations for estimating market potential.

While technical and economic potential are 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 conservation program were included in the Achievable Potential to simulate a realistic estimate of real-life conditions. Again, as stated earlier, program potential (i.e. the subset of achievable potential attainable given constraints on program budget and implemented measures) was not presented in Nexant's report. In 2016, the Company had Nexant enable the ability to include administrative costs in the model, better aligning the achievable level of potential inclusive of costs to realistically implement programs as described below.

Administrative costs and TEA-Pot modeling moving forward

As per Stakeholder and Commission request, the Company moved away from developing a subset of Programmatic Potential below the Achievable level and instead included administrative costs associated with program implementation under the Achievable screen. The TEA-Pot tool developed by Nexant has the capability of factoring the administrative costs into the modeling, but as this was not the initial intent when the model was activated for Cascade, it was not initially enabled. The Company requested Nexant activate this feature in 2015 in order to include administrative costs as an input in the model. The model now provides forecasts inclusive of the administrative costs and will be used in estimates of potential for the full forecast horizon in this Plan.

Please note, the Company maintains the Achievable potential (with administrative costs included) will still be an *aspirational* goal (especially as it relates to the residential program) and believes it does not provide the same level of refinement to goal setting as can be performed at a program implementer level. Having said that, this method does allow the Company to set future goals commensurate with the Achievable level through the modeling tool, while increasing transparency.

The following section elaborates on the methods used by the TEA-Pot model to develop the three levels of Potential for the programs and subsequent creation of the Company's 2-year plan.

Industry standard cost effectiveness tests as identified in the California Standard Practices Manual, are 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.

Total Resource Cost test (TRC).

This test weighs avoided energy costs and avoided capacity costs for the lifetime of the measure (and non-energy benefits) against the total installed costs and administrative costs incurred by the utility for an energy conservation measure or portfolio to determine if it is in the interests of the customer. It is assumed that a customer's decision to participate in an energy conservation effort is solely economic, and that it is the responsibility of the program administrator to screen-out measures that are expensive as compared to lower efficiency technologies. While the Company did not run the TEA-Pot model under the TRC, annual reporting for the program will include the calculation of cost effectiveness under a TRC for reference as per UG-121207.

Utility Cost Test (UCT).

The benefits in this test are the avoided energy costs and avoided capacity costs for the lifetime of the measure, the same as the TRC benefits. The costs in this test are the program administrator's incentive costs and administrative costs. Under this test, the customer is considered a rational actor who may assign multiple forms of value to an energy conservation purchase. The cost of the measure is not taken into consideration, thus allowing for higher-cost measures with deep, long-term energy savings potential to achieve deeper market transformation.

Cost effectiveness was measured under a base-case scenario of Cascade's current avoided costs used in the most recent iteration of the 2016 IRP which is in review status now, along with an incentive rate near 30% for most measures and 50% for a screened select set of measures. The Company will further discuss opportunities for altering incentive rates later in this plan. Inputs can be altered within the TEA-Pot model and updated by the Company on an ongoing basis as appropriate.

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. In its final report to the Company, Nexant offered the Company control totals to which all energy usage was calibrated in the base year of the study and then forecasted while using the same three climate zones the Company has used in the past for calculating its potential. This resulted in a calculation of total natural gas consumption by eligible residential, commercial and industrial customers in Cascade's Washington service territory.

Table 3

Washington Conservation Climate Zones by District		
Zone 1	Zone 2	Zone 3
• Bellingham	• Aberdeen	• Sunnyside
• Mount Vernon	• Bremerton	• Tri-Cities
	• Longview	• Walla Walla
		• Wenatchee
		• Yakima

Energy Efficiency Portfolio Development

Cascade's energy efficiency potential model was developed by Nexant in 2013. Based on measures screened through the initial run of the TEA-Pot model for the study, Cascade's forecast was rerun under the following main assumptions for the 2016 IRP and Conservation Plan:

- Measure cost effectiveness screen: Utility Cost Test (UCT)
- Incentive percent of incremental cost (for achievable scenarios): 30% and 50%
- Avoided Costs: Current avoided costs, provided in Appendix H of Cascade's 2016 draft Integrated Resource Plan
- Long Term Discount Rate: The average 30 Year Mortgage Rate, which will be reevaluated annually as part of the Company's IRP process. For 2016, the long term discount rate used is 3.52%.

The high level screens performed under Nexant's baseline conditions yield total Achievable Potential for the Residential, Commercial and Industrial sectors. The summary pages of the study provide a high-level view into what would be *theoretically* possible without concerns from program budgets, administrative costs or regulatory parameters. But in reality, not all measures identified by Nexant remain cost effective under real-world conditions and within the cost-screen thresholds identified in Appendix H of the Company's IRP. When Nexant developed the TEA-Pot model for the Company, they did not enable the model to include administrative costs associated with program implementation (as mentioned previously) – as the intention was to include them at the programmatic potential development level.

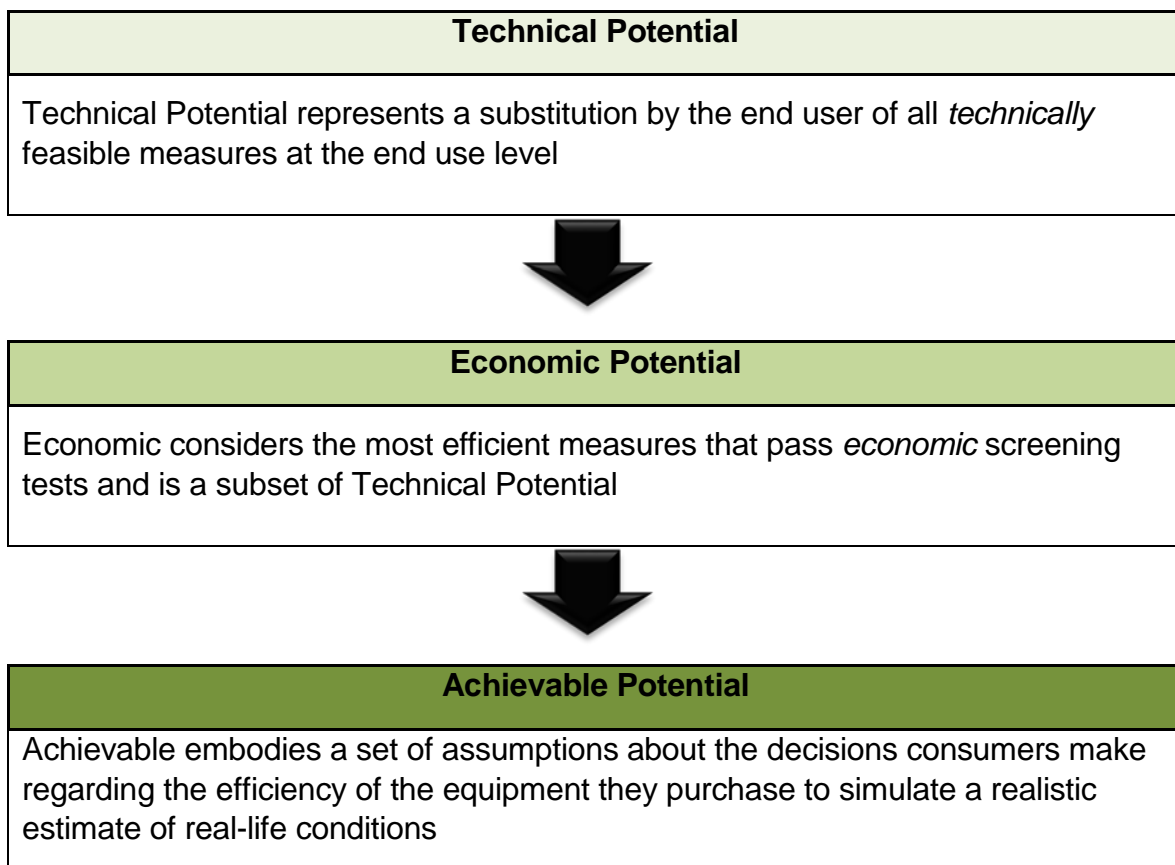
Refinement of the model in 2016 allowed climate zone specific Avoided Costs to be utilized in developing the most granular conservation forecast to date for the company.

Cascade evaluated all of Nexant's original energy saving measures' cost effectiveness by climate zone, market segment, and vintage with 2016 IRP conditions in order to discern which could afford incentive amount increases. The results yielded three groups of measures: Those that were not cost effective at the 30% minimum, those that were cost effective at 30% but could not tolerate an increase, and those that remained cost effective

after an incentive increase to 50% of incremental costs. The Company is planning to file a tariff change by the end of the first quarter of 2017 in order to update its offerings to reflect the most cost-effective mix after a thorough review of actual incremental costs. By doing so, Cascade will be able to send better price signals to customers about energy efficiency options.

A summary of the program planning and TEA-Pot modeling scenarios used by the Company for its Conservation Incentive Program portfolio in the 2016 IRP is included here. Following is a visual representation of the process of narrowing down potential from the Technical to the Achievable level employed by the Company.

Figure 1
Technical, Economic and Achievable Potential



DSM Portfolio Updates and Planning

TEA-Pot provides the Company with a much more nuanced and manageable method to developing its portfolio than was used in the past.

The Company's objectives in developing its rebate offerings center on the desire to:

1. Maximize the inclusiveness of viable, industry-acknowledged conservation measures
2. Maintain incentive levels that send meaningful price signals to consumers to upgrade to high-efficiency natural gas equipment and energy saving measures
3. Remain cost effective at the Company's draft 2016 IRP avoided costs

Below is a brief snapshot of a few of the elements that go into the process by which the Company narrows down its portfolio, in collaboration with its CAG.

Budgeting Parameters

The Company sets 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 the Company's programs. If the budget or therm savings upon which the portfolio is built are unrealistic, there is a risk of developing a scale-dependent portfolio unable to maintain cost effectiveness.

The Company recognizes the need to increase program performance commensurate with higher savings goals. Traditionally it has geared toward a conservative approach when establishing administrative budgets and estimating costs. In fact, the Company repeatedly looked to decrease administrative costs in past program years to offset lower avoided costs and maintain as robust a program portfolio as feasible. In the new realm of increased program achievable goals and expectations the Company took a close look at areas where it could invest more heavily to meet those goals and encourage uptake.

In order to maintain a conservative budget to protect the CIP's cost-effectiveness on the portfolio level, past benefit cost ratios were reviewed in order to determine how much could be available to invest toward increasing program uptake. It was determined under a worst-case-scenario, where therm savings achieved yielded the lowest cost-effectiveness over the past five years (2013), a sufficient buffer existed to both increase the rebate amounts for measures with high enough benefit-cost ratios to 50 percent of incremental costs, as well as bring the Residential delivery in-house in order to improve customer service satisfaction, provide an up-to-date online application processing experience, and allow for faster and more accurate data acquisition.

For example, using the three year average of therm savings achieved (648,000) with the Company's three year average benefit/cost ratio (1.606), under the current Avoided Costs available at the time, as well as an increased 2017 administrative budget, the cushion (which could be used on admin and/or a combination of rebate increases under "costs" in the Utility Cost Test) was approximately \$1.45 million.

In addition, the numbers were explored for the worst case scenario mentioned above. Looking at the lowest performing year (as measured by benefit/cost ratios) 2013 measured 1.306 at a portfolio level, when administrative costs were higher than in 2015 and deemed therm savings achieved were the lowest in six years (471,000). Under this scenario a significant buffer would still exist for increasing administrative efforts by approximately half of the best case cushion noted above.

Utilizing these two scenarios for best and worst cases helped set budget guidelines to determine which investments could yield the greatest potential increases in therm savings for the program. The Company discussed the necessary increase in administrative budgetary costs throughout its CAG meetings in 2015 leading up to implementation of the residential internal program delivery model. The Company continues to monitor the effects of ever changing avoided cost impacts to the CIP's budgetary options.

Incentive Level

The Company is planning to increase some incentive levels to encourage additional uptake from the base 30% level to 50% of incremental costs, where cost-effectiveness permits. It has modeled this scenario in TEA-Pot for 2017 onward under the (administrative cost inclusive) Achievable potential later in this plan for reference. Incentive levels had been previously set to around 30 percent of incremental costs as determined by Nexant and programmatic data.

Targets

TEA-Pot generated targets will be acknowledged in the conservation plan as *aspirational* targets and those which the Company 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 final numbers fall short of that target. See Section [CY 2017-2018 Targets](#) for additional details.

Commercial/Industrial Scenarios

It is important to note that the screen conducted with the TEA-Pot tool and internal valuation mechanism for the Commercial/Industrial sector was performed to assess both viable prescriptive and custom measures' potential, thus reflecting inclusion of all available measures from Nexant's Potential Study. For reference, program experience has demonstrated the prescriptive portion of savings from the program is fairly consistent, with an average of around two-thirds of therm savings coming from custom projects. The full program forecast for planning purposes also included the same review of measures by market segment and vintage to allow for a portion of the measures' incentive levels to be increased from 30% to 50%, with the aim of increasing program participation.

Most Recent Program Update

The Company frequently re-evaluates its program offerings in the changing context of avoided costs, building codes and ENERGY STAR updates. This approach is consistent with how technology on the market gradually increases in efficiency (i.e. market transformation). As per UG-152286³ the Company is committed to updating the tariffs for the Conservation program at least once per year. On July 13, 2016 the Company met with its CAG to discuss alterations to the program including removal of a furnace upgrade to the ENERGY STAR whole home bundle, inclusion of the Demand Control Ventilation commercial rebate (as noted in the Company's 2016 Conservation Plan) and revisions to the residential air sealing rebate criteria. The Company submitted these proposed program updates after consultation with its CAG to the WUTC and they were approved with an effective date of October 10th, 2016. See section: [Program Offerings as of October 10th 2016](#) for further detail around the current measures offered through Cascade's programs.

The Company will continue to monitor the state of natural gas conservation technologies within its service territory and make adjustments commensurate with evolving ENERGY STAR standards and code requirements. Cascade will also monitor new and promising technologies available to optimize the use of natural gas in customers' homes. Such measures may include a natural gas heat pump as they become more widespread throughout the market place, or potentially Boiler Pipe Insulation. The Company is also continuing to monitor the residential natural gas furnace standards as well as water heater criteria and will alter the program offerings as standards and building codes change in the next few years.

Residential Program Delivery Changes from 2016

Calendar Year 2016 was a transition year for the Conservation Department as the Company set the stage for expansion of program savings into the next 10 years.

For the past two years, the residential programs had been delivered through a mix of third party implementation and internal program oversight which impaired transparency and data quality and required a high level of Cascade intervention and oversight. In order to pursue a strategic affordable and simplified delivery model the Company began to explore internal conservation program delivery options for its residential program in the summer of 2015, in light of the expiration of the existing vendor contract at the end of the year. Internal delivery allows the Company to manage the customer rebate experience for more efficient rebate processing from start to finish, effective data quality and data management resulting in a best in class customer experience as noted in the most recent JD Edwards survey of midsized gas companies.

³ Washington Utilities and Transportation Commission Docket UG-152286 Order 4, Final Order Approving Settlement Agreement. Page 3-4

The Company also recognized administrative funding and budgets for program implementation needed to increase to accommodate the higher savings targets (see [Budgeting Parameters](#) for further details). Historically, the Company has taken a conservative approach and attempted to reduce administrative budgets as much as possible to accommodate lower gas costs and maintain cost effectiveness of the programs. However, during discussions with the prior residential program delivery vendor the Company came to understand expenses for delivery of the residential programs would increase for 2016 as initial estimates of administrative costs for delivery of the Cascade residential rebate programs by the vendor were not adequate to cover the vendor's costs.

Transitioning to an internal delivery model was not a lower upfront cost option as the decision necessitated adding two internal staff to support residential rebate processing and Trade Ally management. In the long term it will provide customer experience continuity and data management security in future years when taken hand-in-hand with the Nexant software solution.

The Company submitted a request for proposals for an Energy Efficiency incentive software platform which allows customer submission via an online rebate portal. In the summer of 2015 Cascade vetted various software implementation companies to better understand the potential benefits of cloud based software offerings for internal residential program delivery.

In late summer the Company engaged in conversations with its CAG about proposed program delivery changes and advised it would send out an RFP for software support. All RFPs received a response and the current software platform vendor, Nexant Inc., was chosen in November 2015. Work started immediately to customize the Nexant Inc. iDSM Central and iTrade Ally product to Cascade's needs. The program's residential delivery vendor (EGIA) agreed to continue processing residential rebates and work with the Company through the first few months of CY 2016 as their program delivery ramped down and the new software and commensurate internal delivery processes ramped up.

Over the past ten months of internal residential program delivery, it has become apparent internal implementation of the programs has allowed for greater insight into areas to improve the experience for the customer. The more streamlined and frictionless the process to apply, the more likely he or she is to recall the programs positively when making future home and business energy choices, and consequently the more likely to choose higher-efficiency upgrades. The Company has thoroughly reviewed and revised its residential applications and program requirements to remove barriers while increasing ease of submission and maintaining program integrity. Improvements to the process include removal of the "Paid in full" requirement (which allows and encourages equipment financing when appropriate for the customer) as well as increased messaging to contractors to include all relevant install data on the invoice, negating the need for repeat data entry by the customer.

One additional item to note is recognition of the improvements to the program in reviewing and processing of rebate applications with missing data – thereby reducing the amount of “Disqualified” applicants. The Company estimates a reduction in DNQ’d projects by 66%, which could reflect the reality that two-thirds of the projects previously disqualified between May 2013 and January 2016 could have been approved if some additional follow-up had been performed. Previously, the vendor administering the residential programs did not allocate adequate resources toward project follow up, resulting in a significant portion of the residential rebates sitting in limbo awaiting additional data from either contractors or customers to allow the program to either approve or disqualify the submissions. While it is important to acknowledge the onus is ultimately on the customer to provide all required data, it’s also important to contribute to their success and help with what can be a confusing application process (when feasible within administrative budgetary constraints). The in house program provides the technical resources to advise the customer during the pre-purchase decision-making step, facilitating a more informed choice by the customer and less follow up during rebate processing.

Upon transition of the existing files to the Company it was determined a significant portion of the pending applications could be processed and approved if additional administrative time was allocated to the process. While this effort did require a significant amount of time and effort from the internal team to resolve the missing data projects, and unfortunately caused a backlog of newer projects in the process, it has allowed the program to more accurately portray savings associated with equipment and weatherization measures that had already been installed and should be counted toward the program achievements.

During the residential program transition planning phase the Company also began to alter a few key elements of the program administration to increase the timeliness of reporting related to program accomplishments. Supporting the capacity to create a timelier snapshot of current program accomplishments would allow the Company to more nimbly pivot efforts as the need arose and better enable the Company to react to market trends in building construction and efficiency. One of the elements explored was altering the reporting methodology from tracking per Paid Date versus Install Date as discussed in the 2016 Conservation Plan.

Historically, the Company tracked rebate submissions by the date the measure or upgrade was installed at the premise. CAG members requested the Company pursue tracking via the date a rebate was paid rather than the previous install date method to help reduce lag-time in reporting savings. The Company agreed to transition the program reporting model to track savings based on the date the rebate was paid, which makes annual reporting more straightforward and allows the Company to accommodate the earlier submission deadline of June 1st to the Commission each year.

The Company also altered the requirement for submission of rebates to require they be sent to the utility within 90 days of install (as opposed to previous guidelines to submit by March 1

of the following year after install). The combination of these two changes should help the programs avoid the standard influx of rebate applications in the following year, thereby enabling greater transparency into program accomplishments throughout the year.

All program updates and changes have an effect on the savings the Company is able to achieve. These noted changes allow Cascade staff to focus more time on implementing the program and looking toward future outreach opportunities to bring in additional savings.

Outside of the significant updates to the residential program in the past year aimed at achieving increased savings goals, Cascade also increased its administrative support for the Commercial and Industrial Conservation Incentive Program. While the internal staff have been increasing efforts and support, Lockheed Martin, the Commercial program delivery vendor, has significantly increased its support of the program as well by performing additional outreach to commercial and industrial Trade Ally Contractors, and implementing a marketing and outreach campaign to notify customers of available offers while highlighting success stories in the local communities to encourage additional uptake. This is an ongoing effort and will be discussed further under the Outreach section in this plan. It's also relevant to note the increased internal staffing support on the residential side of the program, as well as the investment in the internal software package, positions the Company to grow the commercial program into the future in a variety of ways whether through the existing vendor or through a combination of more robust internal support paired with the expertise of the external vendor's experience and known achievements.

Program Offerings as of October 10th 2016

As suggested above, all items offered at the time of this writing are based on the draft 2016 Integrated Resources Plan, based on the Company's best understanding of avoided costs as outlined in Appendix H and savings assumptions and targets were built from the Nexant Study, TEA-Pot modeling tool and on-the-ground knowledge of Cascade's Washington service area. The Company's conservation portfolios and programs are subject to modification following the acknowledgement of this more recent IRP, and/or following any and all changes to the underlying data or circumstances surrounding the assessment and measurement of program cost-effectiveness. Customer participation levels will be commensurate with a cost-effective natural gas conservation measure mix that Cascade maintains in its portfolio.

Current program offerings for the residential and prescriptive commercial/industrial program can be found on the following pages.

Cascade Natural Gas Conservation Incentive Program Existing & New Homes Incentives

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 Entry (not sliding) Door ¹	$U \leq 0.21$	\$50

Existing Homes Incentives

Energy-Saving Measure	Basic Specifications	Incentive
Floor Insulation ^{1&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 ^{1&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 ^{1&4}	Equal to or greater than R-38, prior condition must not exceed R-18	\$0.30/sq.ft.
Whole House Residential Air Sealing ^{1&4}	Minimum 400 CFM ₅₀ reduction using pre and post blower door testing ⁶	\$100

Efficient New Home Packages

Energy-Saving Measure	Basic Specifications	Incentive
ENERGY STAR [®] Certified Home ^{1&7}	National Program Requirements Version 3.1 (Rev. 08)	\$600
Built Green Certified Home ^{1&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. They may not be combined with any other measure except Hearths.

Commercial/Industrial Standard Incentives

In the Community to Serve

<p>Warm Air Furnaces - \$3.00/kBtu/hr High Efficiency Condensing Furnace—Min 91% AFUE</p>	<p>Motion Control Faucet³ - \$105 Maximum flow rate of 1.8 gpm WaterSense® Certified and Below Deck Mixing Valve</p>
<p>HVAC Unit Heater - \$1.50/kBtu/hr High Efficiency Non-Condensing Min—86% AFUE</p>	<p>Clothes Washer³ - \$180 Commercial gas washer—1.8 MEF</p>
<p>HVAC Unit Heater - \$3.00/kBtu/hr High Efficiency Condensing Min—92% AFUE</p>	<p>Gas Convection Oven - \$450 ENERGY STAR® ≥42% Cooking Eff/ ≤13,000 Btu/hr Idle Rate</p>
<p>Radiant Heating - \$6.95/kBtu/hr Direct fired radiant heating</p>	<p>Gas Griddle - \$350 ENERGY STAR® ≥38% Cooking Eff/ ≤2650 Btu/hr sq ft Idle Rate</p>
<p>Boiler - \$4.00/kBtu/hr High Efficiency Condensing Boiler Min 90% Thermal Eff & 300 kBtu input</p>	<p>Gas Conveyor Oven - \$600 Greater than 42% tested baking efficiency</p>
<p>Boiler Vent Damper - \$1,000 Min 1,000 kBtu input</p>	<p>Connectionless 3 Pan Gas Steamer - \$850 ENERGY STAR® or CEE/FSTC Qualified ≥38% Cooking Eff / ≤2,083 Btu/hr/pan Idle Rate</p>
<p>Boiler Steam Trap¹ - \$125 Min 300 kBtu in; steam pressure at 7psig or ></p>	<p>Connectionless 6 Pan Gas Steamer - \$1,200 ENERGY STAR® or CEE/FSTC Qualified ≥38% Cooking Eff / ≤2,083 Btu/hr/pan Idle Rate</p>
<p>Domestic Hot Water Tanks³ - \$2.50/kBtu/hr Condensing tank, Min 91% Thermal Eff</p>	<p>Double Rack Oven - \$2,000 FSTC Qualified ≥50% Cooking Eff/ ≤3,500 Btu/hr/Idle Rate D Rack</p>
<p>Domestic Hot Water Tankless Water Heater³ - \$60/gpm ENERGY STAR® .82 EF</p>	<p>ENERGY STAR® Gas Fryer - \$600</p>
<p>Attic Insulation - (retrofit only) Tier 1: Min R-30 - \$0.50/sq ft Tier 2: Min R-45 - \$0.65/sq ft</p>	<p>Door Type Dishwasher Low Temp Gas³ - \$650 ENERGY STAR® ≤.6 kw Idle Rate/ ≤1.18 gallon/rack</p>
<p>Roof Insulation - (retrofit only) Tier 1: Min R-21 - \$0.60/sq ft Tier 2: Min R-30 - \$0.80/sq ft</p>	<p>Multi-Tank Conveyor Low Temp Dishwasher³ - \$1,000 Gas Main w/Electric Booster ENERGY STAR® ≤2.0 kw Idle Rate; ≤ 0.50 gallons/rack</p>
<p>Wall Insulation² - (retrofit only) Tier 1: Min R-11 - \$0.50/sq ft Tier 2: Min R-19 - \$0.56/sq ft</p>	<p>Recirculation Controls³ - \$100 Continuous Operation DHW Pump Pre-Approval required.</p>
<p>Energy Savings Kits³ - FREE A: Kitchen Pre Rinse Spray Valve & Bath Aerators B: Low Flow Showerhead</p>	<p>Demand Control Ventilation⁴ - \$12/nominal ton 5 tons ≤ Unit Cooling Capacity ≤ 20 tons. Pre-Approval Required.</p>
<p>Ozone Injection Laundry³ - \$2,500 Venturi injection or bubble diffusion - Min 125 lb. total washer/extractor capacity. Pre-approval required.</p>	

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.

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 contingent upon use of natural gas fired domestic hot water serving the specified measure equipment or fixture.

⁴ For Existing Packaged HVAC Units equipped with Gas Fired Furnace and Direct Expansion Cooling Sections. DCV Unit Controller must meet Joint Utility Advanced Rooftop Control Guidelines

For the following tables please note – levelized costs displayed include administrative costs. As mentioned, the Company includes the administrative costs at the achievable level, which are used for planning and are in turn represented within the annual report. Also note, levelized costs differ for some measures depending on the customer’s geographic location since Cascade tracks therm savings dependent on which of Washington’s three climate zones the measure is installed within. The range below is based on the 2015 Cascade Natural Gas Conservation Incentive Program Annual Report. Blank entries indicate zero installs in CY 2015 in the specified Climate Zone.

Table 4
Residential Program Offerings from Tariff 300 as of the 2015 Annual Report

MEASURE	ZONE	ANNUAL THERM SAVINGS	PROGRAM REBATE	UC W/DELIVERY & ADMIN
Energy * Certified Home (BOP 1) <i>(Incentive Increase effective 09/02/2014)</i>	1	206	\$ 600.00	
Energy * Certified Home (BOP 1) <i>(Incentive Increase effective 09/02/2014)</i>	2	200	\$ 600.00	
Energy * Certified Home (BOP 1) <i>(Incentive Increase effective 09/02/2014)</i>	3	207	\$ 600.00	\$ 0.297
Energy * Plus Certified Home (Discontinued 09/02/2014)	1	235	\$ 550.00	
Energy * Plus Certified Home (Discontinued 09/02/2014)	2	221	\$ 550.00	
Energy * Plus Certified Home (Discontinued 09/02/2014)	3	296	\$ 550.00	\$ 0.236
Built Green Certified Home	1	209	\$ 600.00	\$ 0.296
Built Green Certified Home	2	203	\$ 600.00	
Built Green Certified Home	3	210	\$ 600.00	
95% AFUE Gas Furnace Upgrade E* OLD	1	111	\$ 200.00	
95% AFUE Gas Furnace Upgrade E* OLD	2	110	\$ 200.00	
95% AFUE Gas Furnace Upgrade E* OLD	3	111	\$ 200.00	\$ 0.315
95% AFUE Gas Furnace Upgrade E* <i>(Incentive Increase effective 09/02/2014)</i>	1	111	\$ 250.00	\$ 0.352
95% AFUE Gas Furnace Upgrade E* <i>(Incentive Increase effective 09/02/2014)</i>	2	110	\$ 250.00	
95% AFUE Gas Furnace Upgrade E* <i>(Incentive Increase effective 09/02/2014)</i>	3	111	\$ 250.00	\$ 0.352
90% AFUE New Gas Furnace(New construction) (Discontinued 09/02/2014)	1	65	\$ 150.00	\$ 0.356
90% AFUE New Gas Furnace(New construction) (Discontinued 09/02/2014)	2	61	\$ 150.00	
90% AFUE New Gas Furnace(New construction) (Discontinued 09/02/2014)	3	81	\$ 150.00	
90% AFUE New Gas Furnace(Existing) (Discontinued 09/02/2014)	1	81	\$ 150.00	\$ 0.319
90% AFUE New Gas Furnace(Existing) (Discontinued 09/02/2014)	2	75	\$ 150.00	
90% AFUE New Gas Furnace(Existing) (Discontinued 09/02/2014)	3	99	\$ 150.00	
95% AFUE New Gas Furnace(New & Existing)	1	111	\$ 250.00	\$ 0.352
95% AFUE New Gas Furnace(New & Existing)	2	110	\$ 250.00	\$ 0.353
95% AFUE New Gas Furnace(New & Existing)	3	111	\$ 250.00	\$ 0.352
80% AFUE Hearth <i>(Incentive decreased effective 09/02/2014)</i>	1	75	\$ 250.00	\$ 0.409
80% AFUE Hearth <i>(Incentive decreased effective 09/02/2014)</i>	2	75	\$ 250.00	\$ 0.409

MEASURE	ZONE	ANNUAL THERM SAVINGS	PROGRAM REBATE	UC W/DELIVERY & ADMIN
80% AFUE Hearth (<i>Incentive decreased effective 09/02/2014</i>)	3	75	\$ 250.00	\$ 0.409
70% FE Hearth OLD	1	56	\$ 200.00	\$ 0.426
70% FE Hearth OLD	2	56	\$ 200.00	\$ 0.426
70% FE Hearth OLD	3	56	\$ 200.00	\$ 0.426
70% FE Hearth (<i>Incentive decreased effective 09/02/2014</i>)	1	56	\$ 150.00	\$ 0.360
70% FE Hearth (<i>Incentive decreased effective 09/02/2014</i>)	2	56	\$ 150.00	\$ 0.360
70% FE Hearth (<i>Incentive decreased effective 09/02/2014</i>)	3	56	\$ 150.00	\$ 0.360
High Efficiency Entryway Door	1	13	\$ 50.00	\$ 0.390
High Efficiency Entryway Door	2	13	\$ 50.00	
High Efficiency Entryway Door	3	13	\$ 50.00	\$ 0.390
Ceiling Insulation	1	0.062	\$ 0.30	\$ 0.346
Ceiling Insulation	2	0.057	\$ 0.30	\$ 0.367
Ceiling Insulation	3	0.067	\$ 0.30	\$ 0.328
Floor Insulation OLD	1	0.056	\$ 0.45	\$ 0.504
Floor Insulation OLD	2	0.054	\$ 0.45	\$ 0.519
Floor Insulation OLD	3	0.059	\$ 0.45	\$ 0.484
Floor Insulation (<i>Incentive decreased effective 09/02/2014</i>)	1	0.056	\$ 0.30	\$ 0.372
Floor Insulation (<i>Incentive decreased effective 09/02/2014</i>)	2	0.054	\$ 0.30	\$ 0.381
Floor Insulation (<i>Incentive decreased effective 09/02/2014</i>)	3	0.059	\$ 0.30	\$ 0.358
Wall Insulation OLD	1	0.071	\$ 0.40	\$ 0.385
Wall Insulation OLD	2	0.065	\$ 0.40	
Wall Insulation OLD	3	0.076	\$ 0.40	\$ 0.367
Wall Insulation (<i>Incentive decreased effective 09/02/2014</i>)	1	0.071	\$ 0.35	\$ 0.350
Wall Insulation (<i>Incentive decreased effective 09/02/2014</i>)	2	0.065	\$ 0.35	\$ 0.373
Wall Insulation (<i>Incentive decreased effective 09/02/2014</i>)	3	0.076	\$ 0.35	\$ 0.334
High Efficiency Combination Radiant Heat OLD	1	475	\$ 1,000.00	\$ 0.307
High Efficiency Combination Radiant Heat OLD	2	468	\$ 1,000.00	
High Efficiency Combination Radiant Heat OLD	3	476	\$ 1,000.00	
High Efficiency Combination Radiant Heat (<i>Incentive decreased effective 09/02/2014</i>)	1	475	\$ 825.00	\$ 0.280
High Efficiency Combination Radiant Heat (<i>Incentive decreased effective 09/02/2014</i>)	2	468	\$ 825.00	\$ 0.282
High Efficiency Combination Radiant Heat (<i>Incentive decreased effective 09/02/2014</i>)	3	476	\$ 825.00	
.64 Water Heater (Discontinued 09/02/2014)	1	33	\$ 40.00	\$ 0.360
.64 Water Heater (Discontinued 09/02/2014)	2	33	\$ 40.00	\$ 0.360
.64 Water Heater (Discontinued 09/02/2014)	3	33	\$ 40.00	\$ 0.360
.67 Water Heater	1	33	\$ 45.00	\$ 0.304
.67 Water Heater	2	33	\$ 45.00	\$ 0.304
.67 Water Heater	3	33	\$ 45.00	\$ 0.304
.91 Tankless Hot Water Heater	1	54	\$ 150.00	\$ 0.394
.91 Tankless Hot Water Heater	2	54	\$ 150.00	\$ 0.394
.91 Tankless Hot Water Heater	3	54	\$ 150.00	\$ 0.394
Energy Saver Kit (Kit 1)	1	17	\$ 10.00	\$ 0.339

MEASURE	ZONE	ANNUAL THERM SAVINGS	PROGRAM REBATE	UC W/DELIVERY & ADMIN
Energy Saver Kit (Kit 1)	2	17	\$ 10.00	\$ 0.339
Energy Saver Kit (Kit 1)	3	17	\$ 10.00	\$ 0.339
Energy Saver Kit (Kit 2)	1	31	\$ 16.00	\$ 0.330
Energy Saver Kit (Kit 2)	2	31	\$ 16.00	\$ 0.330
Energy Saver Kit (Kit 2)	3	31	\$ 16.00	\$ 0.330
TOTAL PROGRAM				\$ 0.349

Table 5
Commercial/Industrial Program Offerings from Tariff 302 as of the 2015 Annual Report

MEASURES	ANNUAL THERM SAVINGS/UNIT	UNITS	PROGRAM REBATE	LOADED UC
<i>Prescriptive Measures</i>				
HVAC Unit Heater	0.61	kBtu/hr	\$ 1.50	
HVAC Unit Heater	1.10	kBtu/hr	\$ 3.00	\$ 0.421
Warm Air Furnace	1.10	kBtu/hr	\$ 3.00	\$ 0.421
Radiant Heating	4.33	kBtu/hr	\$ 6.50	
Insulation-Attic	0.40	sq. ft.	\$ 0.50	
Insulation-Attic	0.22	sq. ft.	\$ 0.50	
Insulation-Attic	0.41	sq. ft.	\$ 0.65	
Insulation-Attic	0.23	sq. ft.	\$ 0.65	
Insulation-Roof	0.45	sq. ft.	\$ 0.60	
Insulation-Roof	0.25	sq. ft.	\$ 0.60	
Insulation-Roof	0.46	sq. ft.	\$ 0.80	
Insulation-Roof	0.25	sq. ft.	\$ 0.80	
Insulation-Wall	0.22	sq. ft.	\$ 0.30	
Insulation-Wall	0.12	sq. ft.	\$ 0.30	
Insulation-Wall	0.24	sq. ft.	\$ 0.40	
Insulation-Wall	0.14	sq. ft.	\$ 0.40	
Domestic Hot Water Tanks	0.79	kBtu/hr	\$ 2.50	\$ 0.518
Boiler Vent Damper	270.00	kBtu/hr	\$ 1,000.00	
Gas Fryer	548.00	each	\$ 600.00	\$ 0.542
Clothes Washer	90.00	each	\$ 180.00	\$ 0.563
Steam Trap (New Tariff)	136.90	kBtu/hr	\$ 125.00	\$ 0.577
Boiler	1.50	kBtu/hr	\$ 4.00	\$ 0.388
DHW Tankless Water Heater	35.00	gpm	\$ 60.00	\$ 0.340
Gas Convection Oven	261.00	each	\$ 400.00	
Conn 6 Pan Gas Steamer	912.00	each	\$ 1,200.00	
Conn 6 Pan Gas Steamer	448.00	each	\$ 600.00	
Double Rack Oven	1,806.00	each	\$ 2,000.00	
Gas Griddle	158.00	each	\$ 200.00	
Gas Fryer (New Tariff)	272.00	each	\$ 600.00	\$ 0.510
Attic Insulation Tier 1 (New Tariff)	0.31	sq. ft.	\$ 0.50	\$ 0.245
Wall Insulation Tier 2 (New Tariff)	0.19	sq. ft.	\$ 0.56	\$ 0.323
Motion Control Faucet	136.00	each	\$ 105.00	\$ 0.745

MEASURES	ANNUAL THERM SAVINGS/UNIT	UNITS	PROGRAM REBATE	LOADED UC
Gas Convection Oven	213.00	each	\$ 450.00	\$ 0.500
Radiant Heating (New Tariff)	4.330	kBtu/hr	\$ 6.95	\$ 0.331
ESK A	109.000	each	\$ 119.00	\$ 0.818
ESK B	14.000	each	\$ 44.00	\$ 0.705
<i>Custom Measures</i>				
Restaurant A Standard and Custom	1,892	/unit	\$ 1,789.00	\$ 0.188
Junior High School Standard & Custom	1,933	/unit	\$ 2,588.00	\$ 0.160
State Office A Standard and Custom	15,706	/unit	\$ 13,982.00	\$ 0.210
Elementary School Custom and Standard DHW Tank	1,442	/unit	\$ 1,818.00	\$ 0.187
High School Control Upgrade, Boilers	7,504	/unit	\$ 9,459.00	\$ 0.187
Event Center DCV Control	4,219	/unit	\$ 2,250.00	\$ 0.165
Warehouse Silverdale Custom Controls	1,045	/unit	\$ 1,317.00	\$ 0.187
Commercial Building Custom Insulation	119	/unit	\$ 241.00	\$ 0.167
Industrial Manufacturing Custom 2014+	229,000	/unit	\$ 145,750.00	\$ 0.130
Restaurant B Combi Oven	712	/unit	\$ 739.00	\$ 0.197
State Offices B Standard and Custom	6,613	/unit	\$ 3,059.00	\$ 0.284
Industrial Custom	174,600	/unit	\$ 146,500.00	\$ 0.149
Restaurant C. Custom Dishwashers	244	/unit	\$ 217.00	\$ 0.210
Restaurant D. Custom Dishwashers	422	/unit	\$ 438.00	\$ 0.197
Commercial Building Custom	280	/unit	\$ 353.00	\$ 0.187
High School Retro-commissioning	28,046	/unit	\$ 12,971.00	\$ 0.284
State Offices Standard and Custom	11,359	/unit	\$ 17,765.00	\$ 0.176
TOTAL PROGRAM				\$ 0.216

Washington Low Income Program

The Low Income Weatherization Incentive Program (LI-WIP) offers rebates to weatherization agencies performing work to increase energy efficiency in low-income households within Cascade's service territory. Rebates are provided for the installation of certain energy efficiency measures following the completion of a home energy evaluation performed by a qualifying Community Action Agency or Low Income Agency.

The following measures qualify for a rebate through the current LI-WIP tariff. Calculations for rebates are based on projected annual therm savings of the measure(s) x 100% of the Avoided Cost per therm.

Table 6

Current Low Income Weatherization rebate offerings from Tariff 301

Measure	Avoided Cost per Therm
Ceiling Insulation	\$8.09
Wall Insulation	\$8.09
Floor Insulation	\$8.09
Duct Sealing & Insulation	\$6.15
Infiltration Reduction	\$6.15

Cascade has partnered with low income weatherization providers since 2008, offering rebates to the agencies delivering essential home energy improvements to CNGC customers in the State of Washington. Achievements for each year have been provided in the table below.

Table 7

Weatherization Incentive Program Participation Levels and Savings by Year		
Year	Number of Homes Served	Therm Savings
2008	46	13,985
2009	54	14,733
2010	112	30,809
2011	84	24,130
2012	64	21,824
2013	38	14,960
2014	21	7,338
2015	19	11,724

As demonstrated, participation by agencies in Cascade's LI-WIP rose steadily from 2008 through 2010, peaking at 112 homes served in a single year. This success was reflective of the abundance of funds available through the American Recovery and Reinvestment Act of 2009 (ARRA). It also reflected a time when natural gas costs were higher, thus resulting in higher avoided cost payments associated with the work performed. The higher energy burden of natural gas households at that time also resulted in greater prioritization of natural gas weatherization work.

Since 2011, the number of CNGC natural gas homes served by the low income weatherization program has steadily declined. Several agencies that had only minimally participated in LI-WIP since the advent of Cascade's program (even during the height of ARRA) have all but discontinued providing low income weatherization services to Cascade

customers. More troubling is anecdotal feedback that formerly active weatherization agencies have begun to inform customers that no weatherization services are available to natural gas customers, despite the ongoing availability of Rate Schedule 301 LI-WIP offered by Cascade.

Fortunately, the low income weatherization agencies, with the support of The Energy Project, and the Company's CAG have been extremely responsive to Cascade's request for feedback and support in restructuring its LI-WIP program to better accommodate the needs of the agencies with which the Company partners. The Company has further committed to coordinating with the CAG and Energy Project to present a proposal for overcoming barriers to the implementation of the LI-WIP program to the Commission by December 31, 2016.

On Wednesday, October 5, 2016 the Company presented the CAG with a discussion paper centered on potential revisions to Cascade's LI-WIP. Points of discussion included:

- 1) Identifying barriers to success, such as program design constraints; natural gas weatherization costs; and Federal guidelines. This included exploring the current design of the LI-WIP, Federal prioritization methods inhibiting deeper penetration of the program, and areas of potential improvement;
- 2) Identifying potential solutions to increase program viability by addressing the limitations associated with the current funding mechanism; and potentially reconfiguring the current program design to meet the needs of the agencies delivering the program.

The Company found this meeting to be extremely productive. Following this discussion, Cascade staff integrated feedback from the CAG and Opportunity Council to map out a preliminary re-design to its LI-WIP, which will be modeled in part from the success of the ongoing Conservation Achievement Tariff (CAT) pilot operated by the Company in the State of Oregon. CAT bridges the gap between avoided energy costs payable under the traditional Oregon Low Income Energy Conservation (OLIEC) program, and the total installed cost of a qualified weatherization measure.

In the State of Washington, it has generally been acknowledged that low-income weatherization is different from standard-income conservation efforts in that it also helps customers mitigate their energy burden, reduces arrearages, and addresses the long term energy needs of a low income customer's household in contrast to other programs such as bill assistance that address the immediate crisis. Supportive feedback from the Energy Project and the CAG on LI-WIP has led to consideration of the following proposed program modifications to Rate Schedule 301.

It is essential to note that these modifications will be further refined with the feedback of the Energy Project and the CAG in preparation for the Company filing to the Washington Utilities and Transportation Commission (WUTC) by December 31, 2016.

Proposed changes to the Company's LI-WIP include:

- Expansion of qualified Energy Efficiency Measures to align more closely with the Washington State Department of Commerce's Weatherization Priority List. This includes potential inclusion of measures such as water heater insulation, showerheads, aerators and furnaces and other measures that are eligible under the appropriate priority list for the Weatherization Agency's region and the home type being weatherized, or that qualify with a savings-to-investment ratio of 1.0 or higher under the TREAT audit performed by a qualifying agency.
- Project rebate payments to be expanded to include the total installed cost of approved measures as demonstrated through contractor invoices and/or an itemized list of work performed. Project payments to be capped at \$10k to manage costs and ensure as many homes as possible receive weatherization services.
- Inclusion of an audit and inspection fee to agencies for work performed, similar to the one offered via Cascade's CAT pilot in Oregon.

Additional program terms and conditions will be reflected in the tariff and will also take the form of a memorandum of understanding (MOU) with each participating agency. The MOU will include individualized, realistic targets for each Agency to ensure as many low income natural gas homes as possible are served in Cascade's service territory.

Following the submission and approval of a revised LI-WIP tariff to the WUTC, Cascade will refine the anticipated therm savings and budgetary targets as appropriate.

Conservation Programs in 2018

The Company expects in the next year to engage the CAG in discussions around viable rebate levels and potential portfolios for the 2018 program year. As mentioned in the previous iteration of the Plan, the Advisory Group showed interest in the Company moving away from its traditional method of maintaining the most robust cost-effective portfolio as feasible with rebates set near 30% of the incremental cost of the measure. The Company will explore varying levels of incentive per viable measure near the end of Q1 2017, leaving additional opportunities to review throughout 2017 and into 2018, with the idea being to increase the incentive levels to make them more enticing to consumers, without adversely affecting the programs or inadvertently promoting free-ridership.

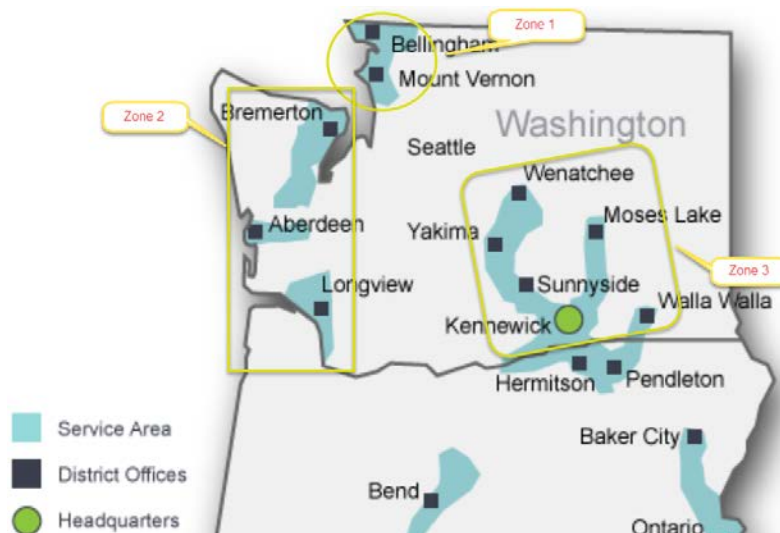
As the Company becomes more familiar with the strengths and capabilities of the iDSM Central software, and continues to build the historical database through everyday use, there is an opportunity to more fully capture actual installed equipment costs based on real data collected from the Company's service territory. One of the elements noted by Nexant Inc. in the potential study and evaluation from 2014 was a need for the Company to track the actual installed cost of measures on a regular basis. Installers often do not provide a detailed invoice broken down to the level of equipment cost vs. labor, but when available it provides a key metric the Company can use in future program planning and evaluation. The Company is using the 2017 year as a time to educate and condition its Trade Allies to provide all relevant data on invoices, including installed costs as available.

There is also a possibility in 2018 the Company will be able to start tailoring targeted conservation efforts and offers in climate zones and towns where the potential in that zone is not being met. Cascade's new method of forecasting savings potential based on climate zone will allow close tracking of achievements throughout 2017, and position the Company to act on this tracking in 2018 to pivot efforts as needs arise.

Calendar year 2018 also provides further opportunity to explore more robust messaging opportunities online for the program. All of these efforts will be geared toward increasing program uptake throughout the territory to meet the program goals as indicated by the TEA-Pot model.

Improved Granularity by Climate Zone

Figure 2
Cascade Natural Gas Washington Climate Zone Map



As noted for the first time, the Conservation Forecast was run at the climate zone level of granularity instead of at a state wide level. By tailoring the inputs, each of the three climate

zones was able to reflect its technical, economic and achievable potential individually. This allows program administrators to tailor outreach to specific, potentially underperforming areas, and mimic other areas' successful marketing campaigns if they surpass their calculated potential.

Unique inputs include customer count and volume growth rate forecasts by customer class, (Residential, Commercial, and Industrial) as well as by avoided costs. All other factors were held constant across each climate zone's scenario, such as the inflation rate, long term discount rate, load profile, transmission loss rate, cost effectiveness threshold, which measures were left at the 30% of incremental costs incentive levels or bumped to 50%, and the administrative levelized costs per therm by end use. All factors of the model, as well as other changes introduced for the first time in this year's IRP, are discussed further in depth in the following [Forward Looking Targets/TEA-Pot Forecasts](#) section below.

The results of both the Residential and Commercial/Industrial Incentive Programs' climate zone level potential are summarized in the following graphs.

Note, Climate Zone 3 contains the Industrial customer class's highest potential. Large Industrial customers' projects are not available every year, but when they are, they have a large impact on the Commercial & Industrial program's annual achievements and full program portfolio's cost effectiveness.

The Total CIP Forecasted Potential by Zone graph demonstrates Climate Zone 2's lower potential compared to Climate Zones 1 and 3. The difference in potential can be tied to its significantly lower customer counts and volume inputs, which are partially offset by the lowest avoided costs in both the near and long term time horizons.

Forward Looking Targets/ TEA-Pot Forecasts

As mentioned previously the method Cascade uses to calculate potential is the TEA-Pot modeling tool (developed in 2013/2014 by Nexant Inc.) The study's analysis at the time was based on calendar year 2012 and tailored to Cascade's distinct service territory.

The following section provides Cascade's achievable forecast by climate zone and customer class as per TEA-Pot calculations from October 2016 for the 10 year horizon.

Figure 3
Zone 1 Achievable Conservation Forecast Potential by Customer Class

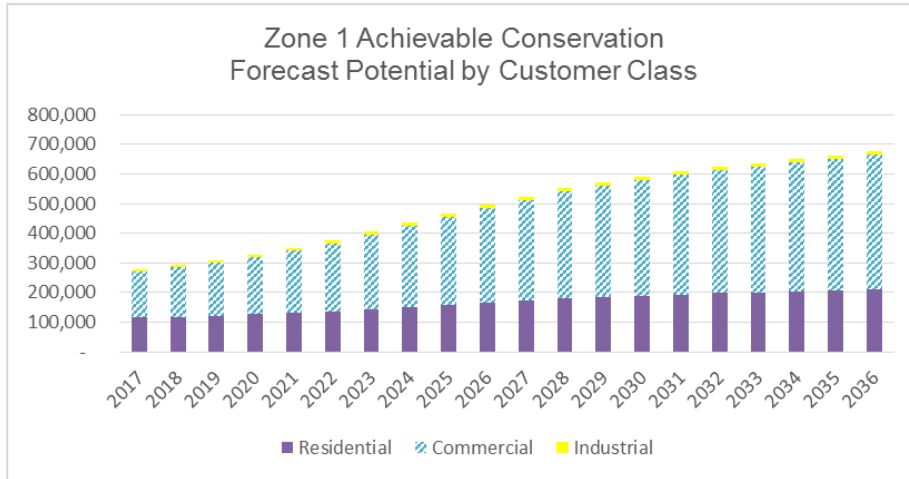


Figure 4
Zone 2 Achievable Conservation Forecast Potential by Customer Class

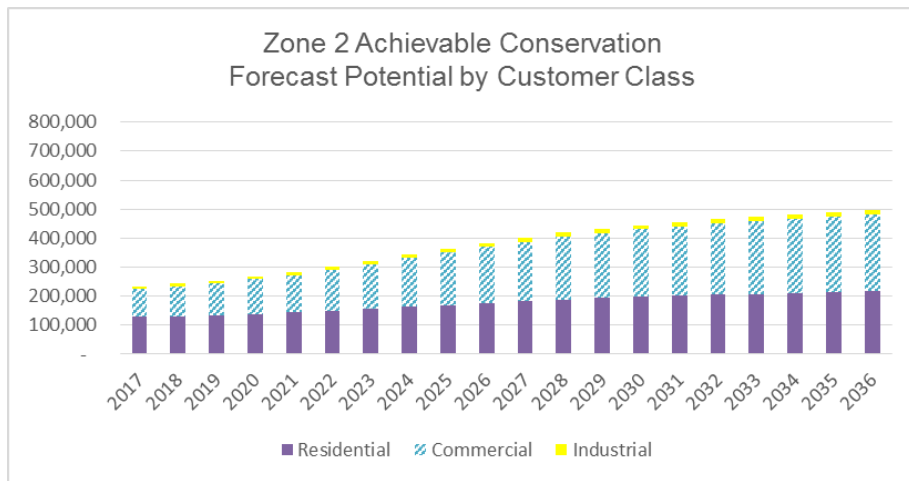


Figure 5
Zone 3 Achievable Conservation Forecast Potential by Customer Class

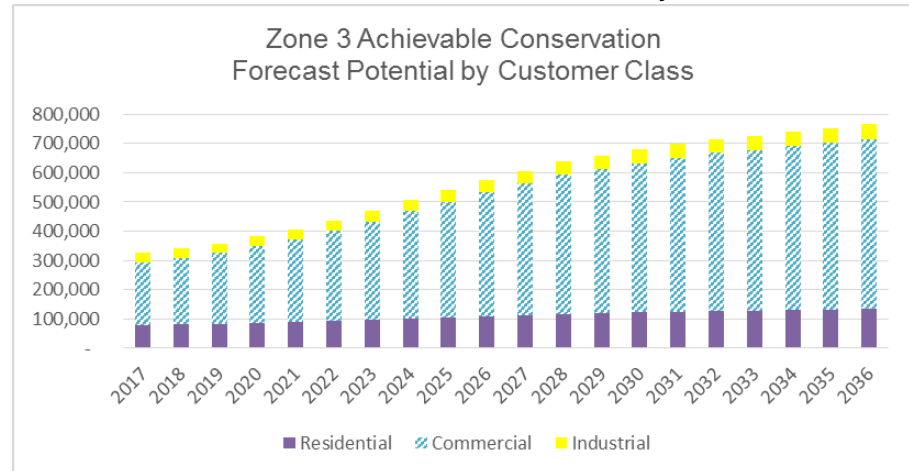
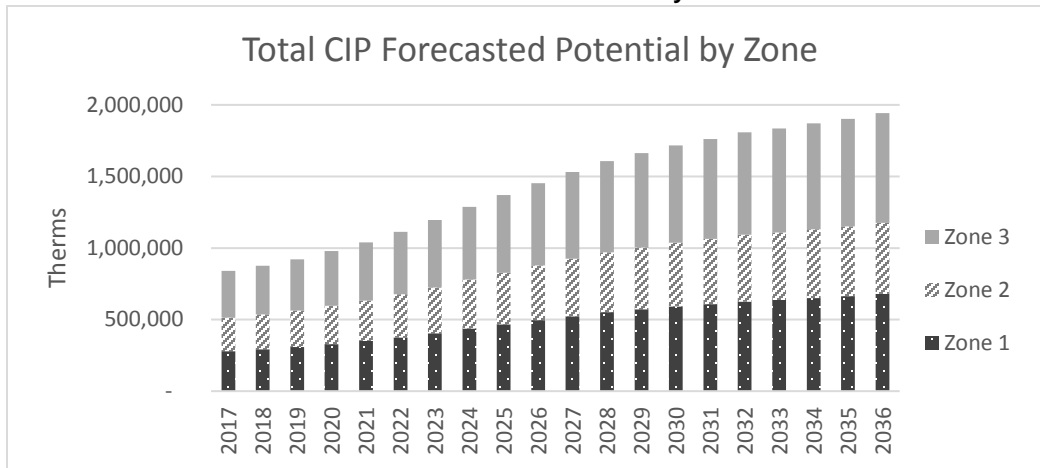


Figure 6
Total CIP Forecasted Potential by Zone



Cascade's methodology has changed in two key ways along with the inclusion of the administrative costs in the model, and climate zone granularity. First, on both the Residential and the Commercial/Industrial programs, all measures from the study are used for all years of the time horizon. This methodology was implemented instead of past Commercial/Industrial forecast modeling where solely the prescriptive measures offered under the current tariff in place at the time of writing were included in the forecast. This new methodology accounts for capturing the savings inherent to the custom project sector more accurately, in addition to the prescriptive measure offerings, without applying a subjective percentage of custom project therm savings (based on historic performance) on top of the prescriptive savings estimate. On the Residential side, this allows for a full review of the cost-effectiveness measures available in the Nexant Study's library to be considered for future changes to the menu of efficiency offerings.

Second, for both the Residential and Commercial/Industrial programs, measures deemed cost effective at the 50% level of incremental costs were run through the model at the higher incentive level. A higher incentive level yields a higher adoption curve because installation of the measure becomes more cost effective and thus more appealing to participants. In return, a higher level of potential therm savings becomes possible. A full list of included measures' cost effectiveness and incentive levels by customer class at the original base 30% incentive level are available in *Appendix A*.

Below is a summary of the other model inputs, updated from the 2016 Conservation Plan:

- Inflation rate decreased from 2.00% to 1.00% and is in line with the remainder of the IRP. It was also applied to the Administrative Costs per levelized therm by end use, based on 2015 Annual Report achievements. Thus, the decrease in inflation rate

helped decrease the long term Administrative Costs' forecast, and brought down the overall costs needed to acquire therm savings, thereby increasing the Benefit-Cost ratios for measures to pass cost-effectiveness.

- Transmission Loss rate decreased from 0.1959% to 0.1348%
- Long Term Discount rate decreased from 4.17% to 3.52%, aligned with the rest of the IRP's' models. Note, the lower the long term discount rate, the higher the therm savings potential because future years' therm savings' avoided cost values are discounted less, and thus more of the avoided costs can be included, thereby allowing the Benefit-Cost ratios for measures to pass the 0.90 cost-effectiveness threshold for inclusion in the modeling run. This approach recognizes the value of long-lived conservation measures and the generational benefits of deep energy savings.
- Administrative Costs increased to bring the Residential program administration in house, thereby increasing accuracy of reporting and improving control of the customers' rebate processing experiences. It also allowed expansion of Commercial and Industrial CIP outreach. The 2017 budget was set at \$550,000 for the Residential program and \$1 million for the Commercial/Industrial to accommodate the additional outreach efforts. Note while this may appear to have a negative impact on the Benefit-Cost ratios for each measure, and raises the costs needed to acquire therm savings, it is necessary to accommodate higher therm savings goals.
- Avoided Costs were updated per Appendix H and divided by Climate Zone. It is important to note the higher the Avoided Costs, the higher the therm savings potential because Avoided Costs under the Utility Cost Test increase the Benefit-Cost ratio to allow more measures to be considered cost-effective. Conversely, the lower the avoided costs, the lower the therm savings potential forecasted.
- Load Profile system wide and Customers and Volume Forecasts, divided by Climate Zone, were updated per the Demand Forecast chapter.

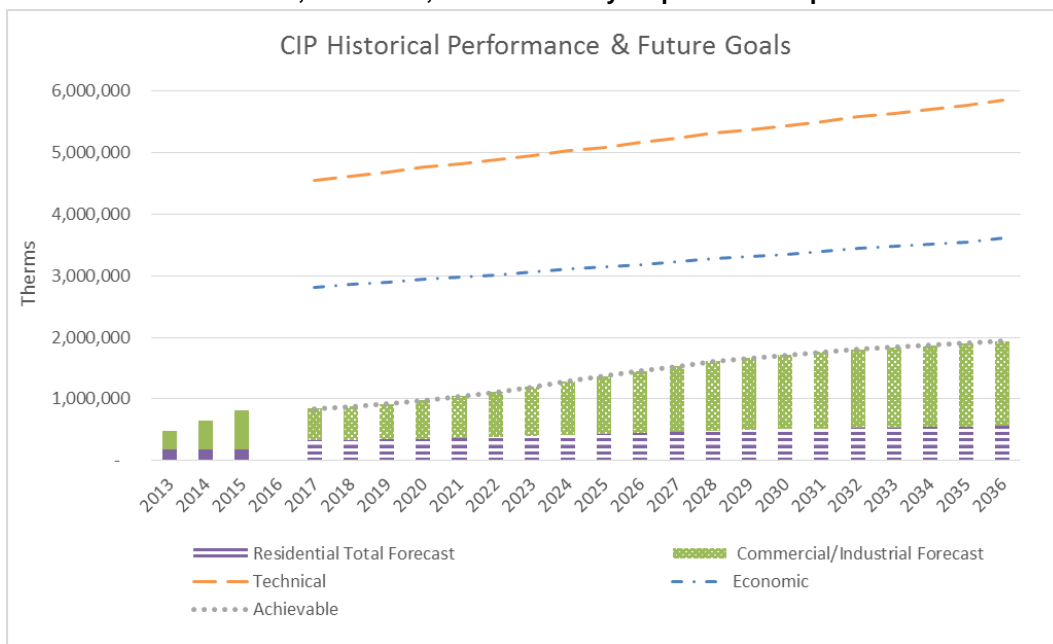
Nexant's model provides three levels of potential: Technical, Economic, and Achievable which are further defined below

- *Technical Potential:* An estimate of all energy savings that could theoretically be accomplished if every customer that could potentially install a conservation measure did so without consideration of market barriers such as cost and customer awareness.

- **Economic Potential:** The most efficient measures that pass economic screening tests and is a subset of Technical Potential. Because measures' cost effectiveness differs by Climate Zone, market segmentation, and vintage, Cascade implements a 0.90 cost-effectiveness threshold in order to be able to include the largest breadth of measures feasible.
- **Achievable Potential:** Embodies a set of assumptions about the decisions consumers make regarding the efficiency of the equipment they purchase to simulate a realistic estimate of real-life conditions.

As mentioned in the previous section, the model was run individually by climate zone in order to provide increased granularity. The outcomes shown in that section are by climate zone, whereas the summary of the model's output below combines Technical, Economic, and Achievable therm savings potentials, in addition to the past three years of program performance for perspective. Note, 2016 figures are not available at time of writing as the program year has not ended, January 1, 2016 through December 31, 2016. Further analysis and representations of these forecasts can be found in *Appendix A*.

Figure 7
Technical, Economic, Achievable 20 year potential snapshot



The line graph above provides two separate lines denoting the savings potentials for Technical and Economic levels, followed by the Achievable Residential and Commercial /Industrial targets.

CY 2017 & 2018 Targets

Cascade is providing targets the Company has reported for its conservation potential from the 2016 IRP in the following section (in review status at the time of writing of this Conservation Plan). The Company has included the most up to date Achievable goals as per the TEA-Pot model *inclusive* of administrative costs as aspirational goals for 2017 and 2018. These goals have been developed keeping in mind the alterations the Cascade program is currently implementing.

As mentioned, historically the Company tracked rebate submissions to the date the measure or upgrade was installed at the premise. CAG members requested the Company track via the date a rebate was paid rather than the install date method to reduce lag-time in reporting savings. The Company agreed to transition its program reporting which should make annual reporting more straightforward for the 2016 program's Conservation Achievements Annual Report.

In the next two years the Company will continue to explore the cost-effectiveness of some of those measures included in the full Nexant review and not currently offered in its portfolio based on availability to the marketplace, administrative costs in implementing and a variety of other elements.

Note in the 2016 IRP, the Company included the full breadth of measures from Nexant's model for CY 2017 & CY 2018. For 2017, based on the most recent TEA-Pot model and current program offerings, the on-the-ground realistic goal would be closer to 156,459 therms for Residential, with a total of 687,457 including Commercial. However if the Residential program offerings in 2017 were altered significantly to include all possible measures in the Residential portfolio (the Commercial program is slightly different as all measures are encompassed under the custom option category) the goal would be that which is included as the "official" goals noted in this Plan.

The Company is aware it is important to demonstrate the level of savings that could be achieved should the full breadth of offerings be included in the program portfolio throughout the 10 year plan horizon. It is also important to recognize the portfolio will likely change throughout the next two years to accommodate building codes and technology updates.

The following graph shows the next ten years' worth of savings potential in Cascade's territory based on customer type under all three potential levels.

Figure 8

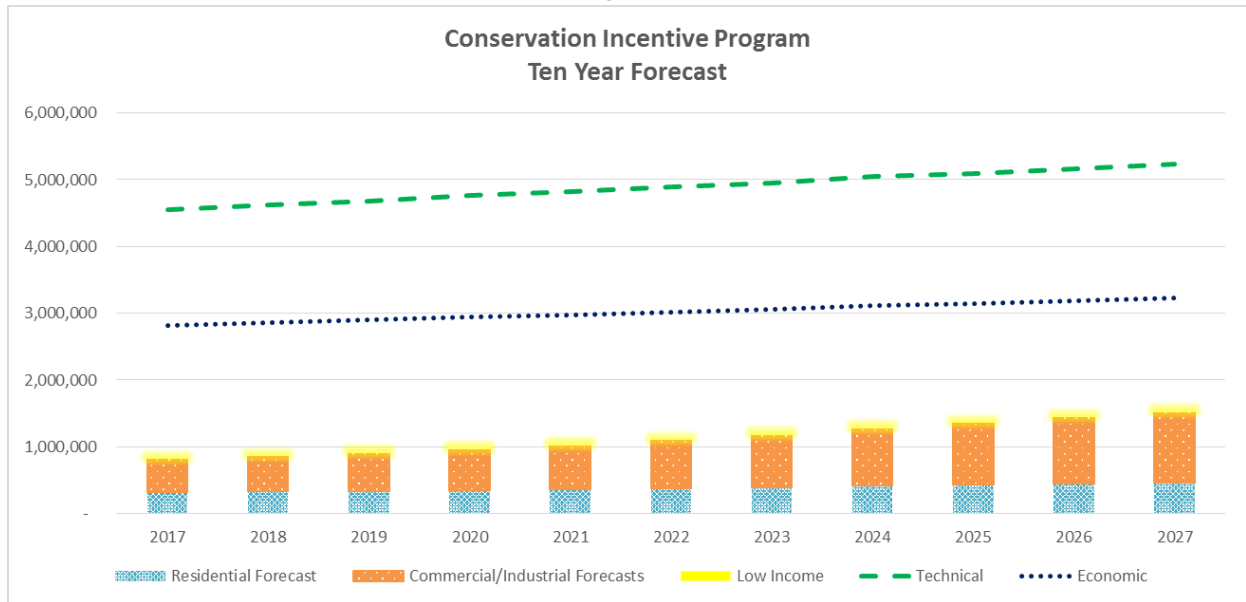
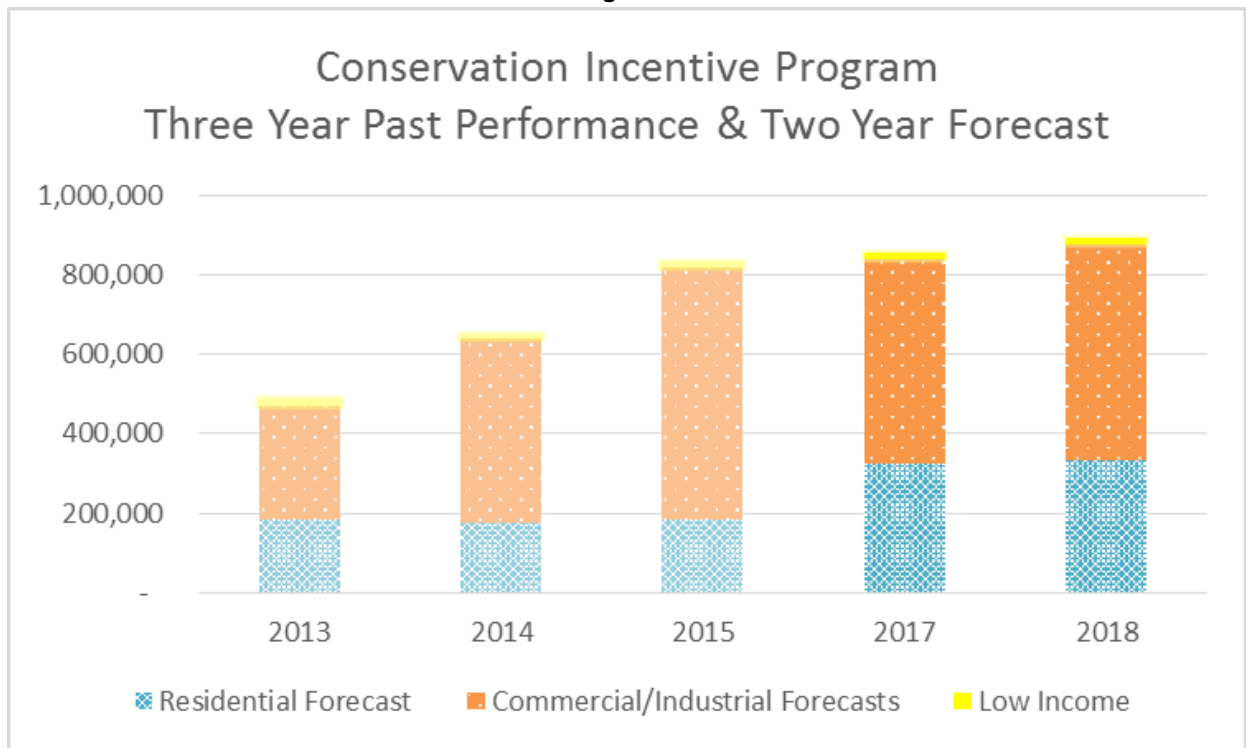


Figure 9



These projected achievements are based on the Company’s current best estimates of its Achievable potential, which are based on projected gas costs and the Nexant Potential study of viable natural gas measures. Projections are subject to modification dependent upon updated forecasts; knowledge of evolving efficiency technologies; customer interest

and program participation levels; and updates based on external influences. Budgets for FY 2017 and 2018 are based commensurately with these targets and adjusted to ensure maintenance of cost-effectiveness and appropriate leveled costs. The Company anticipates the budget on a portfolio level for 2017 to be in the range of **\$1.55 million** in administrative costs to support the increased goals for the residential program. FY 2018 is estimated to have a budget up to **\$1.6 million**. The 2017 budget is in line with that which was released in the 2016 Conservation Plan. Administrative costs for FY 2017 are higher than those in previous years due to the transition of the Residential program processing to internal delivery, as well as the initial implementation fee for the new software platform (costs for this one-time software implementation will be accounted for separately in the annual report outside of the standard cost benefit analysis).

Note some of the set-up and development costs for the software package will be paid in 2017 as opposed to 2016 due to a lag in invoicing from delays in meeting delivery timelines. The Company also includes expected participation level costs for the five year NEEA pilot (total **\$1,705,130**) as agreed upon in January, 2015. The Company lists these costs in the Annual Conservation Report and will represent the program's cost-effectiveness primarily without the associated NEEA pilot efforts, but also with the costs included in the analysis to demonstrate its effect on cost-effectiveness on the program as a whole.

Table 8
Cascade Natural Gas NEEA Natural Gas Market Transformation Pilot Participation

Year	Cascade's Washington Commitment at 9.3% of total budget for 5 year pilot
2015	\$145,872
2016	\$244,996
2017	\$313,174
2018	\$452,285
2019	\$548,803
Total	\$1,705,130

Long term Conservation Potential

The Company provided a table of total CIP Forecasted therms for Residential, Commercial and Industrial efficiency gains from 2017-2036 in the 2016 IRP. Cascade is providing a clearer iteration of the incremental annual potential savings for this Conservation Plan for years 2017-2027 below.

Table 9

Total CIP Forecast 2017-2027							
Incremental Annual Energy Savings							
Year	Technical	Economic	Residential Achievable	Commercial /Industrial Achievable*	Total Achievable	Low Income	Conservation Plan
2017	4,552,099	2,815,454	323,878	515,998	839,876	15,000	854,876
2018	4,622,799	2,858,324	331,357	545,217	876,574	15,000	891,574
2019	4,686,406	2,896,840	340,468	580,973	921,441	25,000	946,441
2020	4,769,664	2,948,056	352,843	626,755	979,599	25,000	1,004,599
2021	4,817,844	2,977,179	363,984	675,894	1,039,878	25,000	1,064,878
2022	4,886,307	3,018,791	378,657	735,221	1,113,877	25,000	1,138,877
2023	4,954,176	3,060,537	395,111	800,558	1,195,669	25,000	1,220,669
2024	5,044,322	3,115,644	414,680	872,792	1,287,472	25,000	1,312,472
2025	5,093,061	3,145,133	431,139	938,231	1,369,370	25,000	1,394,370
2026	5,163,110	3,187,846	449,272	1,004,324	1,453,596	25,000	1,478,596
2027	5,231,124	3,229,479	466,452	1,064,697	1,531,149	25,000	1,556,149

Note, short-term goals are more realistic when viewed in two-year increments since they allow flexibility in addressing current legislative, building code and budgeting criteria.

Many specific details are required to implement successful programs. As discussed above, the program potential, that which is based from actual implementation design, delivery, and market conditions, reflects some variance in savings, costs, and overall achievements. Customer participation in a program is heavily influenced by the level of incentive paid by the utility versus the cost to the customer.

External infrastructure considerations must also be addressed, such as product availability to utility customers and an adequate network of contractors, retailers, and trade allies to

support a program. As new measures or expanded programs are developed and added to the current program mix, internal and external resources and capabilities need to grow accordingly and progress through a “learning curve.” Additionally, revised projections regarding the cost of natural gas and other external factors will always lead to needed revisions to the Company’s existing programs, and will result in additional impacts on the company’s projected participation levels.

Planning and EM&V

The Company and its software vendor Nexant Inc. is continuing the process of customizing and building the iDSM Central platform for the Cascade residential programs including Low Income and iTrade Ally support. As part of the transition to internal program delivery, the Company researched ways to cost-effectively increase Evaluation, Measurement and Verification opportunities within the program reporting software platform. Nexant is committed as a partner in further developing the opportunities inherent in its software into Calendar year 2017. The following year will also provide the Company with the means to use the software to provide the tracking and groundwork for future EM&V efforts, potentially in conjunction with additional outside evaluations in future years when deemed necessary and not cost-prohibitive.

Housing Stock Assessment Review from NEEA

One of the areas CAG stakeholders requested Cascade explore and incorporate into future efforts involves engaging further with NEEA in relation to their housing assessment reports. These reports encompass a snapshot of a specific building stock (Residential and Commercial) and have information relevant to natural gas service percentages throughout each of the years of the study. This will enable a view into trends amongst gas usage and gas equipment types. Although the reports do not have gas meter data they have been a key element of the NEEA efforts to understand the market potential in the region. The desire is for Cascade to work with NEEA staff to develop recommendations for exploring what else can be extrapolated specific to Cascade as a gas utility from the data to help in updates to the Company’s programs.

Cascade currently depends on its Nexant potential study from 2013-2014 to establish program potential (as that study was specifically intended to address Cascade’s territory), but sees an opportunity to further refine its approach to future program planning by including elements of the NEEA housing assessments from a regional perspective and in other areas where it might not have previously seen opportunities or needs.

The Company will engage in conversations with NEEA in 2017 to explore additional opportunities for leveraging this resource into its program planning methods.

Outreach & Messaging Campaigns

The Company frequently reaches out to the public to notify rate payers of available incentives in order to drive uptake of the Conservation Incentive Programs – thereby reducing overall consumption of natural gas. The Company approaches its customer-facing energy efficiency messaging through an integrated marketing strategy - meaning multiple marketing methods or avenues are used to deliver a single (unified) message.

This method utilizes a consistent message that is reinforced frequently to increase brand awareness of the Cascade CIP to natural gas customers. In addition to the integrated marketing approach, the Company is also employing a cross channel marketing practice whereby the customer not only receives messaging via various mediums, but can also use the medium which they are most comfortable with to, in turn, interact with Cascade's programs. The Company does not employ all possible channels by which it could reach customers since marketing can be a costly endeavor, but rather is strategic in its approach to focus on marketing channels that take advantage of synergies in the avenues traditionally employed. The Company leverages existing partnerships and communication channels and adds new opportunities as they arise to keep its energy efficiency message useful, low-profile (yet impactful) and natural in its placement.

The marketing world is rapidly changing with additional technology and social media opportunities. The Company's CIP has traditionally centered on known messaging opportunities but is poised in the next year or two to move further into the digital and social media realm to reach rate payers through additional media channels – always keeping the integrated message in mind.

Current examples of avenues customers can use to gain information or interact with the program include using the internet as a resource for information about the programs through the www.cngc.com/conservation website, applying to receive a residential rebate through a customer portal <https://cngc.dsmcentral.com/traksmart4/public/registration.do>, sending in a hard copy application through the mail, contacting the program via phone or email and direct one-on-one interactions during an event at which program staff present.

In turn, the Company has multiple avenues in place to deliver program messaging including bill inserts to existing customers, radio advertising, event participation, community engagement and program material inclusion in external publications as well as targeting specific audiences for that message. With the increased goals comes a need to increase outreach and messaging to those key audiences.

A messaging campaign includes elements of consistency for brand awareness with a key focus on the Conservation Incentive Programs offered through Cascade as a standard go-

to for high-efficiency options to assist with offsetting the cost of higher-performance upgrades.

Cascade's messages and print material are tailored to the intended audience. Examples of potential audiences include residential, commercial, construction industry, real-estate and the financial or loan industry.

Community Participation - A Key to Program Longevity and Support

One area Cascade has repeatedly found essential to increased program participation and awareness is involvement with local community energy efforts and programs. The Company has long followed the motto *"In the Community to Serve"* which is strongly reinforced through the offerings provided through the Energy-Efficiency and Community Outreach Department. Energy program efforts outside of the utility programs are often a valuable resource for the utility to leverage in order to reach a new audience while reinforcing the same efficiency message to audiences the Company has targeted in the past.

The following discussion highlights some of the community groups and areas the Company will continue to partner with and message through:

On an annual basis Cascade partners with community energy programs including Sustainable Connections and the Community Energy Challenge in Whatcom and Skagit County and the Sustainable Living Center in Walla Walla. The Company provides funds to assist with delivery of its program information and pave the way for additional customers to apply for (and qualify for) rebates while working through the local auditors and the Community Energy Efficiency Programs (CEEP) where available. The CEEP were created by the Washington State Legislature in 2009 and administered by the Washington State University Extension Energy Program. The funds were used to help deliver energy efficiency upgrades to targeted customers throughout Washington State – both homeowners and small businesses alike. Funding for the program participants originated with the U.S. Department of Energy's State Energy Program and the American Recovery and Reinvestment Act. Once the pilot efforts had wrapped up additional funding was provided to the organizations to leverage already existing community investment. See *Appendix B* for copies of the sponsorship letter agreements between the Company and Sustainable Connections, Community Energy Challenge and the Sustainable Living Center which list out the benefits of partnering with the agencies for their energy use reduction collaborative efforts.

These CEEP funded organizations have been creative in the methods used to help customers reduce usage – ranging from performing energy audits, suggesting energy-

saving efforts, leveraging utility rebates, creating and maintaining Trade Ally networks of qualified contractors and providing additional rebates on top of the existing utility sponsored rebates. In each of these situations, the CEEP group has been an integral partner with the utility in providing personal interactions with community members to help them apply, and more importantly, qualify for the rebate program. In many situations the community organization has helped make the final push to encourage the customer to go with the higher-efficiency options by providing an in-depth understanding of how the different elements of the home affect their comfort, health and overall energy use. Having the ability to partner with local organizations whose efforts include reaching out and performing these services has proved immensely beneficial to all parties in the equation. If a customer can look at their energy use on a whole home basis as opposed to a one-off upgrade approach the overall reduction and potential for repeat efforts increases dramatically.

The Company has spent the past several years working with four towns within its service territory, three of which are in Washington, in their community wide effort to reduce energy use in the residential and municipal realm. Walla Walla, Bellingham and Anacortes engaged in the Georgetown University Energy Prize (GUEP) Competition an effort to encourage local governments and utilities to work with their communities to develop and implement plans for replicable, innovative, scalable and consistent reductions in natural gas and electric consumption. Three areas of import for the prize include:

- Spurring innovative approaches for communities to decrease their per-capita energy usage;
- Highlighting best practices for communities working with utilities, businesses, and their local governments to create and implement inventive plans for sustained energy efficiency;
- Educate the public and engage students in energy efficiency issues including methods, benefits and the environmental costs of the full fuel cycle.

Support from the Company has taken the form of assisting the GUEP with developing best practices in data tracking from a utility perspective, providing quality aggregate data downloads to track reductions in the participating towns and providing miscellaneous assistance as requested to the cities in the variety of activities and events they have engaged in within the communities to promote the efforts. The competition timeframe concludes at the end of 2016, however final evaluation and data management will continue into 2017. As part of the support the Company has provided to communities participating in these efforts, a joint bill insert was released to the four towns in Cascade's territory in 2015 and 2016 (see *Appendix B* for reference.) The Company has also provided a copy of a coloring book cover that was tailored to efficiency messaging for local students interested

in energy-efficiency which can be viewed in the *Appendix B*. Note the remainder of the coloring book includes low-cost/no-cost tips for children to reduce their energy use.

Cascade has also found great value in coordinating with the Western Washington University Institute for Energy Studies. This partnership has grown for the past two years and has been an excellent opportunity for Cascade to provide support to the Sustainability efforts on the Campus with information about its Energy-Efficiency programs, tabling at events as they arise and providing guest lectures about demand side management and associated efficiency programs for multiple classes at the university including a Business of Energy and an Energy Policy class in support of the Energy Policy and Management major as well as the Energy Policy minor.

Company representatives are also involved in a Women in Energy Mentoring Network (WIEMN) which meets on a monthly basis and provides students an opportunity to talk to professionals throughout the industry about various energy topics including efficiency and renewable resources. Its goal is to develop leadership skills in students while maintaining diversity in energy studies and the energy industry through the support and feedback of professionals.

In 2015 Cascade partnered with other utilities in the Tri-Cities area to provide an Energy Experience to local junior high students. The event's goal was to target middle school students and educate them about energy generation, production, safety, efficiency and conservation. Participation by Cascade helped increase awareness of natural gas as a source of energy in the home and how it is used, and in turn how it could be conserved. It also provided an opportunity to talk about the Cascade rebate program in terms of rebates, home energy consumption, and the importance of understanding how a home performs and can be audited, see *Appendix B* for a copy of the flyer developed for the outreach event to students. The event is slated to occur again in 2017 with the Company planning to continue participation.

In accordance with the Company's integrated marketing efforts Cascade has also branched out to its customers through an alternative messaging venue from standard energy efficiency focused events in the community. During the spring and summer season for the past two years the energy efficiency department has worked closely with the safety department on a joint message. The groups will continue outreach of this nature in future years, although the final format will be determined based on discussions with the advertisers and team. A messaging campaign was provided during the Walla Walla Sweets baseball team and Yakima Pippins baseball team seasons for the Company to provide information about natural gas safety going hand-in-hand with efficient use of natural gas. See *Appendix B* for a copy of a handout provided to all attendees at the games as well an

image of one of the signs at the fields. Overall program impressions at one of the fields was up to 1,300 fans viewing the messaging each night throughout the season, and at the other field 41,255 fans attended games this season. The campaign included the following elements:

- Either a 3'x4' poster at the stadium entrance or a 12'x8' outfield sign
- In-game promotion of safe digging (811 promotion) - (*please note costs for this element of the messaging were not covered through deferred funds*)
- 30 second video board commercial during Yakima game
- 30 second radio commercial per game
- 3 tabling nights at each field with distribution of up to 600 efficiency flyers per game
- Web-button linking to CNGC and the efficiency programs from the team's website

Energy efficiency messaging is also provided when requested for support of District Office community engagement efforts including the items from Longview's outreach during sporting events in *Appendix B* from 2016.

In the coming year, Cascade also plans to create Spanish language messaging and forms to ensure the Company is engaging more fully with the Latino community in energy efficiency education and awareness.

Residential Focus

The Company takes advantage of the opportunity to message to its customers on the energy efficiency programs whenever possible and cost effective. One such example includes the monthly energy efficiency bill insert sent to all core customers which is sent to customers receiving utility bills in both an electronic and hard copy form. This venue continues to be a viable and consistent format for providing efficiency messaging and updates to customers on program offerings. See *Appendix B* for samples of inserts sent during CY 2016. The bill inserts are generally residential customer focused as it's important for the decision makers in the home to receive the messaging. Having said that, the Company has also referenced its commercial program offerings in bill inserts on occasion and has received follow-up from customers based on the information in the piece.

Local Home Builders Associations provide another strong partnership opportunity for energy efficiency messaging. These organizations play an integral part with local contractors and the new home industry to promote higher-efficiency equipment use and efficient building practices, including Built Green® certification. The Company attends Built Green meetings and events as available to further encourage uptake of program offerings and higher-efficiency natural gas investment from builders at the time when decisions are being made. HBAs commonly message to new home buyers and those interested in

renovating their existing homes – which in turn, provides the Company with a premier opportunity for outreach during an association’s Home and Garden Shows and Home Tours. During these events, the Company often places advertisements in event directories and at the homes themselves (see *Appendix B*). The Company will also attend such events in person to speak with customers and support local Trade Ally Contractors by providing program materials and rebate information for distribution to attendees. These efforts will continue into 2017 and 2018 with the Tri-Cities HBA, Central Washington HBA, Skagit/Island County HBA, Home Builders Association of Whatcom County and others as deemed appropriate. Note – in Longview the Company has also provided ad placements in the Lower Columbia Contractor’s Association Directory which meets many of the same messaging opportunities as coordinating with the HBAs (See Appendix B for ad placements from 2016).

The real-estate industry also poses a unique opportunity for Company representatives to provide information about energy-efficiency offerings to an audience that is poised to help home buyers make wise decisions on future energy consumption in their homes. Informing real-estate agents of available rebates and the impact energy choices can make to a home’s energy costs during the lifespan of the measure is important to start the purchaser on an energy efficient path as early as possible. The Company has attended Association of Realtor meetings in the past and will seek additional opportunities to increase outreach to this group throughout 2017 and into 2018.

As the home owner/buyer is most frequently the decision maker in efficiency upgrade situations it’s also an opportunity for the Company to provide information to the industry helping home buyers with their purchase – i.e. the financial or loan industry. The Company recognizes that one of the main barriers to installing higher-efficiency equipment in existing homes and businesses is the initial higher costs. If the Company is able to get information about rebates into the hands of those making the purchasing decisions it helps them be more informed about their options and possibly accommodate the additional higher costs at the time funding is being discussed and made available. Cascade will research opportunities for outreach to this industry in 2017 and increase its efforts accordingly into 2018.

The Company relies heavily on coordination with local area contractors to encourage uptake of its conservation programs. Contractors are on site with the customer, in their home, helping them make the decision to install either standard or high-efficiency appliances. Since contractors play such an integral role in the customer experience and decision making process the Company therefore maintains a robust Trade Ally (TA) network and encourages these contractors to promote higher-efficiency natural gas equipment. The TA network also enables the Company to confirm the majority of

installations performed as part of the CIP conforms to industry best practices meaning the install meets expectations and results in anticipated energy savings.

As part of the residential transition to internal program implementation, Trade Ally management is now being handled directly by Cascade staff. This gives the Company the ability to interface directly with the contractors should questions or concerns arise. The Company also sends periodic newsletters and emails to the contractors addressing pertinent aspects of the program including updates, quality control issues, highlighting best practices and case studies, etc. The Company also provides a range of Trade Ally benefits to encourage active sales of higher-efficiency natural gas equipment and measures. See *Appendix B* for an example of a trade ally bonus coupon, which provides an additional incentive to customers working directly through a qualified TA. These coupons must be submitted by a customer in conjunction with a qualifying rebate application whereupon funds are distributed directly to the customer. The TA program also provides limited cooperative marketing funding for Trade Allies along with reimbursement monies for trainings relevant to working with homes served by natural gas.

Low Income messaging opportunities

With the revision of the LI-WIP programs there will be opportunities for additional messaging to customers and the Agencies. The Company will continue to work hand-in-hand with the Agencies to encourage uptake of the programs and may also use bill inserts to generate greater program awareness in select areas, or other strategies at the request of the Company's weatherization partners including public facing advertising as deemed appropriate and cost-effective.

Commercial Focus

In addition to the Company's residential outreach efforts, Cascade also tailors messaging to Commercial and Industrial customers. Outreach efforts for these customers in the past were tailored to one-on-one customer engagement and have since blossomed to a more robust effort in accordance with the cross-channel marketing mentioned earlier. For the past several years, Cascade has been a sponsor at the Northwest Food Processors Association Energy Summit. This sponsorship gives program representatives a unique opportunity to discuss conservation options in person and provide information directly to industrial customers who can otherwise be difficult to reach.

The Company also sponsored the 2016 Washington Energy Future Conference where we displayed messaging about the program in the directory. This event plays a key role in promoting energy efficiency throughout the state to industry decision makers and the general public. See *Appendix B* for a sample of the ad.

Additionally, the Company has posted a standee at the Columbia Center Mall tailored to both residential and small commercial business owners, encouraging these customers to consider efficiency in the business and purchasing decisions they make. See *Appendix B*.

The Company regularly attends and tables at Chamber of Commerce events including annual meetings, business expos and monthly meetings to distribute commercial/industrial messaging, and will continue to do so in the following years as opportunities arise.

In 2016, Lockheed Martin, the Company's Commercial program implementation vendor increased its outreach efforts on behalf of the Cascade CIP and is positioned to continue to further increase these efforts into 2017. The Lockheed team attends and tables at events as needed to provide information about Commercial and Industrial program offerings and requirements. They have also reached out to local Chambers and directories to display advertisements to further increase interest in rebates. Lockheed has identified multiple opportunities to highlight customer achievements by providing case studies and public check presentations to increase awareness and excitement about commercial natural gas upgrades. See *Appendix B* for sample

The program will continue to move forward with its outreach strategy into 2017. The Cascade team will also work with Lockheed to develop a more robust second tier of commercially focused trade allies who can serve the same role as the residential program in helping customers move toward higher-efficiency options.

Appendix A

Conservation Planning 2017 Cascade Natural Gas Corporation

Table of Contents

**Breakdown of Scenarios by Customer Class
with Adoption Curves**

Equipment and Non Equipment Libraries

Residential Forecasts			
Year	Tech	Econ	Achievable
2017	1,153,065	960,841	323,878
2018	1,169,903	973,256	331,357
2019	1,184,300	985,292	340,468
2020	1,204,222	1,001,899	352,843
2021	1,213,571	1,009,714	363,984
2022	1,228,391	1,022,078	378,657
2023	1,243,366	1,034,568	395,111
2024	1,263,873	1,051,638	414,680
2025	1,273,121	1,059,334	431,139
2026	1,288,080	1,071,785	449,272
2027	1,302,901	1,084,093	466,452
2028	1,323,802	1,101,481	484,478
2029	1,332,855	1,108,992	496,550
2030	1,346,751	1,120,426	508,657
2031	1,360,395	1,131,650	519,158
2032	1,380,170	1,147,991	530,765
2033	1,387,405	1,153,884	536,512
2034	1,400,722	1,164,845	545,271
2035	1,414,005	1,175,781	552,472
2036	1,435,386	1,193,634	561,700

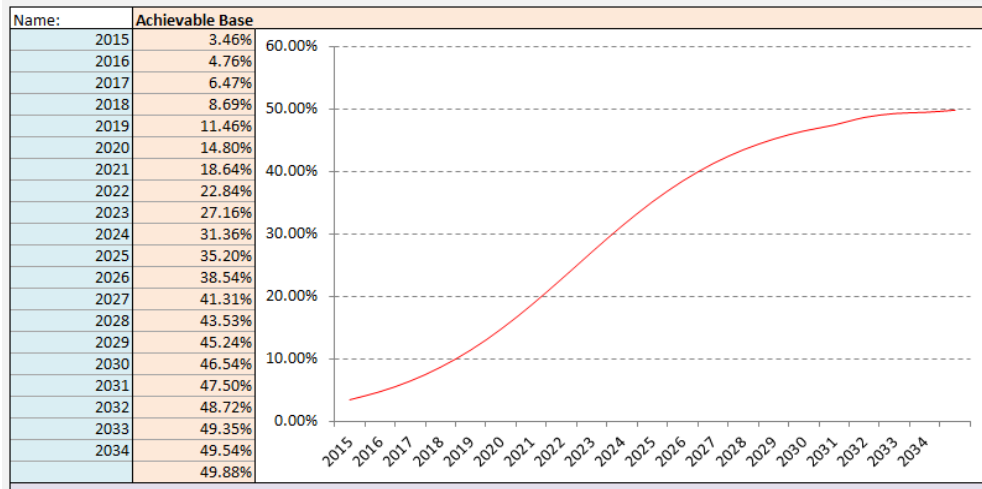
Commercial/Industrial Forecasts			
Year	Tech	Econ	Achievable
2017	3,399,034	1,854,613	515,998
2018	3,452,896	1,885,068	545,217
2019	3,502,105	1,911,548	580,973
2020	3,565,442	1,946,157	626,755
2021	3,604,272	1,967,465	675,894
2022	3,657,915	1,996,713	735,221
2023	3,710,809	2,025,969	800,558
2024	3,780,448	2,064,006	872,792
2025	3,819,939	2,085,799	938,231
2026	3,875,030	2,116,061	1,004,324
2027	3,928,224	2,145,386	1,064,697
2028	3,999,479	2,184,484	1,123,630
2029	4,036,383	2,204,858	1,166,051
2030	4,090,945	2,234,827	1,207,197
2031	4,143,535	2,263,714	1,242,185
2032	4,211,920	2,301,211	1,277,411
2033	4,247,266	2,320,633	1,299,065
2034	4,300,942	2,350,312	1,325,558
2035	4,351,743	2,378,098	1,350,379
2036	4,428,426	2,420,644	1,379,572

Total Conservation Forecasts			
Year	Technical	Economic	Achievable
2017	4,552,099	2,815,454	839,876
2018	4,622,799	2,858,324	876,574
2019	4,686,406	2,896,840	921,441
2020	4,769,664	2,948,056	979,599
2021	4,817,844	2,977,179	1,039,878
2022	4,886,307	3,018,791	1,113,877
2023	4,954,176	3,060,537	1,195,669
2024	5,044,322	3,115,644	1,287,472
2025	5,093,061	3,145,133	1,369,370
2026	5,163,110	3,187,846	1,453,596
2027	5,231,124	3,229,479	1,531,149
2028	5,323,281	3,285,965	1,608,109
2029	5,369,238	3,313,850	1,662,601
2030	5,437,697	3,355,253	1,715,853
2031	5,503,930	3,395,364	1,761,343
2032	5,592,090	3,449,201	1,808,177
2033	5,634,670	3,474,518	1,835,577
2034	5,701,664	3,515,157	1,870,829
2035	5,765,748	3,553,879	1,902,851
2036	5,863,812	3,614,278	1,941,272

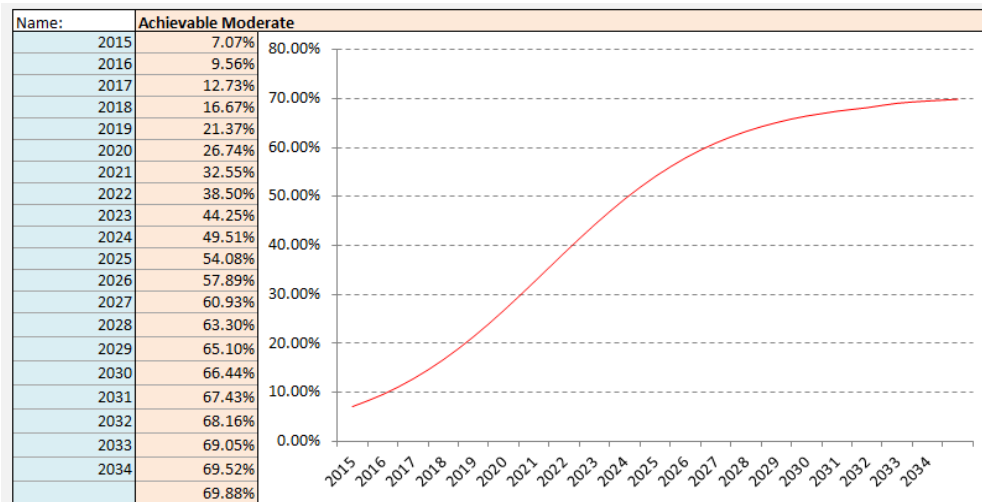
Commercial Forecasts			
Year	Tech	Econ	Achievable
2017	3,178,361	1,726,527	468,479
2018	3,228,640	1,755,071	496,521
2019	3,275,345	1,780,082	530,929
2020	3,335,788	1,812,997	575,035
2021	3,372,961	1,833,333	622,516
2022	3,424,468	1,861,331	679,805
2023	3,475,362	1,889,417	742,897
2024	3,542,475	1,925,981	812,585
2025	3,580,683	1,947,024	875,725
2026	3,633,982	1,976,240	939,436
2027	3,685,422	2,004,543	997,584
2028	3,754,384	2,042,306	1,054,356
2029	3,790,238	2,062,067	1,095,213
2030	3,843,214	2,091,112	1,134,886
2031	3,894,232	2,119,085	1,168,627
2032	3,960,462	2,155,328	1,202,616
2033	3,994,967	2,174,260	1,223,571
2034	4,047,168	2,203,081	1,249,084
2035	4,096,585	2,230,060	1,273,176
2036	4,171,528	2,271,522	1,301,660

Industrial Forecasts			
Year	Tech	Econ	Achievable
2017	220,673	128,086	47,520
2018	224,256	129,997	48,695
2019	226,760	131,466	50,045
2020	229,654	133,160	51,720
2021	231,311	134,131	53,378
2022	233,448	135,382	55,416
2023	235,447	136,552	57,661
2024	237,973	138,025	60,207
2025	239,256	138,776	62,506
2026	241,048	139,821	64,888
2027	242,802	140,844	67,113
2028	245,094	142,178	69,274
2029	246,146	142,791	70,838
2030	247,731	143,715	72,311
2031	249,302	144,629	73,558
2032	251,458	145,883	74,796
2033	252,299	146,374	75,494
2034	253,774	147,231	76,474
2035	255,158	148,038	77,203
2036	256,898	149,123	77,911

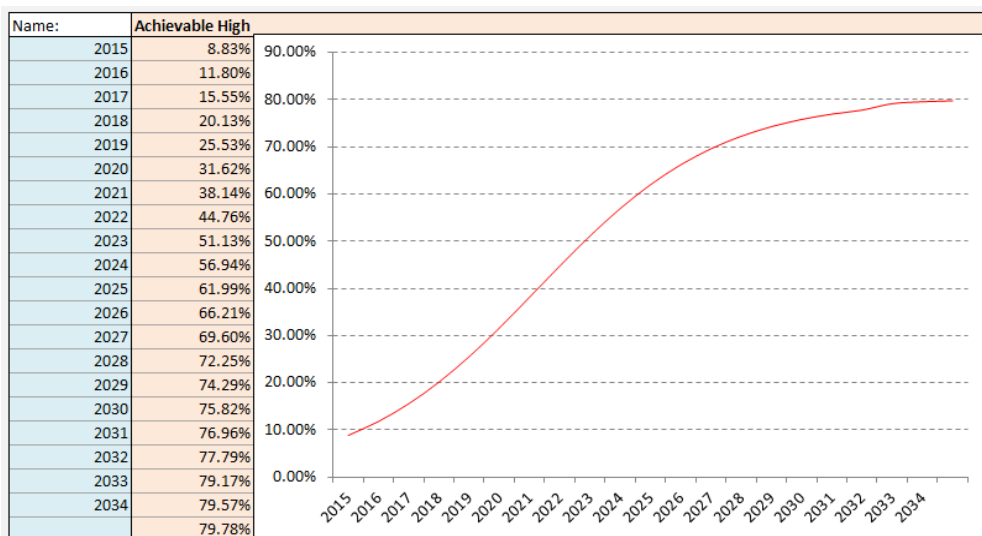
Achievable 1 - Adoption Curve for 30% of Incremental Costs Incentive Level



Achievable 2 - Adoption Curve for 50% of Incremental Costs Incentive Level



Achievable 3 - Adoption Curve for 75% of Incremental Costs Incentive Level



Description	Vintage	Segment	Climate Zone	B/c Ratio
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Mfg_CZ1	1	0.8208
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Mfg_CZ2	2	0.8208
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Mfg_CZ3	3	0.8208
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Multi_CZ1	1	0.6785
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Multi_CZ2	2	0.6785
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Multi_CZ3	3	0.6785
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Single_CZ1	1	0.8158
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Single_CZ2	2	0.8158
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Early Retirement	Single_CZ3	3	0.8158
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Mfg_CZ1	1	1.1811
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Mfg_CZ2	2	1.1811
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Mfg_CZ3	3	1.1811
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Multi_CZ1	1	1.0145
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Multi_CZ2	2	1.0145
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Multi_CZ3	3	1.0145
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Single_CZ1	1	1.1769
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Single_CZ2	2	1.1769
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	New	Single_CZ3	3	1.1769
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Mfg_CZ1	1	1.1811
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Mfg_CZ2	2	1.1811
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Mfg_CZ3	3	1.1811
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Multi_CZ1	1	1.0145
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Multi_CZ2	2	1.0145
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Multi_CZ3	3	1.0145
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Single_CZ1	1	1.1769
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Single_CZ2	2	1.1769
40 Gallon High Efficiency Natural Gas Water Heater (0.67 EF)	Turnover	Single_CZ3	3	1.1769
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Mfg_CZ1	1	0.7894
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Mfg_CZ2	2	0.7719
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Mfg_CZ3	3	0.7918
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Multi_CZ1	1	0.7220
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Multi_CZ2	2	0.7059
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Multi_CZ3	3	0.7245
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Single_CZ1	1	0.9702
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Single_CZ2	2	0.9504
Condensing boiler with 96% estimated seasonal efficiency	Early Retirement	Single_CZ3	3	0.9730
Condensing boiler with 96% estimated seasonal efficiency	New	Mfg_CZ1	1	1.0154
Condensing boiler with 96% estimated seasonal efficiency	New	Mfg_CZ2	2	0.9958
Condensing boiler with 96% estimated seasonal efficiency	New	Mfg_CZ3	3	1.0190
Condensing boiler with 96% estimated seasonal efficiency	New	Multi_CZ1	1	0.9369
Condensing boiler with 96% estimated seasonal efficiency	New	Multi_CZ2	2	0.9174
Condensing boiler with 96% estimated seasonal efficiency	New	Multi_CZ3	3	0.9400
Condensing boiler with 96% estimated seasonal efficiency	New	Single_CZ1	1	1.2205
Condensing boiler with 96% estimated seasonal efficiency	New	Single_CZ2	2	1.1992
Condensing boiler with 96% estimated seasonal efficiency	New	Single_CZ3	3	1.2240
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Mfg_CZ1	1	1.0154
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Mfg_CZ2	2	0.9958
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Mfg_CZ3	3	1.0190
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Multi_CZ1	1	0.9369
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Multi_CZ2	2	0.9174
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Multi_CZ3	3	0.9400

Description	Vintage	Segment	Climate Zone	B/c Ratio
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Single_CZ1	1	1.2205
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Single_CZ2	2	1.1992
Condensing boiler with 96% estimated seasonal efficiency	Turnover	Single_CZ3	3	1.2240
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Mfg_CZ1	1	0.8121
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Mfg_CZ2	2	0.8121
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Mfg_CZ3	3	0.8121
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Multi_CZ1	1	0.6648
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Multi_CZ2	2	0.6648
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Multi_CZ3	3	0.6648
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Single_CZ1	1	0.8072
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Single_CZ2	2	0.8072
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Early Retirement	Single_CZ3	3	0.8072
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Mfg_CZ1	1	0.7929
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Mfg_CZ2	2	0.7929
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Mfg_CZ3	3	0.7929
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Multi_CZ1	1	0.6478
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Multi_CZ2	2	0.6478
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Multi_CZ3	3	0.6478
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Single_CZ1	1	0.7887
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Single_CZ2	2	0.7887
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	New	Single_CZ3	3	0.7887
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Mfg_CZ1	1	0.7929
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Mfg_CZ2	2	0.7929
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Mfg_CZ3	3	0.7929
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Multi_CZ1	1	0.6478
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Multi_CZ2	2	0.6478
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Multi_CZ3	3	0.6478

Description	Vintage	Segment	Climate Zone	B/c Ratio
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Single_CZ1	1	0.7887
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Single_CZ2	2	0.7887
Condensing High Efficiency Natural Gas Tankless Water Heater (0.91 EF)	Turnover	Single_CZ3	3	0.7887
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Mfg_CZ1	1	0.7068
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Mfg_CZ2	2	0.7068
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Mfg_CZ3	3	0.7068
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Multi_CZ1	1	0.5799
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Multi_CZ2	2	0.5799
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Multi_CZ3	3	0.5799
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Single_CZ1	1	0.7024
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Single_CZ2	2	0.7024
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Early Retirement	Single_CZ3	3	0.7024
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Mfg_CZ1	1	0.8017
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Mfg_CZ2	2	0.8017
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Mfg_CZ3	3	0.8017
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Multi_CZ1	1	0.6645
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Multi_CZ2	2	0.6645
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Multi_CZ3	3	0.6645
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Single_CZ1	1	0.7972
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Single_CZ2	2	0.7972
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	New	Single_CZ3	3	0.7972
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Mfg_CZ1	1	0.8017
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Mfg_CZ2	2	0.8017
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Mfg_CZ3	3	0.8017
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Multi_CZ1	1	0.6645
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Multi_CZ2	2	0.6645
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Multi_CZ3	3	0.6645
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Single_CZ1	1	0.7972
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Single_CZ2	2	0.7972
Condensing Natural Gas Water Heater (0.90 EF), 40 gallon	Turnover	Single_CZ3	3	0.7972
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Mfg_CZ1	1	0.9800
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Mfg_CZ2	2	0.9600
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Mfg_CZ3	3	0.9828
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Multi_CZ1	1	0.9038
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Multi_CZ2	2	0.8854
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Multi_CZ3	3	0.9068
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Single_CZ1	1	1.1770
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Single_CZ2	2	1.1562
High Efficiency Boiler, 90% AFUE or greater.	Early Retirement	Single_CZ3	3	1.1805
High Efficiency Boiler, 90% AFUE or greater.	New	Mfg_CZ1	1	1.4110
High Efficiency Boiler, 90% AFUE or greater.	New	Mfg_CZ2	2	1.3896
High Efficiency Boiler, 90% AFUE or greater.	New	Mfg_CZ3	3	1.4146
High Efficiency Boiler, 90% AFUE or greater.	New	Multi_CZ1	1	1.3243
High Efficiency Boiler, 90% AFUE or greater.	New	Multi_CZ2	2	1.3031
High Efficiency Boiler, 90% AFUE or greater.	New	Multi_CZ3	3	1.3269
High Efficiency Boiler, 90% AFUE or greater.	New	Single_CZ1	1	1.6250
High Efficiency Boiler, 90% AFUE or greater.	New	Single_CZ2	2	1.6027
High Efficiency Boiler, 90% AFUE or greater.	New	Single_CZ3	3	1.6285

Description	Vintage	Segment	Climate Zone	B/c Ratio
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Mfg_CZ1	1	1.4110
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Mfg_CZ2	2	1.3896
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Mfg_CZ3	3	1.4146
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Multi_CZ1	1	1.3243
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Multi_CZ2	2	1.3031
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Multi_CZ3	3	1.3269
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Single_CZ1	1	1.6250
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Single_CZ1	1	2.6094
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Single_CZ2	2	1.6027
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Single_CZ2	2	2.6577
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Single_CZ3	3	2.6471
High Efficiency Boiler, 90% AFUE or greater.	Turnover	Single_CZ3	3	1.6285
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Mfg_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Mfg_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Mfg_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Multi_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Multi_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Multi_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Single_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Single_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	Early Retirement	Single_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	New	Mfg_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	New	Mfg_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	New	Mfg_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	New	Multi_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	New	Multi_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	New	Multi_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	New	Single_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	New	Single_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	New	Single_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Mfg_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Mfg_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Mfg_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Multi_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Multi_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Multi_CZ3	3	1.5883
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Single_CZ1	1	1.5844
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Single_CZ2	2	1.5626
High efficiency natural gas fireplace hearth; AFUE 80%	Turnover	Single_CZ3	3	1.5883
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Mfg_CZ1	1	0.9929
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Mfg_CZ2	2	0.9887
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Mfg_CZ3	3	0.9934
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Multi_CZ1	1	1.0100
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Multi_CZ2	2	1.0059
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Multi_CZ3	3	1.0111
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Single_CZ1	1	1.0600
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Single_CZ2	2	1.0546
High-efficiency (condensing) furnace = AFUE 95	Early Retirement	Single_CZ3	3	1.0609
High-efficiency (condensing) furnace = AFUE 95	New	Mfg_CZ1	1	1.2767
High-efficiency (condensing) furnace = AFUE 95	New	Mfg_CZ2	2	1.2726
High-efficiency (condensing) furnace = AFUE 95	New	Mfg_CZ3	3	1.2773

Description	Vintage	Segment	Climate Zone	B/c Ratio
High-efficiency (condensing) furnace = AFUE 95	New	Multi_CZ1	1	1.2932
High-efficiency (condensing) furnace = AFUE 95	New	Multi_CZ2	2	1.2886
High-efficiency (condensing) furnace = AFUE 95	New	Multi_CZ3	3	1.2939
High-efficiency (condensing) furnace = AFUE 95	New	Single_CZ1	1	1.3401
High-efficiency (condensing) furnace = AFUE 95	New	Single_CZ2	2	1.3352
High-efficiency (condensing) furnace = AFUE 95	New	Single_CZ3	3	1.3413
High-efficiency (condensing) furnace = AFUE 95	Turnover	Mfg_CZ1	1	1.2767
High-efficiency (condensing) furnace = AFUE 95	Turnover	Mfg_CZ2	2	1.2726
High-efficiency (condensing) furnace = AFUE 95	Turnover	Mfg_CZ3	3	1.2773
High-efficiency (condensing) furnace = AFUE 95	Turnover	Multi_CZ1	1	1.2932
High-efficiency (condensing) furnace = AFUE 95	Turnover	Multi_CZ2	2	1.2886
High-efficiency (condensing) furnace = AFUE 95	Turnover	Multi_CZ3	3	1.2939
High-efficiency (condensing) furnace = AFUE 95	Turnover	Single_CZ1	1	1.3401
High-efficiency (condensing) furnace = AFUE 95	Turnover	Single_CZ2	2	1.3352
High-efficiency (condensing) furnace = AFUE 95	Turnover	Single_CZ3	3	1.3413
New High Efficiency Condensing Boiler for Water and Space Heating applied to MF buildings	Early Retirement	Multi_CZ3	3	1.9605
New High Efficiency Condensing Boiler for Water and Space Heating applied to MF buildings	New	Multi_CZ1	1	1.9605
New High Efficiency Condensing Boiler for Water and Space Heating applied to MF buildings	Turnover	Multi_CZ2	2	1.9605
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Mfg_CZ1	1	0.8326
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Mfg_CZ2	2	0.8229
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Mfg_CZ3	3	0.8341
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Multi_CZ1	1	0.6756
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Multi_CZ2	2	0.6662
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Multi_CZ3	3	0.6771
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Single_CZ1	1	0.4675
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Single_CZ2	2	0.4613
Tankless water heater with mean capacity of 108 MBTU/hr	Early Retirement	Single_CZ3	3	0.4684
Tankless water heater with mean capacity of 108 MBTU/hr	New	Mfg_CZ1	1	2.4795
Tankless water heater with mean capacity of 108 MBTU/hr	New	Mfg_CZ2	2	2.4717
Tankless water heater with mean capacity of 108 MBTU/hr	New	Mfg_CZ3	3	2.4806
Tankless water heater with mean capacity of 108 MBTU/hr	New	Multi_CZ1	1	2.4180
Tankless water heater with mean capacity of 108 MBTU/hr	New	Multi_CZ2	2	2.4086
Tankless water heater with mean capacity of 108 MBTU/hr	New	Multi_CZ3	3	2.4194
Tankless water heater with mean capacity of 108 MBTU/hr	New	Single_CZ1	1	2.2099
Tankless water heater with mean capacity of 108 MBTU/hr	New	Single_CZ2	2	2.2002
Tankless water heater with mean capacity of 108 MBTU/hr	New	Single_CZ3	3	2.2114
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Mfg_CZ1	1	0.8400
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Mfg_CZ2	2	0.8305
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Mfg_CZ3	3	0.8414
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Multi_CZ1	1	0.6685
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Multi_CZ2	2	0.6594
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Multi_CZ3	3	0.6699
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Single_CZ1	1	0.4421
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Single_CZ2	2	0.4363
Tankless water heater with mean capacity of 108 MBTU/hr	Turnover	Single_CZ3	3	0.4430

Description	Vintage	Segment	Climate Zone	B/c Ratio
Attic / Ceiling Insulation > R-38	Existing	Mfg_CZ1	1	1.5437
Attic / Ceiling Insulation > R-38	Existing	Mfg_CZ1	1	1.2698
Attic / Ceiling Insulation > R-38	Existing	Mfg_CZ2	2	1.4993
Attic / Ceiling Insulation > R-38	Existing	Mfg_CZ2	2	1.2329
Attic / Ceiling Insulation > R-38	Existing	Mfg_CZ3	3	1.6560
Attic / Ceiling Insulation > R-38	Existing	Mfg_CZ3	3	1.3745
Attic / Ceiling Insulation > R-38	Existing	Multi_CZ1	1	1.5437
Attic / Ceiling Insulation > R-38	Existing	Multi_CZ1	1	1.2698
Attic / Ceiling Insulation > R-38	Existing	Multi_CZ2	2	1.4993
Attic / Ceiling Insulation > R-38	Existing	Multi_CZ2	2	1.2329
Attic / Ceiling Insulation > R-38	Existing	Multi_CZ3	3	1.6560
Attic / Ceiling Insulation > R-38	Existing	Multi_CZ3	3	1.3745
Attic / Ceiling Insulation > R-38	Existing	Single_CZ1	1	1.5449
Attic / Ceiling Insulation > R-38	Existing	Single_CZ1	1	1.2709
Attic / Ceiling Insulation > R-38	Existing	Single_CZ2	2	1.5032
Attic / Ceiling Insulation > R-38	Existing	Single_CZ2	2	1.2329
Attic / Ceiling Insulation > R-38	Existing	Single_CZ3	3	1.6548
Attic / Ceiling Insulation > R-38	Existing	Single_CZ3	3	1.3726
Attic / Ceiling Insulation > R-38	New	Mfg_CZ1	1	1.4993
Attic / Ceiling Insulation > R-38	New	Mfg_CZ2	2	1.4532
Attic / Ceiling Insulation > R-38	New	Mfg_CZ3	3	1.6042
Attic / Ceiling Insulation > R-38	New	Multi_CZ1	1	1.4993
Attic / Ceiling Insulation > R-38	New	Multi_CZ2	2	1.4532
Attic / Ceiling Insulation > R-38	New	Multi_CZ3	3	1.6042
Attic / Ceiling Insulation > R-38	New	Single_CZ1	1	1.4954
Attic / Ceiling Insulation > R-38	New	Single_CZ2	2	1.4559
Attic / Ceiling Insulation > R-38	New	Single_CZ3	3	1.6065
Attic / Ceiling Insulation > R-49	Existing	Mfg_CZ1	1	2.6501
Attic / Ceiling Insulation > R-49	Existing	Mfg_CZ1	1	1.7673
Attic / Ceiling Insulation > R-49	Existing	Mfg_CZ2	2	2.6134
Attic / Ceiling Insulation > R-49	Existing	Mfg_CZ2	2	1.7238
Attic / Ceiling Insulation > R-49	Existing	Mfg_CZ3	3	2.7445
Attic / Ceiling Insulation > R-49	Existing	Mfg_CZ3	3	1.8804
Attic / Ceiling Insulation > R-49	Existing	Multi_CZ1	1	2.6501
Attic / Ceiling Insulation > R-49	Existing	Multi_CZ1	1	1.7673
Attic / Ceiling Insulation > R-49	Existing	Multi_CZ2	2	2.6134
Attic / Ceiling Insulation > R-49	Existing	Multi_CZ2	2	1.7238
Attic / Ceiling Insulation > R-49	Existing	Multi_CZ3	3	2.7445
Attic / Ceiling Insulation > R-49	Existing	Multi_CZ3	3	1.8804
Attic / Ceiling Insulation > R-49	Existing	Single_CZ1	1	2.6498
Attic / Ceiling Insulation > R-49	Existing	Single_CZ1	1	1.7673
Attic / Ceiling Insulation > R-49	Existing	Single_CZ2	2	2.6135
Attic / Ceiling Insulation > R-49	Existing	Single_CZ2	2	1.7249
Attic / Ceiling Insulation > R-49	Existing	Single_CZ3	3	2.7446
Attic / Ceiling Insulation > R-49	Existing	Single_CZ3	3	1.8804
Attic / Ceiling Insulation > R-49	New	Mfg_CZ1	1	2.6082

Description	Vintage	Segment	Climate Zone	B/c Ratio
Attic / Ceiling Insulation > R-49	New	Mfg_CZ1	1	1.7183
Attic / Ceiling Insulation > R-49	New	Mfg_CZ1	1	1.2275
Attic / Ceiling Insulation > R-49	New	Mfg_CZ2	2	2.5703
Attic / Ceiling Insulation > R-49	New	Mfg_CZ2	2	1.6756
Attic / Ceiling Insulation > R-49	New	Mfg_CZ2	2	1.3307
Attic / Ceiling Insulation > R-49	New	Mfg_CZ3	3	2.7041
Attic / Ceiling Insulation > R-49	New	Mfg_CZ3	3	1.8317
Attic / Ceiling Insulation > R-49	New	Mfg_CZ3	3	1.3307
Attic / Ceiling Insulation > R-49	New	Multi_CZ1	1	2.6082
Attic / Ceiling Insulation > R-49	New	Multi_CZ1	1	1.7183
Attic / Ceiling Insulation > R-49	New	Multi_CZ1	1	1.2275
Attic / Ceiling Insulation > R-49	New	Multi_CZ2	2	2.5703
Attic / Ceiling Insulation > R-49	New	Multi_CZ2	2	1.6756
Attic / Ceiling Insulation > R-49	New	Multi_CZ2	2	1.3307
Attic / Ceiling Insulation > R-49	New	Multi_CZ3	3	2.7041
Attic / Ceiling Insulation > R-49	New	Multi_CZ3	3	1.8317
Attic / Ceiling Insulation > R-49	New	Multi_CZ3	3	1.3307
Attic / Ceiling Insulation > R-49	New	Single_CZ1	1	2.6077
Attic / Ceiling Insulation > R-49	New	Single_CZ1	1	1.7182
Attic / Ceiling Insulation > R-49	New	Single_CZ1	1	1.2265
Attic / Ceiling Insulation > R-49	New	Single_CZ2	2	2.5706
Attic / Ceiling Insulation > R-49	New	Single_CZ2	2	1.6756
Attic / Ceiling Insulation > R-49	New	Single_CZ2	2	1.3288
Attic / Ceiling Insulation > R-49	New	Single_CZ3	3	2.7042
Attic / Ceiling Insulation > R-49	New	Single_CZ3	3	1.8307
Attic / Ceiling Insulation > R-49	New	Single_CZ3	3	1.3288
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Mfg_CZ1	1	1.4492
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Mfg_CZ2	2	1.4277
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Mfg_CZ3	3	1.4527
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Multi_CZ1	1	1.3621
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Multi_CZ2	2	1.3408
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Multi_CZ3	3	1.3660

Description	Vintage	Segment	Climate Zone	B/c Ratio
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Single_CZ1	1	1.6627
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Single_CZ2	2	1.6415
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	Existing	Single_CZ3	3	1.6662
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Mfg_CZ1	1	1.4118
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Mfg_CZ2	2	1.3892
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Mfg_CZ3	3	1.4155
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Multi_CZ1	1	1.3244
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Multi_CZ2	2	1.3021
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Multi_CZ3	3	1.3272
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Single_CZ1	1	1.6251
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Single_CZ2	2	1.6036
Boiler reset controls capable of resetting boiler supply water temp in an inverse linear fasion w/outdoor air temp	New	Single_CZ3	3	1.6288
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Mfg_CZ1	1	0.9585
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Mfg_CZ2	2	0.9363
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Mfg_CZ3	3	1.0188
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Multi_CZ1	1	0.9585
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Multi_CZ2	2	0.9363

Description	Vintage	Segment	Climate Zone	B/c Ratio
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Multi_CZ3	3	1.0188
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Single_CZ1	1	0.9585
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Single_CZ2	2	0.9363
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	Existing	Single_CZ3	3	1.0188
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Mfg_CZ1	1	0.0818
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Mfg_CZ2	2	0.0795
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Mfg_CZ3	3	0.0929
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Multi_CZ1	1	0.0818
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Multi_CZ2	2	0.0795
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Multi_CZ3	3	0.0929
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Single_CZ1	1	0.0818
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Single_CZ2	2	0.0795
Comprehensive shell air sealing / infiltration control: to achieve CFM of 1250	New	Single_CZ3	3	0.0929
Door U-Factor <0.21, Energy Star Door	Existing	Mfg_CZ1	1	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Mfg_CZ2	2	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Mfg_CZ3	3	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Multi_CZ1	1	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Multi_CZ2	2	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Multi_CZ3	3	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Single_CZ1	1	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Single_CZ2	2	1.3109
Door U-Factor <0.21, Energy Star Door	Existing	Single_CZ3	3	1.3109
Door U-Factor <0.21, Energy Star Door	New	Mfg_CZ1	1	1.3109
Door U-Factor <0.21, Energy Star Door	New	Mfg_CZ2	2	1.3109
Door U-Factor <0.21, Energy Star Door	New	Mfg_CZ3	3	1.3109
Door U-Factor <0.21, Energy Star Door	New	Multi_CZ1	1	1.3109
Door U-Factor <0.21, Energy Star Door	New	Multi_CZ2	2	1.3109
Door U-Factor <0.21, Energy Star Door	New	Multi_CZ3	3	1.3109
Door U-Factor <0.21, Energy Star Door	New	Single_CZ1	1	1.3109
Door U-Factor <0.21, Energy Star Door	New	Single_CZ2	2	1.3109
Door U-Factor <0.21, Energy Star Door	New	Single_CZ3	3	1.3109
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Mfg_CZ1	1	1.2044
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Mfg_CZ2	2	1.2044

Description	Vintage	Segment	Climate Zone	B/c Ratio
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Mfg_CZ3	3	1.2044
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Multi_CZ1	1	0.7145
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Multi_CZ2	2	0.7145
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Multi_CZ3	3	0.7145
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Single_CZ1	1	1.2044
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Single_CZ2	2	1.2044
Drain Water Heat Recovery Unit, 60% efficiency	Existing	Single_CZ3	3	1.2044
Drain Water Heat Recovery Unit, 60% efficiency	New	Mfg_CZ1	1	0.9739
Drain Water Heat Recovery Unit, 60% efficiency	New	Mfg_CZ2	2	0.9739
Drain Water Heat Recovery Unit, 60% efficiency	New	Mfg_CZ3	3	0.9739
Drain Water Heat Recovery Unit, 60% efficiency	New	Multi_CZ1	1	0.5531
Drain Water Heat Recovery Unit, 60% efficiency	New	Multi_CZ2	2	0.5531
Drain Water Heat Recovery Unit, 60% efficiency	New	Multi_CZ3	3	0.5531
Drain Water Heat Recovery Unit, 60% efficiency	New	Single_CZ1	1	0.9739
Drain Water Heat Recovery Unit, 60% efficiency	New	Single_CZ2	2	0.9739
Drain Water Heat Recovery Unit, 60% efficiency	New	Single_CZ3	3	0.9739
Exterior Wall Insulation > R11	Existing	Mfg_CZ1	1	2.6064
Exterior Wall Insulation > R11	Existing	Mfg_CZ2	2	2.5697
Exterior Wall Insulation > R11	Existing	Mfg_CZ3	3	2.7035
Exterior Wall Insulation > R11	Existing	Multi_CZ1	1	2.6064
Exterior Wall Insulation > R11	Existing	Multi_CZ2	2	2.5697
Exterior Wall Insulation > R11	Existing	Multi_CZ3	3	2.7035
Exterior Wall Insulation > R11	Existing	Single_CZ1	1	2.6066
Exterior Wall Insulation > R11	Existing	Single_CZ2	2	2.5697
Exterior Wall Insulation > R11	Existing	Single_CZ3	3	2.7033
Exterior Wall Insulation > R11	New	Mfg_CZ1	1	2.5643
Exterior Wall Insulation > R11	New	Mfg_CZ2	2	2.5257
Exterior Wall Insulation > R11	New	Mfg_CZ3	3	2.6626
Exterior Wall Insulation > R11	New	Multi_CZ1	1	2.5643
Exterior Wall Insulation > R11	New	Multi_CZ2	2	2.5257
Exterior Wall Insulation > R11	New	Multi_CZ3	3	2.6626
Exterior Wall Insulation > R11	New	Single_CZ1	1	2.5641
Exterior Wall Insulation > R11	New	Single_CZ2	2	2.5261
Exterior Wall Insulation > R11	New	Single_CZ3	3	2.6623
HERS 75	New	Single_CZ1	1	0.7706
HERS 75	New	Single_CZ2	2	0.7619
HERS 75	New	Single_CZ3	3	0.7721
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Mfg_CZ1	1	1.3176
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Mfg_CZ2	2	1.3176
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Mfg_CZ3	3	1.3176
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Multi_CZ1	1	1.2449

Description	Vintage	Segment	Climate Zone	B/c Ratio
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Multi_CZ2	2	1.2449
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Multi_CZ3	3	1.2449
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Single_CZ1	1	1.3137
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Single_CZ2	2	1.3137
Insulated hot water pipe for conventional gas storage tank-type hot water heater (R>5.3)	Existing	Single_CZ3	3	1.3137
Low Flow Showerhead (1.5 GPM max)	Existing	Mfg_CZ1	1	1.4845
Low Flow Showerhead (1.5 GPM max)	Existing	Mfg_CZ2	2	1.4845
Low Flow Showerhead (1.5 GPM max)	Existing	Mfg_CZ3	3	1.4845
Low Flow Showerhead (1.5 GPM max)	Existing	Multi_CZ1	1	1.4709
Low Flow Showerhead (1.5 GPM max)	Existing	Multi_CZ2	2	1.4709
Low Flow Showerhead (1.5 GPM max)	Existing	Multi_CZ3	3	1.4709
Low Flow Showerhead (1.5 GPM max)	Existing	Single_CZ1	1	1.4507
Low Flow Showerhead (1.5 GPM max)	Existing	Single_CZ2	2	1.4507
Low Flow Showerhead (1.5 GPM max)	Existing	Single_CZ3	3	1.4507
Low Flow Showerhead (1.5 GPM max)	New	Mfg_CZ1	1	1.3357
Low Flow Showerhead (1.5 GPM max)	New	Mfg_CZ2	2	1.3357
Low Flow Showerhead (1.5 GPM max)	New	Mfg_CZ3	3	1.3357
Low Flow Showerhead (1.5 GPM max)	New	Multi_CZ1	1	1.3094
Low Flow Showerhead (1.5 GPM max)	New	Multi_CZ2	2	1.3094
Low Flow Showerhead (1.5 GPM max)	New	Multi_CZ3	3	1.3094
Low Flow Showerhead (1.5 GPM max)	New	Single_CZ1	1	1.2717
Low Flow Showerhead (1.5 GPM max)	New	Single_CZ2	2	1.2717
Low Flow Showerhead (1.5 GPM max)	New	Single_CZ3	3	1.2717
Low Flow Showerhead (2.0 GPM max)	Existing	Mfg_CZ1	1	1.4447
Low Flow Showerhead (2.0 GPM max)	Existing	Mfg_CZ2	2	1.4447
Low Flow Showerhead (2.0 GPM max)	Existing	Mfg_CZ3	3	1.4447
Low Flow Showerhead (2.0 GPM max)	Existing	Multi_CZ1	1	1.4270
Low Flow Showerhead (2.0 GPM max)	Existing	Multi_CZ2	2	1.4270
Low Flow Showerhead (2.0 GPM max)	Existing	Multi_CZ3	3	1.4270
Low Flow Showerhead (2.0 GPM max)	Existing	Single_CZ1	1	1.4018
Low Flow Showerhead (2.0 GPM max)	Existing	Single_CZ2	2	1.4018
Low Flow Showerhead (2.0 GPM max)	Existing	Single_CZ3	3	1.4018
Low Flow Showerhead (2.0 GPM max)	New	Mfg_CZ1	1	0.8330
Low Flow Showerhead (2.0 GPM max)	New	Mfg_CZ2	2	0.8330
Low Flow Showerhead (2.0 GPM max)	New	Mfg_CZ3	3	0.8330
Low Flow Showerhead (2.0 GPM max)	New	Multi_CZ1	1	0.7893
Low Flow Showerhead (2.0 GPM max)	New	Multi_CZ2	2	0.7893
Low Flow Showerhead (2.0 GPM max)	New	Multi_CZ3	3	0.7893
Low Flow Showerhead (2.0 GPM max)	New	Single_CZ1	1	0.7327
Low Flow Showerhead (2.0 GPM max)	New	Single_CZ2	2	0.7327
Low Flow Showerhead (2.0 GPM max)	New	Single_CZ3	3	0.7327

Description	Vintage	Segment	Climate Zone	B/c Ratio
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Mfg_CZ1	1	1.3208
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Mfg_CZ2	2	1.3208
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Mfg_CZ3	3	1.3208
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Multi_CZ1	1	1.2493
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Multi_CZ2	2	1.2493
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Multi_CZ3	3	1.2493
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Single_CZ1	1	1.1627
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Single_CZ2	2	1.1627
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	Existing	Single_CZ3	3	1.1627
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Mfg_CZ1	1	1.0194
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Mfg_CZ2	2	1.0194
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Mfg_CZ3	3	1.0194
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Multi_CZ1	1	0.9283
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Multi_CZ2	2	0.9283
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Multi_CZ3	3	0.9283

Description	Vintage	Segment	Climate Zone	B/c Ratio
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Single_CZ1	1	0.7988
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Single_CZ2	2	0.7988
One kitchen aerator at 1.5 gpm, and two additional aerators at 1.0 gpm = 1.17 gpm weighted average.	New	Single_CZ3	3	0.7988
Programmable Thermostat	Existing	Mfg_CZ1	1	1.1257
Programmable Thermostat	Existing	Mfg_CZ2	2	1.1055
Programmable Thermostat	Existing	Mfg_CZ3	3	1.1728
Programmable Thermostat	Existing	Multi_CZ1	1	1.1257
Programmable Thermostat	Existing	Multi_CZ2	2	1.1055
Programmable Thermostat	Existing	Multi_CZ3	3	1.1728
Programmable Thermostat	Existing	Single_CZ1	1	1.5350
Programmable Thermostat	Existing	Single_CZ2	2	1.5261
Programmable Thermostat	Existing	Single_CZ3	3	1.5570
Programmable Thermostat	New	Mfg_CZ1	1	1.3285
Programmable Thermostat	New	Mfg_CZ2	2	1.3155
Programmable Thermostat	New	Mfg_CZ3	3	1.3666
Programmable Thermostat	New	Multi_CZ1	1	1.3285
Programmable Thermostat	New	Multi_CZ2	2	1.3155
Programmable Thermostat	New	Multi_CZ3	3	1.3666
Programmable Thermostat	New	Single_CZ1	1	1.6217
Programmable Thermostat	New	Single_CZ2	2	1.6162
Programmable Thermostat	New	Single_CZ3	3	1.6359
R-13 Basement Insulation added to a basement or crawl space	Existing	Mfg_CZ1	1	3.4134
R-13 Basement Insulation added to a basement or crawl space	Existing	Mfg_CZ2	2	3.3967
R-13 Basement Insulation added to a basement or crawl space	Existing	Mfg_CZ3	3	3.4547
R-13 Basement Insulation added to a basement or crawl space	Existing	Multi_CZ1	1	3.4134
R-13 Basement Insulation added to a basement or crawl space	Existing	Multi_CZ2	2	3.3967
R-13 Basement Insulation added to a basement or crawl space	Existing	Multi_CZ3	3	3.4547
R-13 Basement Insulation added to a basement or crawl space	Existing	Single_CZ1	1	3.4134
R-13 Basement Insulation added to a basement or crawl space	Existing	Single_CZ2	2	3.3967
R-13 Basement Insulation added to a basement or crawl space	Existing	Single_CZ3	3	3.4547

Description	Vintage	Segment	Climate Zone	B/c Ratio
R-13 Basement Insulation added to a basement or crawl space	New	Mfg_CZ1	1	3.3943
R-13 Basement Insulation added to a basement or crawl space	New	Mfg_CZ2	2	3.3775
R-13 Basement Insulation added to a basement or crawl space	New	Mfg_CZ3	3	3.4373
R-13 Basement Insulation added to a basement or crawl space	New	Multi_CZ1	1	3.3943
R-13 Basement Insulation added to a basement or crawl space	New	Multi_CZ2	2	3.3775
R-13 Basement Insulation added to a basement or crawl space	New	Multi_CZ3	3	3.4373
R-13 Basement Insulation added to a basement or crawl space	New	Single_CZ1	1	3.3943
R-13 Basement Insulation added to a basement or crawl space	New	Single_CZ2	2	3.3775
R-13 Basement Insulation added to a basement or crawl space	New	Single_CZ3	3	3.4373
R-30 insulation added to basement or crawl space floor	Existing	Mfg_CZ1	1	1.1602
R-30 insulation added to basement or crawl space floor	Existing	Mfg_CZ2	2	1.1256
R-30 insulation added to basement or crawl space floor	Existing	Mfg_CZ3	3	1.2550
R-30 insulation added to basement or crawl space floor	Existing	Multi_CZ1	1	1.1603
R-30 insulation added to basement or crawl space floor	Existing	Multi_CZ2	2	1.1252
R-30 insulation added to basement or crawl space floor	Existing	Multi_CZ3	3	1.2548
R-30 insulation added to basement or crawl space floor	Existing	Single_CZ1	1	1.1598
R-30 insulation added to basement or crawl space floor	Existing	Single_CZ2	2	1.1253
R-30 insulation added to basement or crawl space floor	Existing	Single_CZ3	3	1.2548
R-30 insulation added to basement or crawl space floor	New	Mfg_CZ1	1	1.2002
R-30 insulation added to basement or crawl space floor	New	Mfg_CZ2	2	1.1653
R-30 insulation added to basement or crawl space floor	New	Mfg_CZ3	3	1.2971
R-30 insulation added to basement or crawl space floor	New	Multi_CZ1	1	1.2002
R-30 insulation added to basement or crawl space floor	New	Multi_CZ2	2	1.1655

Description	Vintage	Segment	Climate Zone	B/c Ratio
R-30 insulation added to basement or crawl space floor	New	Multi_CZ3	3	1.2970
R-30 insulation added to basement or crawl space floor	New	Single_CZ1	1	1.2005
R-30 insulation added to basement or crawl space floor	New	Single_CZ2	2	1.1652
R-30 insulation added to basement or crawl space floor	New	Single_CZ3	3	1.2971
R-5 Slab Insulation (4ft)	Existing	Mfg_CZ1	1	1.5041
R-5 Slab Insulation (4ft)	Existing	Mfg_CZ2	2	1.4642
R-5 Slab Insulation (4ft)	Existing	Mfg_CZ3	3	1.6205
R-5 Slab Insulation (4ft)	Existing	Multi_CZ1	1	1.5969
R-5 Slab Insulation (4ft)	Existing	Multi_CZ2	2	1.5560
R-5 Slab Insulation (4ft)	Existing	Multi_CZ3	3	1.7157
R-5 Slab Insulation (4ft)	Existing	Single_CZ1	1	1.2912
R-5 Slab Insulation (4ft)	Existing	Single_CZ2	2	1.2520
R-5 Slab Insulation (4ft)	Existing	Single_CZ3	3	1.3987
R-5 Slab Insulation (4ft)	New	Mfg_CZ1	1	1.8482
R-5 Slab Insulation (4ft)	New	Mfg_CZ2	2	1.8056
R-5 Slab Insulation (4ft)	New	Mfg_CZ3	3	1.9708
R-5 Slab Insulation (4ft)	New	Multi_CZ1	1	1.7319
R-5 Slab Insulation (4ft)	New	Multi_CZ2	2	1.6899
R-5 Slab Insulation (4ft)	New	Multi_CZ3	3	1.8532
R-5 Slab Insulation (4ft)	New	Single_CZ1	1	1.4800
R-5 Slab Insulation (4ft)	New	Single_CZ2	2	1.4380
R-5 Slab Insulation (4ft)	New	Single_CZ3	3	1.5942
Residential Energy Star Home [HERS Score: 75: base Home (as described in assumptions below) with the following alternates: R-44 Ceiling Insulation, 92AFUE furnace, 0.62 EF water heater, 0.46 ACH] plus the following additional savings: efficient dishwasher, clothes washer, duct insulation, and water faucets.	New	Single_CZ1	1	0.7753
Residential Energy Star Home [HERS Score: 75: base Home (as described in assumptions below) with the following alternates: R-44 Ceiling Insulation, 92AFUE furnace, 0.62 EF water heater, 0.46 ACH] plus the following additional savings: efficient dishwasher, clothes washer, duct insulation, and water faucets.	New	Single_CZ2	2	0.7666

Description	Vintage	Segment	Climate Zone	B/c Ratio
Residential Energy Star Home [HERS Score: 75: base Home (as described in assumptions below) with the following alternates: R-44 Ceiling Insulation, 92AFUE furnace, 0.62 EF water heater, 0.46 ACH] plus the following additional savings: efficient dishwasher, clothes washer, duct insulation, and water faucets.	New	Single_CZ3	3	0.7766
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Mfg_CZ1	1	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Mfg_CZ2	2	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Mfg_CZ3	3	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Multi_CZ1	1	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Multi_CZ2	2	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Multi_CZ3	3	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Single_CZ1	1	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Single_CZ2	2	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	Existing	Single_CZ3	3	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Mfg_CZ1	1	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Mfg_CZ2	2	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Mfg_CZ3	3	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Multi_CZ1	1	1.8163

Description	Vintage	Segment	Climate Zone	B/c Ratio
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Multi_CZ2	2	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Multi_CZ3	3	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Single_CZ1	1	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Single_CZ2	2	1.8163
Ventilation system meeting ASHRAE 62.2-2007 requirements using an Energy Star qualified air-to-air heat recovery ventilator	New	Single_CZ3	3	1.8163
Wall Insulation, R-13	Existing	Mfg_CZ1	1	2.6757
Wall Insulation, R-13	Existing	Mfg_CZ2	2	2.6397
Wall Insulation, R-13	Existing	Mfg_CZ3	3	2.7684
Wall Insulation, R-13	Existing	Multi_CZ1	1	2.6757
Wall Insulation, R-13	Existing	Multi_CZ2	2	2.1889
Wall Insulation, R-13	Existing	Multi_CZ3	3	2.7684
Wall Insulation, R-13	Existing	Single_CZ1	1	2.6753
Wall Insulation, R-13	Existing	Single_CZ2	2	3.0115
Wall Insulation, R-13	Existing	Single_CZ3	3	2.7687
Wall Insulation, R-13	New	Mfg_CZ1	1	2.6341
Wall Insulation, R-13	New	Mfg_CZ2	2	2.5969
Wall Insulation, R-13	New	Mfg_CZ3	3	2.7293
Wall Insulation, R-13	New	Multi_CZ1	1	2.6341
Wall Insulation, R-13	New	Multi_CZ2	2	2.1402
Wall Insulation, R-13	New	Multi_CZ3	3	2.7293
Wall Insulation, R-13	New	Single_CZ1	1	2.6339
Wall Insulation, R-13	New	Single_CZ2	2	2.9782
Wall Insulation, R-13	New	Single_CZ3	3	2.7293

Description	Vintage	Segment	Climate Zone	B/c Ratio
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Education	All	1.3363
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Grocery	All	0.1795
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Healthcare	All	0.8592
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Lodging	All	2.4627
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Misc.	All	0.0189
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Office	All	0.0700
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Restaurant	All	0.6449
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Retail	All	0.0427
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Early Retirement	Warehouse	All	0.0331
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Education	All	1.3363
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Grocery	All	0.1795
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Healthcare	All	0.8592
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Lodging	All	2.4627
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Misc.	All	0.0189
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Office	All	0.0700
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Restaurant	All	0.6449
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Retail	All	0.0427
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	New	Warehouse	All	0.0331
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Education	All	1.3363
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Grocery	All	0.1795
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Healthcare	All	0.8592
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Lodging	All	2.4627
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Misc.	All	0.0189
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Office	All	0.0700
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Restaurant	All	0.6449
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Retail	All	0.0427
1 32SF Solar Collector, Glazed. Thermodynamics G32 (<2012)	Turnover	Warehouse	All	0.0331
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Education	All	0.0399
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Grocery	All	0.2307
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Healthcare	All	0.0339
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Lodging	All	0.0385
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Misc.	All	0.0087
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Office	All	0.0035
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Restaurant	All	0.1296
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Retail	All	0.0127
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Early Retirement	Warehouse	All	0.0000
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Education	All	0.2157
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Grocery	All	1.1203
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Healthcare	All	0.1842
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Lodging	All	0.2085
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Misc.	All	0.0481

Description	Vintage	Segment	Climate Zone	B/c Ratio
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Office	All	0.0191
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Restaurant	All	0.6655
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Retail	All	0.0696
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	New	Warehouse	All	0.0000
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Education	All	0.2157
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Grocery	All	1.1203
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Healthcare	All	0.1842
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Lodging	All	0.2085
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Misc.	All	0.0481
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Office	All	0.0191
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Restaurant	All	0.6655
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Retail	All	0.0696
Combination convection with steam oven cooking efficiency \geq 38% and convection mode cooking efficiency \geq 44%	Turnover	Warehouse	All	0.0000
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Education	All	0.4139
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Grocery	All	1.9275
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Healthcare	All	0.3548
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Lodging	All	0.4004
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Misc.	All	0.0944
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Office	All	0.0377
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Restaurant	All	1.2077
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Retail	All	0.1361
Energy Star Convection Oven with cooking efficiency \geq 44%	Early Retirement	Warehouse	All	0.0000
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Education	All	5.4951
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Grocery	All	7.0122
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Healthcare	All	5.2542
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Lodging	All	5.4448
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Misc.	All	2.8436
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Office	All	1.4653
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Restaurant	All	6.7103
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Retail	All	3.5180
Energy Star Convection Oven with cooking efficiency \geq 44%	New	Warehouse	All	0.0010
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Education	All	5.4951
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Grocery	All	7.0122
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Healthcare	All	5.2542
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Lodging	All	5.4448
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Misc.	All	2.8436
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Office	All	1.4653
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Restaurant	All	6.7103
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Retail	All	3.5180
Energy Star Convection Oven with cooking efficiency \geq 44%	Turnover	Warehouse	All	0.0010
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Education	All	0.5035

Description	Vintage	Segment	Climate Zone	B/c Ratio
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Grocery	All	1.1822
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Healthcare	All	0.2633
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Lodging	All	0.7514
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Misc.	All	0.0864
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Office	All	0.0288
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Restaurant	All	1.8599
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Retail	All	0.0742
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Early Retirement	Warehouse	All	0.0000
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Education	All	2.9913
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Grocery	All	4.7318
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Healthcare	All	1.8878
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Lodging	All	3.7931
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Misc.	All	0.7310
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Office	All	0.2583
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Restaurant	All	5.6149
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Retail	All	0.6353
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	New	Warehouse	All	0.0001
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Education	All	2.9913
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Grocery	All	4.7318
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Healthcare	All	1.8878
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Lodging	All	3.7931
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Misc.	All	0.7310
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Office	All	0.2583
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Restaurant	All	5.6149
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Retail	All	0.6353
ENERGY STAR® qualified with 38% minimum cooking energy efficiency at heavy load (potato) cooking capacity for gas steam cookers.	Turnover	Warehouse	All	0.0001
Heat Pump Water Heater, 1.55 COP	Early Retirement	Education	All	0.8635
Heat Pump Water Heater, 1.55 COP	Early Retirement	Grocery	All	0.2106
Heat Pump Water Heater, 1.55 COP	Early Retirement	Healthcare	All	0.7647
Heat Pump Water Heater, 1.55 COP	Early Retirement	Lodging	All	1.8487

Description	Vintage	Segment	Climate Zone	B/c Ratio
Heat Pump Water Heater, 1.55 COP	Early Retirement	Misc.	All	0.0472
Heat Pump Water Heater, 1.55 COP	Early Retirement	Office	All	0.0800
Heat Pump Water Heater, 1.55 COP	Early Retirement	Restaurant	All	2.0567
Heat Pump Water Heater, 1.55 COP	Early Retirement	Retail	All	0.0598
Heat Pump Water Heater, 1.55 COP	Early Retirement	Warehouse	All	0.0316
Heat Pump Water Heater, 1.55 COP	New	Education	All	0.9285
Heat Pump Water Heater, 1.55 COP	New	Grocery	All	0.2281
Heat Pump Water Heater, 1.55 COP	New	Healthcare	All	0.8232
Heat Pump Water Heater, 1.55 COP	New	Lodging	All	1.9666
Heat Pump Water Heater, 1.55 COP	New	Misc.	All	0.0513
Heat Pump Water Heater, 1.55 COP	New	Office	All	0.0868
Heat Pump Water Heater, 1.55 COP	New	Restaurant	All	2.1830
Heat Pump Water Heater, 1.55 COP	New	Retail	All	0.0648
Heat Pump Water Heater, 1.55 COP	New	Warehouse	All	0.0343
Heat Pump Water Heater, 1.55 COP	Turnover	Education	All	0.9285
Heat Pump Water Heater, 1.55 COP	Turnover	Grocery	All	0.2281
Heat Pump Water Heater, 1.55 COP	Turnover	Healthcare	All	0.8232
Heat Pump Water Heater, 1.55 COP	Turnover	Lodging	All	1.9666
Heat Pump Water Heater, 1.55 COP	Turnover	Misc.	All	0.0513
Heat Pump Water Heater, 1.55 COP	Turnover	Office	All	0.0868
Heat Pump Water Heater, 1.55 COP	Turnover	Restaurant	All	2.1830
Heat Pump Water Heater, 1.55 COP	Turnover	Retail	All	0.0648
Heat Pump Water Heater, 1.55 COP	Turnover	Warehouse	All	0.0343
Low Intensity Gas Fired Radiant Heater	Early Retirement	Education	All	5.6123
Low Intensity Gas Fired Radiant Heater	Early Retirement	Grocery	All	4.6467
Low Intensity Gas Fired Radiant Heater	Early Retirement	Healthcare	All	4.2724
Low Intensity Gas Fired Radiant Heater	Early Retirement	Lodging	All	4.2630
Low Intensity Gas Fired Radiant Heater	Early Retirement	Misc.	All	2.2212
Low Intensity Gas Fired Radiant Heater	Early Retirement	Office	All	3.3720
Low Intensity Gas Fired Radiant Heater	Early Retirement	Restaurant	All	2.2273
Low Intensity Gas Fired Radiant Heater	Early Retirement	Retail	All	3.4082
Low Intensity Gas Fired Radiant Heater	Early Retirement	Warehouse	All	2.9874
Low Intensity Gas Fired Radiant Heater	New	Education	All	8.0360
Low Intensity Gas Fired Radiant Heater	New	Grocery	All	7.3361
Low Intensity Gas Fired Radiant Heater	New	Healthcare	All	7.0246
Low Intensity Gas Fired Radiant Heater	New	Lodging	All	7.0164
Low Intensity Gas Fired Radiant Heater	New	Misc.	All	4.7245
Low Intensity Gas Fired Radiant Heater	New	Office	All	6.1577
Low Intensity Gas Fired Radiant Heater	New	Restaurant	All	4.7334
Low Intensity Gas Fired Radiant Heater	New	Retail	All	6.1963
Low Intensity Gas Fired Radiant Heater	New	Warehouse	All	5.7261
Low Intensity Gas Fired Radiant Heater	Turnover	Education	All	8.0360
Low Intensity Gas Fired Radiant Heater	Turnover	Grocery	All	7.3361
Low Intensity Gas Fired Radiant Heater	Turnover	Healthcare	All	7.0246
Low Intensity Gas Fired Radiant Heater	Turnover	Lodging	All	7.0164
Low Intensity Gas Fired Radiant Heater	Turnover	Misc.	All	4.7245
Low Intensity Gas Fired Radiant Heater	Turnover	Office	All	6.1577
Low Intensity Gas Fired Radiant Heater	Turnover	Restaurant	All	4.7334
Low Intensity Gas Fired Radiant Heater	Turnover	Retail	All	6.1963
Low Intensity Gas Fired Radiant Heater	Turnover	Warehouse	All	5.7261
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Education	All	0.0207
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Grocery	All	0.1217
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Healthcare	All	0.0176
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Lodging	All	0.0200
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Misc.	All	0.0045
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Office	All	0.0018

Description	Vintage	Segment	Climate Zone	B/c Ratio
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Restaurant	All	0.0678
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Retail	All	0.0066
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Early Retirement	Warehouse	All	0.0000
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Education	All	0.2772
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Grocery	All	1.4402
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Healthcare	All	0.2367
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Lodging	All	0.2680
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Misc.	All	0.0619
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Office	All	0.0246
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Restaurant	All	0.8555
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Retail	All	0.0895
Natural gas conveyor oven with a tested baking energy efficiency > 42%	New	Warehouse	All	0.0000
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Education	All	0.2772
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Grocery	All	1.4402
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Healthcare	All	0.2367
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Lodging	All	0.2680
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Misc.	All	0.0619
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Office	All	0.0246
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Restaurant	All	0.8555
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Retail	All	0.0895
Natural gas conveyor oven with a tested baking energy efficiency > 42%	Turnover	Warehouse	All	0.0000
Natural gas fired ENERGY STAR fryer	Early Retirement	Education	All	1.9924
Natural gas fired ENERGY STAR fryer	Early Retirement	Grocery	All	3.6269
Natural gas fired ENERGY STAR fryer	Early Retirement	Healthcare	All	1.1610
Natural gas fired ENERGY STAR fryer	Early Retirement	Lodging	All	2.6888
Natural gas fired ENERGY STAR fryer	Early Retirement	Misc.	All	0.4161
Natural gas fired ENERGY STAR fryer	Early Retirement	Office	All	0.1427
Natural gas fired ENERGY STAR fryer	Early Retirement	Restaurant	All	2.8587
Natural gas fired ENERGY STAR fryer	Early Retirement	Retail	All	0.3594
Natural gas fired ENERGY STAR fryer	Early Retirement	Warehouse	All	0.0001
Natural gas fired ENERGY STAR fryer	New	Education	All	2.8175
Natural gas fired ENERGY STAR fryer	New	Grocery	All	4.5609
Natural gas fired ENERGY STAR fryer	New	Healthcare	All	1.7528
Natural gas fired ENERGY STAR fryer	New	Lodging	All	3.6107
Natural gas fired ENERGY STAR fryer	New	Misc.	All	0.6687
Natural gas fired ENERGY STAR fryer	New	Office	All	0.2349
Natural gas fired ENERGY STAR fryer	New	Restaurant	All	3.7923
Natural gas fired ENERGY STAR fryer	New	Retail	All	0.5805
Natural gas fired ENERGY STAR fryer	New	Warehouse	All	0.0001
Natural gas fired ENERGY STAR fryer	Turnover	Education	All	2.8175
Natural gas fired ENERGY STAR fryer	Turnover	Grocery	All	4.5609
Natural gas fired ENERGY STAR fryer	Turnover	Healthcare	All	1.7528
Natural gas fired ENERGY STAR fryer	Turnover	Lodging	All	3.6107
Natural gas fired ENERGY STAR fryer	Turnover	Misc.	All	0.6687
Natural gas fired ENERGY STAR fryer	Turnover	Office	All	0.2349
Natural gas fired ENERGY STAR fryer	Turnover	Restaurant	All	3.7923
Natural gas fired ENERGY STAR fryer	Turnover	Retail	All	0.5805
Natural gas fired ENERGY STAR fryer	Turnover	Warehouse	All	0.0001
Natural gas fired ENERGY STAR griddle	Early Retirement	Education	All	0.2321
Natural gas fired ENERGY STAR griddle	Early Retirement	Grocery	All	0.5754
Natural gas fired ENERGY STAR griddle	Early Retirement	Healthcare	All	0.1191
Natural gas fired ENERGY STAR griddle	Early Retirement	Lodging	All	0.3532
Natural gas fired ENERGY STAR griddle	Early Retirement	Misc.	All	0.0386
Natural gas fired ENERGY STAR griddle	Early Retirement	Office	All	0.0128
Natural gas fired ENERGY STAR griddle	Early Retirement	Restaurant	All	0.3302
Natural gas fired ENERGY STAR griddle	Early Retirement	Retail	All	0.0331

Description	Vintage	Segment	Climate Zone	B/c Ratio
Natural gas fired ENERGY STAR griddle	Early Retirement	Warehouse	All	0.0000
Natural gas fired ENERGY STAR griddle	New	Education	All	2.0435
Natural gas fired ENERGY STAR griddle	New	Grocery	All	3.6914
Natural gas fired ENERGY STAR griddle	New	Healthcare	All	1.1954
Natural gas fired ENERGY STAR griddle	New	Lodging	All	2.7486
Natural gas fired ENERGY STAR griddle	New	Misc.	All	0.4299
Natural gas fired ENERGY STAR griddle	New	Office	All	0.1477
Natural gas fired ENERGY STAR griddle	New	Restaurant	All	2.6277
Natural gas fired ENERGY STAR griddle	New	Retail	All	0.3715
Natural gas fired ENERGY STAR griddle	New	Warehouse	All	0.0001
Natural gas fired ENERGY STAR griddle	Turnover	Education	All	2.0435
Natural gas fired ENERGY STAR griddle	Turnover	Grocery	All	3.6914
Natural gas fired ENERGY STAR griddle	Turnover	Healthcare	All	1.1954
Natural gas fired ENERGY STAR griddle	Turnover	Lodging	All	2.7486
Natural gas fired ENERGY STAR griddle	Turnover	Misc.	All	0.4299
Natural gas fired ENERGY STAR griddle	Turnover	Office	All	0.1477
Natural gas fired ENERGY STAR griddle	Turnover	Restaurant	All	2.6277
Natural gas fired ENERGY STAR griddle	Turnover	Retail	All	0.3715
Natural gas fired ENERGY STAR griddle	Turnover	Warehouse	All	0.0001
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Education	All	0.4761
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Grocery	All	0.6391
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Healthcare	All	0.1907
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Lodging	All	0.2827
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Misc.	All	0.2194
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Office	All	0.1955
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Restaurant	All	0.2202
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Retail	All	0.3905
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Early Retirement	Warehouse	All	0.3239
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Education	All	0.6247
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Grocery	All	0.8348
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Healthcare	All	0.2523
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Lodging	All	0.3730
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Misc.	All	0.2900
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Office	All	0.2585
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Restaurant	All	0.2910
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Retail	All	0.5137
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	New	Warehouse	All	0.4269
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Education	All	0.6247
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Grocery	All	0.8348
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Healthcare	All	0.2523
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Lodging	All	0.3730
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Misc.	All	0.2900
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Office	All	0.2585
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Restaurant	All	0.2910
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Retail	All	0.5137
Natural Gas Heat Pump, 1.2 mimimum seasonal performance factor	Turnover	Warehouse	All	0.4269
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Education	All	0.2961
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Education	All	0.1058
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Grocery	All	0.3997
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Grocery	All	0.0175
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Healthcare	All	0.1175
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Healthcare	All	0.0683
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Lodging	All	0.1747
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Lodging	All	0.1935
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Misc.	All	0.1353
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Misc.	All	0.0038

Description	Vintage	Segment	Climate Zone	B/c Ratio
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Office	All	0.1204
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Office	All	0.0065
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Restaurant	All	0.1358
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Restaurant	All	0.1402
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Retail	All	0.1358
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Retail	All	0.0049
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Warehouse	All	0.2005
New High Efficiency Condensing Boiler for Water and Space Heating	Early Retirement	Warehouse	All	0.0068
New High Efficiency Condensing Boiler for Water and Space Heating	New	Education	All	0.3678
New High Efficiency Condensing Boiler for Water and Space Heating	New	Education	All	0.1323
New High Efficiency Condensing Boiler for Water and Space Heating	New	Grocery	All	0.4954
New High Efficiency Condensing Boiler for Water and Space Heating	New	Grocery	All	0.0219
New High Efficiency Condensing Boiler for Water and Space Heating	New	Healthcare	All	0.1465
New High Efficiency Condensing Boiler for Water and Space Heating	New	Healthcare	All	0.0854
New High Efficiency Condensing Boiler for Water and Space Heating	New	Lodging	All	0.2176
New High Efficiency Condensing Boiler for Water and Space Heating	New	Lodging	All	0.2415
New High Efficiency Condensing Boiler for Water and Space Heating	New	Misc.	All	0.1672
New High Efficiency Condensing Boiler for Water and Space Heating	New	Misc.	All	0.0048
New High Efficiency Condensing Boiler for Water and Space Heating	New	Office	All	0.1502
New High Efficiency Condensing Boiler for Water and Space Heating	New	Office	All	0.0082
New High Efficiency Condensing Boiler for Water and Space Heating	New	Restaurant	All	0.1678
New High Efficiency Condensing Boiler for Water and Space Heating	New	Restaurant	All	0.1751
New High Efficiency Condensing Boiler for Water and Space Heating	New	Retail	All	0.3012
New High Efficiency Condensing Boiler for Water and Space Heating	New	Retail	All	0.0061
New High Efficiency Condensing Boiler for Water and Space Heating	New	Warehouse	All	0.2473
New High Efficiency Condensing Boiler for Water and Space Heating	New	Warehouse	All	0.0085
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Education	All	0.3678
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Education	All	0.1323
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Grocery	All	0.4954
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Grocery	All	0.0219
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Healthcare	All	0.1465
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Healthcare	All	0.0854
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Lodging	All	0.2176
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Lodging	All	0.2415
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Misc.	All	0.1672
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Misc.	All	0.0048
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Office	All	0.1502
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Office	All	0.0082
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Restaurant	All	0.1678
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Restaurant	All	0.1751
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Retail	All	0.3012
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Retail	All	0.0061
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Warehouse	All	0.2473
New High Efficiency Condensing Boiler for Water and Space Heating	Turnover	Warehouse	All	0.0085
New High Efficiency Condensing Boiler Input Capacity >300 kBtu/h and Thermal Efficiency >=90%	Early Retirement	Education	All	0.2979
New High Efficiency Condensing Boiler Input Capacity >300 kBtu/h and Thermal Efficiency >=90%	Early Retirement	Grocery	All	0.4020
New High Efficiency Condensing Boiler Input Capacity >300 kBtu/h and Thermal Efficiency >=90%	Early Retirement	Healthcare	All	0.1182
New High Efficiency Condensing Boiler Input Capacity >300 kBtu/h and Thermal Efficiency >=90%	Early Retirement	Lodging	All	0.1758
New High Efficiency Condensing Boiler Input Capacity >300 kBtu/h and Thermal Efficiency >=90%	Early Retirement	Misc.	All	0.1361
New High Efficiency Condensing Boiler Input Capacity >300 kBtu/h and Thermal Efficiency >=90%	Early Retirement	Office	All	0.1212

Description	Vintage	Segment	Climate Zone	B/c Ratio
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Early Retirement	Restaurant	All	0.1366
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Early Retirement	Retail	All	0.2436
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Early Retirement	Warehouse	All	0.2017
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Education	All	0.3709
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Grocery	All	0.4996
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Healthcare	All	0.1478
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Lodging	All	0.2194
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Misc.	All	0.1701
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Office	All	0.1515
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Restaurant	All	0.1707
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Retail	All	0.3038
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	New	Warehouse	All	0.2517
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Education	All	0.3709
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Grocery	All	0.4996
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Healthcare	All	0.1478
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Lodging	All	0.2194
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Misc.	All	0.1701
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Office	All	0.1515
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Restaurant	All	0.1707
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Retail	All	0.3038
New High Efficiency Condensing Boiler Input Capacity >300 kBtuh and Thermal Efficiency >=90%	Turnover	Warehouse	All	0.2517
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Education	All	1.1277
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Grocery	All	1.4171
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Healthcare	All	0.9697
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Lodging	All	0.7914
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Misc.	All	1.0373
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Office	All	0.8597
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Restaurant	All	1.7281
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Retail	All	1.0484
New High Efficiency Condensing Furnace 91 AFUE	Early Retirement	Warehouse	All	0.6158
New High Efficiency Condensing Furnace 91 AFUE	New	Education	All	2.6949
New High Efficiency Condensing Furnace 91 AFUE	New	Grocery	All	3.2410
New High Efficiency Condensing Furnace 91 AFUE	New	Healthcare	All	2.3755
New High Efficiency Condensing Furnace 91 AFUE	New	Lodging	All	1.9953
New High Efficiency Condensing Furnace 91 AFUE	New	Misc.	All	2.5142

Description	Vintage	Segment	Climate Zone	B/c Ratio
New High Efficiency Condensing Furnace 91 AFUE	New	Office	All	2.1436
New High Efficiency Condensing Furnace 91 AFUE	New	Restaurant	All	3.7782
New High Efficiency Condensing Furnace 91 AFUE	New	Retail	All	2.5367
New High Efficiency Condensing Furnace 91 AFUE	New	Warehouse	All	1.5985
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Education	All	2.6949
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Grocery	All	3.2410
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Healthcare	All	2.3755
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Lodging	All	1.9953
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Misc.	All	2.5142
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Office	All	2.1436
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Restaurant	All	3.7782
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Retail	All	2.5367
New High Efficiency Condensing Furnace 91 AFUE	Turnover	Warehouse	All	1.5985
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Education	All	1.4018
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Grocery	All	1.7513
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Healthcare	All	1.2092
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Lodging	All	0.9905
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Misc.	All	1.2918
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Office	All	1.0745
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Restaurant	All	1.8803
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Retail	All	1.3053
New High Efficiency Condensing Unit Heater 92 AFUE	Early Retirement	Warehouse	All	0.7734
New High Efficiency Condensing Unit Heater 92 AFUE	New	Education	All	1.3166
New High Efficiency Condensing Unit Heater 92 AFUE	New	Grocery	All	1.6487
New High Efficiency Condensing Unit Heater 92 AFUE	New	Healthcare	All	1.1343
New High Efficiency Condensing Unit Heater 92 AFUE	New	Lodging	All	0.9278
New High Efficiency Condensing Unit Heater 92 AFUE	New	Misc.	All	1.2124
New High Efficiency Condensing Unit Heater 92 AFUE	New	Office	All	1.0070
New High Efficiency Condensing Unit Heater 92 AFUE	New	Restaurant	All	1.7716
New High Efficiency Condensing Unit Heater 92 AFUE	New	Retail	All	1.2252
New High Efficiency Condensing Unit Heater 92 AFUE	New	Warehouse	All	0.7234
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Education	All	1.3166
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Grocery	All	1.6487
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Healthcare	All	1.1343
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Lodging	All	0.9278
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Misc.	All	1.2124
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Office	All	1.0070
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Restaurant	All	1.7716
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Retail	All	1.2252
New High Efficiency Condensing Unit Heater 92 AFUE	Turnover	Warehouse	All	0.7234
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Education	All	1.1584
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Grocery	All	1.4569
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Healthcare	All	0.9957
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Lodging	All	0.8122
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Misc.	All	1.0654
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Office	All	0.8825
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Restaurant	All	1.5680
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Retail	All	1.0768
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Early Retirement	Warehouse	All	0.6317
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Education	All	0.8036
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Grocery	All	1.0205
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Healthcare	All	0.6871
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Lodging	All	0.5572
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Misc.	All	0.7368
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Office	All	0.6068
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Restaurant	All	1.1023

Description	Vintage	Segment	Climate Zone	B/c Ratio
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Retail	All	0.7450
New High Efficiency Non-Condensing Unit Heater 86 AFUE	New	Warehouse	All	0.4309
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Education	All	0.8036
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Grocery	All	1.0205
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Healthcare	All	0.6871
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Lodging	All	0.5572
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Misc.	All	0.7368
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Office	All	0.6068
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Restaurant	All	1.1023
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Retail	All	0.7450
New High Efficiency Non-Condensing Unit Heater 86 AFUE	Turnover	Warehouse	All	0.4309
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Education	All	0.6017
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Grocery	All	0.1425
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Healthcare	All	0.5305
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Lodging	All	1.3487
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Misc.	All	0.0317
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Office	All	0.0538
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Restaurant	All	1.5155
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Retail	All	0.0402
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Early Retirement	Warehouse	All	0.0212
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Education	All	1.3685
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Grocery	All	0.3529
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Healthcare	All	1.2219
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Lodging	All	2.7083
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Misc.	All	0.0803
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Office	All	0.1356
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Restaurant	All	2.9658
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Retail	All	0.1015
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	New	Warehouse	All	0.0538
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Education	All	1.3685
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Grocery	All	0.3529
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Healthcare	All	1.2219
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Lodging	All	2.7083
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Misc.	All	0.0803
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Office	All	0.1356
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Restaurant	All	2.9658
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Retail	All	0.1015
New High Efficiency Tank Condensing Water Heater, >75,000 kBtuh	Turnover	Warehouse	All	0.0538
New High Efficiency Tank Water Heater	Early Retirement	Education	All	0.8567
New High Efficiency Tank Water Heater	Early Retirement	Grocery	All	0.2088
New High Efficiency Tank Water Heater	Early Retirement	Healthcare	All	0.7587
New High Efficiency Tank Water Heater	Early Retirement	Lodging	All	1.8363
New High Efficiency Tank Water Heater	Early Retirement	Misc.	All	0.0468
New High Efficiency Tank Water Heater	Early Retirement	Office	All	0.0793
New High Efficiency Tank Water Heater	Early Retirement	Restaurant	All	2.0435
New High Efficiency Tank Water Heater	Early Retirement	Retail	All	0.0592
New High Efficiency Tank Water Heater	Early Retirement	Warehouse	All	0.0313
New High Efficiency Tank Water Heater	New	Education	All	0.9549
New High Efficiency Tank Water Heater	New	Grocery	All	0.2353
New High Efficiency Tank Water Heater	New	Healthcare	All	0.8469
New High Efficiency Tank Water Heater	New	Lodging	All	2.0136
New High Efficiency Tank Water Heater	New	Misc.	All	0.0529
New High Efficiency Tank Water Heater	New	Office	All	0.0895
New High Efficiency Tank Water Heater	New	Restaurant	All	2.2332
New High Efficiency Tank Water Heater	New	Retail	All	0.0669
New High Efficiency Tank Water Heater	New	Warehouse	All	0.0354

Description	Vintage	Segment	Climate Zone	B/c Ratio
New High Efficiency Tank Water Heater, EF=.10	Turnover	Office	All	0.0895
New High Efficiency Tank Water Heater, EF=.11	Turnover	Lodging	All	2.0136
New High Efficiency Tank Water Heater, EF=.12	Turnover	Misc.	All	0.0529
New High Efficiency Tank Water Heater, EF=.13	Turnover	Restaurant	All	2.2332
New High Efficiency Tank Water Heater, EF=.14	Turnover	Retail	All	0.0669
New High Efficiency Tank Water Heater, EF=.15	Turnover	Warehouse	All	0.0354
New High Efficiency Tank Water Heater, EF=.7	Turnover	Education	All	0.9549
New High Efficiency Tank Water Heater, EF=.8	Turnover	Grocery	All	0.2353
New High Efficiency Tank Water Heater, EF=.9	Turnover	Healthcare	All	0.8469
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Education	All	1.6134
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Grocery	All	0.4025
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Healthcare	All	1.4337
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Lodging	All	3.3417
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Misc.	All	0.0908
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Office	All	0.1535
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Restaurant	All	3.6924
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Retail	All	0.1148
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Early Retirement	Warehouse	All	0.0607
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Education	All	1.6134
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Grocery	All	0.4025
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Healthcare	All	1.4337
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Lodging	All	3.3417
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Misc.	All	0.0908
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Office	All	0.1535
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Restaurant	All	3.6924
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Retail	All	0.1148
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	New	Warehouse	All	0.0607
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Education	All	1.4224
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Grocery	All	0.3499
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Healthcare	All	1.2613
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Lodging	All	3.0074
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Misc.	All	0.0786
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Office	All	0.1331
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Restaurant	All	3.3372
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Retail	All	0.0995
New High Efficiency Tankless Water Heater <200,000 Mbtuh, .82 EF	Turnover	Warehouse	All	0.0526

Description	Vintage	Segment	Climate Zone	B/c Ratio
Boiler Pipe Insulation	Existing	Education	All	3.3577
Boiler Pipe Insulation	Existing	Grocery	All	4.1418
Boiler Pipe Insulation	Existing	Healthcare	All	1.5912
Boiler Pipe Insulation	Existing	Lodging	All	2.2273
Boiler Pipe Insulation	Existing	Misc.	All	1.7974
Boiler Pipe Insulation	Existing	Office	All	1.6258
Boiler Pipe Insulation	Existing	Restaurant	All	1.8028
Boiler Pipe Insulation	Existing	Retail	All	2.8882
Boiler Pipe Insulation	Existing	Warehouse	All	2.4900
Boiler Pipe Insulation	New	Education	All	3.3577
Boiler Pipe Insulation	New	Grocery	All	4.1418
Boiler Pipe Insulation	New	Healthcare	All	1.5912
Boiler Pipe Insulation	New	Lodging	All	2.2273
Boiler Pipe Insulation	New	Misc.	All	1.7974
Boiler Pipe Insulation	New	Office	All	1.6258
Boiler Pipe Insulation	New	Restaurant	All	1.8028
Boiler Pipe Insulation	New	Retail	All	2.8882
Boiler Pipe Insulation	New	Warehouse	All	2.4900
Boiler Power Burner	Existing	Education	All	0.4955
Boiler Power Burner	Existing	Grocery	All	0.6283
Boiler Power Burner	Existing	Healthcare	All	0.2213
Boiler Power Burner	Existing	Lodging	All	0.3163
Boiler Power Burner	Existing	Misc.	All	0.2517
Boiler Power Burner	Existing	Office	All	0.2264
Boiler Power Burner	Existing	Restaurant	All	0.2525
Boiler Power Burner	Existing	Retail	All	0.4194
Boiler Power Burner	Existing	Warehouse	All	0.3568
Boiler Power Burner	New	Education	All	0.4955
Boiler Power Burner	New	Grocery	All	0.6283
Boiler Power Burner	New	Healthcare	All	0.2213
Boiler Power Burner	New	Lodging	All	0.3163
Boiler Power Burner	New	Misc.	All	0.2517
Boiler Power Burner	New	Office	All	0.2264
Boiler Power Burner	New	Restaurant	All	0.2525
Boiler Power Burner	New	Retail	All	0.4194
Boiler Power Burner	New	Warehouse	All	0.3568
Boiler Repair/Maintenance	Existing	Education	All	0.1381
Boiler Repair/Maintenance	Existing	Grocery	All	0.1818
Boiler Repair/Maintenance	Existing	Healthcare	All	0.0573
Boiler Repair/Maintenance	Existing	Lodging	All	0.0840
Boiler Repair/Maintenance	Existing	Misc.	All	0.0657
Boiler Repair/Maintenance	Existing	Office	All	0.0587
Boiler Repair/Maintenance	Existing	Restaurant	All	0.0660
Boiler Repair/Maintenance	Existing	Retail	All	0.1145
Boiler Repair/Maintenance	Existing	Warehouse	All	0.0958
Boiler Repair/Maintenance	New	Education	All	0.1381
Boiler Repair/Maintenance	New	Grocery	All	0.1818
Boiler Repair/Maintenance	New	Healthcare	All	0.0573
Boiler Repair/Maintenance	New	Lodging	All	0.0840
Boiler Repair/Maintenance	New	Misc.	All	0.0657
Boiler Repair/Maintenance	New	Office	All	0.0587
Boiler Repair/Maintenance	New	Restaurant	All	0.0660
Boiler Repair/Maintenance	New	Retail	All	0.1145
Boiler Repair/Maintenance	New	Warehouse	All	0.0958
Boiler Stack Economizer	Existing	Education	All	0.6153

Description	Vintage	Segment	Climate Zone	B/c Ratio
Boiler Stack Economizer	Existing	Grocery	All	0.8224
Boiler Stack Economizer	Existing	Healthcare	All	0.2484
Boiler Stack Economizer	Existing	Lodging	All	0.3672
Boiler Stack Economizer	Existing	Misc.	All	0.2855
Boiler Stack Economizer	Existing	Office	All	0.2545
Boiler Stack Economizer	Existing	Restaurant	All	0.2865
Boiler Stack Economizer	Existing	Retail	All	0.5058
Boiler Stack Economizer	Existing	Warehouse	All	0.4203
Boiler Stack Economizer	New	Education	All	0.5468
Boiler Stack Economizer	New	Grocery	All	0.7324
Boiler Stack Economizer	New	Healthcare	All	0.2199
Boiler Stack Economizer	New	Lodging	All	0.3256
Boiler Stack Economizer	New	Misc.	All	0.2529
Boiler Stack Economizer	New	Office	All	0.2254
Boiler Stack Economizer	New	Restaurant	All	0.2538
Boiler Stack Economizer	New	Retail	All	0.4491
Boiler Stack Economizer	New	Warehouse	All	0.3728
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Education	All	2.1762
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Grocery	All	2.4755
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Healthcare	All	1.2733
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Lodging	All	1.6435
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Misc.	All	0.8489
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Office	All	1.9555
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Restaurant	All	1.4032
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Retail	All	1.9715
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Warehouse	All	1.7800
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Education	All	2.0789
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Grocery	All	2.3824
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Healthcare	All	1.1899
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Lodging	All	1.5497
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Misc.	All	0.7853
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Office	All	1.8579
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Restaurant	All	1.3154
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Retail	All	1.8739
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	New	Warehouse	All	1.6840
Boiler vent damper - min. 1000 kBtu input	Existing	Education	All	0.5710
Boiler vent damper - min. 1000 kBtu input	Existing	Grocery	All	0.7568
Boiler vent damper - min. 1000 kBtu input	Existing	Healthcare	All	0.2341
Boiler vent damper - min. 1000 kBtu input	Existing	Lodging	All	0.3444
Boiler vent damper - min. 1000 kBtu input	Existing	Misc.	All	0.2686
Boiler vent damper - min. 1000 kBtu input	Existing	Office	All	0.2398
Boiler vent damper - min. 1000 kBtu input	Existing	Restaurant	All	0.2695
Boiler vent damper - min. 1000 kBtu input	Existing	Retail	All	0.4716
Boiler vent damper - min. 1000 kBtu input	Existing	Warehouse	All	0.3933
Boiler vent damper - min. 1000 kBtu input	New	Education	All	0.5710
Boiler vent damper - min. 1000 kBtu input	New	Grocery	All	0.7568
Boiler vent damper - min. 1000 kBtu input	New	Healthcare	All	0.2341
Boiler vent damper - min. 1000 kBtu input	New	Lodging	All	0.3444
Boiler vent damper - min. 1000 kBtu input	New	Misc.	All	0.2686
Boiler vent damper - min. 1000 kBtu input	New	Office	All	0.2398
Boiler vent damper - min. 1000 kBtu input	New	Restaurant	All	0.2695
Boiler vent damper - min. 1000 kBtu input	New	Retail	All	0.4716
Boiler vent damper - min. 1000 kBtu input	New	Warehouse	All	0.3933
Boiler Waste Water Heat Exchanger	Existing	Education	All	0.0867
Boiler Waste Water Heat Exchanger	Existing	Grocery	All	0.0592

Description	Vintage	Segment	Climate Zone	B/c Ratio
Boiler Waste Water Heat Exchanger	Existing	Healthcare	All	0.0510
Boiler Waste Water Heat Exchanger	Existing	Lodging	All	0.0508
Boiler Waste Water Heat Exchanger	Existing	Misc.	All	0.0196
Boiler Waste Water Heat Exchanger	Existing	Office	All	0.0349
Boiler Waste Water Heat Exchanger	Existing	Restaurant	All	0.0197
Boiler Waste Water Heat Exchanger	Existing	Retail	All	0.0354
Boiler Waste Water Heat Exchanger	Existing	Warehouse	All	0.0292
Boiler Waste Water Heat Exchanger	New	Education	All	0.0867
Boiler Waste Water Heat Exchanger	New	Grocery	All	0.0592
Boiler Waste Water Heat Exchanger	New	Healthcare	All	0.0510
Boiler Waste Water Heat Exchanger	New	Lodging	All	0.0508
Boiler Waste Water Heat Exchanger	New	Misc.	All	0.0196
Boiler Waste Water Heat Exchanger	New	Office	All	0.0349
Boiler Waste Water Heat Exchanger	New	Restaurant	All	0.0197
Boiler Waste Water Heat Exchanger	New	Retail	All	0.0354
Boiler Waste Water Heat Exchanger	New	Warehouse	All	0.0292
Demand Controlled Ventilation	Existing	Education	All	4.2406
Demand Controlled Ventilation	Existing	Grocery	All	3.5314
Demand Controlled Ventilation	Existing	Healthcare	All	3.2543
Demand Controlled Ventilation	Existing	Lodging	All	3.2472
Demand Controlled Ventilation	Existing	Misc.	All	1.7130
Demand Controlled Ventilation	Existing	Office	All	2.5824
Demand Controlled Ventilation	Existing	Restaurant	All	1.7177
Demand Controlled Ventilation	Existing	Retail	All	2.6096
Demand Controlled Ventilation	Existing	Warehouse	All	2.2933
Demand Controlled Ventilation	New	Education	All	4.0141
Demand Controlled Ventilation	New	Grocery	All	3.3034
Demand Controlled Ventilation	New	Healthcare	All	3.0303
Demand Controlled Ventilation	New	Lodging	All	3.0234
Demand Controlled Ventilation	New	Misc.	All	1.5556
Demand Controlled Ventilation	New	Office	All	2.3783
Demand Controlled Ventilation	New	Restaurant	All	1.5600
Demand Controlled Ventilation	New	Retail	All	2.4044
Demand Controlled Ventilation	New	Warehouse	All	2.1021
Drainwater Heat Recovery	Existing	Education	All	4.1589
Drainwater Heat Recovery	Existing	Grocery	All	1.0931
Drainwater Heat Recovery	Existing	Healthcare	All	3.2094
Drainwater Heat Recovery	Existing	Lodging	All	6.5427
Drainwater Heat Recovery	Existing	Misc.	All	0.2782
Drainwater Heat Recovery	Existing	Office	All	0.4303
Drainwater Heat Recovery	Existing	Restaurant	All	5.7961
Drainwater Heat Recovery	Existing	Retail	All	0.3503
Drainwater Heat Recovery	Existing	Warehouse	All	0.5268
Drainwater Heat Recovery	New	Education	All	4.4612
Drainwater Heat Recovery	New	Grocery	All	1.2085
Drainwater Heat Recovery	New	Healthcare	All	3.4747
Drainwater Heat Recovery	New	Lodging	All	6.8597
Drainwater Heat Recovery	New	Misc.	All	0.3101
Drainwater Heat Recovery	New	Office	All	0.4789
Drainwater Heat Recovery	New	Restaurant	All	6.1202
Drainwater Heat Recovery	New	Retail	All	0.3902
Drainwater Heat Recovery	New	Warehouse	All	0.5857
Duct Sealing and Insulation	Existing	Education	All	0.6780
Duct Sealing and Insulation	Existing	Grocery	All	0.8647
Duct Sealing and Insulation	Existing	Healthcare	All	0.5784

Description	Vintage	Segment	Climate Zone	B/c Ratio
Duct Sealing and Insulation	Existing	Lodging	All	0.4678
Duct Sealing and Insulation	Existing	Misc.	All	0.6208
Duct Sealing and Insulation	Existing	Office	All	0.5099
Duct Sealing and Insulation	Existing	Restaurant	All	1.0718
Duct Sealing and Insulation	Existing	Retail	All	0.6278
Duct Sealing and Insulation	Existing	Warehouse	All	0.3608
Duct Sealing and Insulation	New	Education	All	0.6780
Duct Sealing and Insulation	New	Grocery	All	0.8647
Duct Sealing and Insulation	New	Healthcare	All	0.5784
Duct Sealing and Insulation	New	Lodging	All	0.4678
Duct Sealing and Insulation	New	Misc.	All	0.6208
Duct Sealing and Insulation	New	Office	All	0.5099
Duct Sealing and Insulation	New	Restaurant	All	1.0718
Duct Sealing and Insulation	New	Retail	All	0.6278
Duct Sealing and Insulation	New	Warehouse	All	0.3608
Faucet Aerator 2.0 gpm	Existing	Education	All	4.9455
Faucet Aerator 2.0 gpm	Existing	Grocery	All	4.8493
Faucet Aerator 2.0 gpm	Existing	Healthcare	All	4.8764
Faucet Aerator 2.0 gpm	Existing	Lodging	All	5.4110
Faucet Aerator 2.0 gpm	Existing	Misc.	All	3.0291
Faucet Aerator 2.0 gpm	Existing	Office	All	2.6048
Faucet Aerator 2.0 gpm	Existing	Restaurant	All	5.6136
Faucet Aerator 2.0 gpm	Existing	Retail	All	4.1164
Faucet Aerator 2.0 gpm	Existing	Warehouse	All	3.8018
Faucet Aerator 2.0 gpm	New	Education	All	4.4054
Faucet Aerator 2.0 gpm	New	Grocery	All	4.2641
Faucet Aerator 2.0 gpm	New	Healthcare	All	4.3036
Faucet Aerator 2.0 gpm	New	Lodging	All	5.1447
Faucet Aerator 2.0 gpm	New	Misc.	All	2.1420
Faucet Aerator 2.0 gpm	New	Office	All	1.7615
Faucet Aerator 2.0 gpm	New	Restaurant	All	5.4984
Faucet Aerator 2.0 gpm	New	Retail	All	3.2964
Faucet Aerator 2.0 gpm	New	Warehouse	All	2.9321
Floor Insulation, R-30 insulation added to floor	Existing	Education	All	0.1773
Floor Insulation, R-30 insulation added to floor	Existing	Grocery	All	0.1790
Floor Insulation, R-30 insulation added to floor	Existing	Healthcare	All	0.1501
Floor Insulation, R-30 insulation added to floor	Existing	Lodging	All	0.1138
Floor Insulation, R-30 insulation added to floor	Existing	Misc.	All	0.1527
Floor Insulation, R-30 insulation added to floor	Existing	Office	All	0.1316
Floor Insulation, R-30 insulation added to floor	Existing	Restaurant	All	0.2573
Floor Insulation, R-30 insulation added to floor	Existing	Retail	All	0.1275
Floor Insulation, R-30 insulation added to floor	Existing	Warehouse	All	0.0565
Floor Insulation, R-30 insulation added to floor	New	Education	All	0.1773
Floor Insulation, R-30 insulation added to floor	New	Grocery	All	0.1790
Floor Insulation, R-30 insulation added to floor	New	Healthcare	All	0.1501
Floor Insulation, R-30 insulation added to floor	New	Lodging	All	0.1138
Floor Insulation, R-30 insulation added to floor	New	Misc.	All	0.1527
Floor Insulation, R-30 insulation added to floor	New	Office	All	0.1316
Floor Insulation, R-30 insulation added to floor	New	Restaurant	All	0.2573
Floor Insulation, R-30 insulation added to floor	New	Retail	All	0.1275
Floor Insulation, R-30 insulation added to floor	New	Warehouse	All	0.0565
Heat Recovery	Existing	Education	All	0.3047
Heat Recovery	Existing	Grocery	All	0.3917
Heat Recovery	Existing	Healthcare	All	0.2588
Heat Recovery	Existing	Lodging	All	0.2084

Description	Vintage	Segment	Climate Zone	B/c Ratio
Heat Recovery	Existing	Misc.	All	0.2783
Heat Recovery	Existing	Office	All	0.2275
Heat Recovery	Existing	Restaurant	All	0.4898
Heat Recovery	Existing	Retail	All	0.2815
Heat Recovery	Existing	Warehouse	All	0.1600
Heat Recovery	New	Education	All	0.3047
Heat Recovery	New	Grocery	All	0.3917
Heat Recovery	New	Healthcare	All	0.2588
Heat Recovery	New	Lodging	All	0.2084
Heat Recovery	New	Misc.	All	0.2783
Heat Recovery	New	Office	All	0.2275
Heat Recovery	New	Restaurant	All	0.4898
Heat Recovery	New	Retail	All	0.2815
Heat Recovery	New	Warehouse	All	0.1600
High Efficiency Commercial Gas Clothes Washer	Existing	Education	All	2.6043
High Efficiency Commercial Gas Clothes Washer	Existing	Grocery	All	0.6103
High Efficiency Commercial Gas Clothes Washer	Existing	Healthcare	All	2.0322
High Efficiency Commercial Gas Clothes Washer	Existing	Lodging	All	3.3908
High Efficiency Commercial Gas Clothes Washer	Existing	Misc.	All	0.0717
High Efficiency Commercial Gas Clothes Washer	Existing	Office	All	0.2559
High Efficiency Commercial Gas Clothes Washer	Existing	Restaurant	All	1.6872
High Efficiency Commercial Gas Clothes Washer	Existing	Retail	All	0.1591
High Efficiency Commercial Gas Clothes Washer	Existing	Warehouse	All	0.1242
High Efficiency Commercial Gas Clothes Washer	New	Education	All	4.1620
High Efficiency Commercial Gas Clothes Washer	New	Grocery	All	2.4508
High Efficiency Commercial Gas Clothes Washer	New	Healthcare	All	3.9258
High Efficiency Commercial Gas Clothes Washer	New	Lodging	All	4.3790
High Efficiency Commercial Gas Clothes Washer	New	Misc.	All	0.4870
High Efficiency Commercial Gas Clothes Washer	New	Office	All	1.4055
High Efficiency Commercial Gas Clothes Washer	New	Restaurant	All	3.7288
High Efficiency Commercial Gas Clothes Washer	New	Retail	All	0.9716
High Efficiency Commercial Gas Clothes Washer	New	Warehouse	All	0.7903
Hot Water Pipe Insulation	Existing	Education	All	4.9236
Hot Water Pipe Insulation	Existing	Grocery	All	5.2665
Hot Water Pipe Insulation	Existing	Healthcare	All	4.6806
Hot Water Pipe Insulation	Existing	Lodging	All	4.3363
Hot Water Pipe Insulation	Existing	Misc.	All	4.7907
Hot Water Pipe Insulation	Existing	Office	All	4.4787
Hot Water Pipe Insulation	Existing	Restaurant	All	5.5373
Hot Water Pipe Insulation	Existing	Retail	All	4.8077
Hot Water Pipe Insulation	Existing	Warehouse	All	3.8922
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Education	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Grocery	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Healthcare	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Lodging	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Misc.	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Office	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Restaurant	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Retail	All	0.0000
Hot Water Pipe Insulation 1.0" of Insulation, assuming R-4 (WA Stat	New	Warehouse	All	0.0000
Hot Water Temperature Reset	Existing	Education	All	0.9897
Hot Water Temperature Reset	Existing	Grocery	All	1.2534
Hot Water Temperature Reset	Existing	Healthcare	All	0.8475
Hot Water Temperature Reset	Existing	Lodging	All	0.6884
Hot Water Temperature Reset	Existing	Misc.	All	0.9082

Description	Vintage	Segment	Climate Zone	B/c Ratio
Hot Water Temperature Reset	Existing	Office	All	0.7492
Hot Water Temperature Reset	Existing	Restaurant	All	1.4021
Hot Water Temperature Reset	Existing	Retail	All	0.9182
Hot Water Temperature Reset	Existing	Warehouse	All	0.5332
Hot Water Temperature Reset	New	Education	All	0.9897
Hot Water Temperature Reset	New	Grocery	All	1.2534
Hot Water Temperature Reset	New	Healthcare	All	0.8475
Hot Water Temperature Reset	New	Lodging	All	0.6884
Hot Water Temperature Reset	New	Misc.	All	0.9082
Hot Water Temperature Reset	New	Office	All	0.7492
Hot Water Temperature Reset	New	Restaurant	All	1.4021
Hot Water Temperature Reset	New	Retail	All	0.9182
Hot Water Temperature Reset	New	Warehouse	All	0.5332
Hot Water Temperature Setback	Existing	Education	All	3.2278
Hot Water Temperature Setback	Existing	Grocery	All	2.5059
Hot Water Temperature Setback	Existing	Healthcare	All	3.1496
Hot Water Temperature Setback	Existing	Lodging	All	3.2952
Hot Water Temperature Setback	Existing	Misc.	All	0.7847
Hot Water Temperature Setback	Existing	Office	All	1.7842
Hot Water Temperature Setback	Existing	Restaurant	All	3.0802
Hot Water Temperature Setback	Existing	Retail	All	1.3708
Hot Water Temperature Setback	Existing	Warehouse	All	1.1694
Hot Water Temperature Setback	New	Education	All	3.2278
Hot Water Temperature Setback	New	Grocery	All	2.5059
Hot Water Temperature Setback	New	Healthcare	All	3.1496
Hot Water Temperature Setback	New	Lodging	All	3.2952
Hot Water Temperature Setback	New	Misc.	All	0.7847
Hot Water Temperature Setback	New	Office	All	1.7842
Hot Water Temperature Setback	New	Restaurant	All	3.0802
Hot Water Temperature Setback	New	Retail	All	1.3708
Hot Water Temperature Setback	New	Warehouse	All	1.1694
HVAC Controls	Existing	Education	All	0.7570
HVAC Controls	Existing	Grocery	All	0.5344
HVAC Controls	Existing	Healthcare	All	0.4648
HVAC Controls	Existing	Lodging	All	0.4632
HVAC Controls	Existing	Misc.	All	0.1865
HVAC Controls	Existing	Office	All	0.3247
HVAC Controls	Existing	Restaurant	All	0.1871
HVAC Controls	Existing	Retail	All	0.3297
HVAC Controls	Existing	Warehouse	All	0.2742
HVAC Controls	New	Education	All	0.7570
HVAC Controls	New	Grocery	All	0.5344
HVAC Controls	New	Healthcare	All	0.4648
HVAC Controls	New	Lodging	All	0.4632
HVAC Controls	New	Misc.	All	0.1865
HVAC Controls	New	Office	All	0.3247
HVAC Controls	New	Restaurant	All	0.1871
HVAC Controls	New	Retail	All	0.3297
HVAC Controls	New	Warehouse	All	0.2742
HVAC System Commissioning	Existing	Education	All	0.2399
HVAC System Commissioning	Existing	Grocery	All	0.1672
HVAC System Commissioning	Existing	Healthcare	All	0.1449
HVAC System Commissioning	Existing	Lodging	All	0.1444
HVAC System Commissioning	Existing	Misc.	All	0.0572
HVAC System Commissioning	Existing	Office	All	0.1004

Description	Vintage	Segment	Climate Zone	B/c Ratio
HVAC System Commissioning	Existing	Restaurant	All	0.0574
HVAC System Commissioning	Existing	Retail	All	0.1020
HVAC System Commissioning	Existing	Warehouse	All	0.0845
HVAC System Commissioning	New	Education	All	0.2399
HVAC System Commissioning	New	Grocery	All	0.1672
HVAC System Commissioning	New	Healthcare	All	0.1449
HVAC System Commissioning	New	Lodging	All	0.1444
HVAC System Commissioning	New	Misc.	All	0.0572
HVAC System Commissioning	New	Office	All	0.1004
HVAC System Commissioning	New	Restaurant	All	0.0574
HVAC System Commissioning	New	Retail	All	0.1020
HVAC System Commissioning	New	Warehouse	All	0.0845
Low Flow Showerhead, 2.0 gpm	Existing	Education	All	4.7141
Low Flow Showerhead, 2.0 gpm	Existing	Grocery	All	4.6315
Low Flow Showerhead, 2.0 gpm	Existing	Healthcare	All	3.7124
Low Flow Showerhead, 2.0 gpm	Existing	Lodging	All	4.2341
Low Flow Showerhead, 2.0 gpm	Existing	Misc.	All	1.3999
Low Flow Showerhead, 2.0 gpm	Existing	Office	All	3.2485
Low Flow Showerhead, 2.0 gpm	Existing	Restaurant	All	5.7621
Low Flow Showerhead, 2.0 gpm	Existing	Retail	All	2.4748
Low Flow Showerhead, 2.0 gpm	Existing	Warehouse	All	2.1026
Low Flow Showerhead, 2.0 gpm	New	Education	All	5.3335
Low Flow Showerhead, 2.0 gpm	New	Grocery	All	5.2759
Low Flow Showerhead, 2.0 gpm	New	Healthcare	All	4.5768
Low Flow Showerhead, 2.0 gpm	New	Lodging	All	4.9871
Low Flow Showerhead, 2.0 gpm	New	Misc.	All	2.1762
Low Flow Showerhead, 2.0 gpm	New	Office	All	4.1783
Low Flow Showerhead, 2.0 gpm	New	Restaurant	All	6.0026
Low Flow Showerhead, 2.0 gpm	New	Retail	All	3.4310
Low Flow Showerhead, 2.0 gpm	New	Warehouse	All	3.0284
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Education	All	3.1507
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Grocery	All	2.1552
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Healthcare	All	3.0301
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Lodging	All	3.2575
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Misc.	All	0.9092
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Office	All	1.9471
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Restaurant	All	2.9258
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Retail	All	1.5328
Low-flow Pre-Rinse Spray Valve 1.06 gpm	Existing	Warehouse	All	1.3235
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Education	All	3.2513
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Grocery	All	2.6323
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Healthcare	All	3.1867
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Lodging	All	3.3065
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Misc.	All	1.4417
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Office	All	2.4730
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Restaurant	All	3.1289
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Retail	All	2.1149
Low-flow Pre-Rinse Spray Valve 1.06 gpm	New	Warehouse	All	1.9093
Low-temp Door-Type Energy Star Dishwasher	Existing	Education	All	1.7579
Low-temp Door-Type Energy Star Dishwasher	Existing	Grocery	All	0.2479
Low-temp Door-Type Energy Star Dishwasher	Existing	Healthcare	All	1.1529
Low-temp Door-Type Energy Star Dishwasher	Existing	Lodging	All	3.0966
Low-temp Door-Type Energy Star Dishwasher	Existing	Misc.	All	0.0525
Low-temp Door-Type Energy Star Dishwasher	Existing	Office	All	0.1921
Low-temp Door-Type Energy Star Dishwasher	Existing	Restaurant	All	0.8732

Description	Vintage	Segment	Climate Zone	B/c Ratio
Low-temp Door-Type Energy Star Dishwasher	Existing	Retail	All	0.1178
Low-temp Door-Type Energy Star Dishwasher	Existing	Warehouse	All	0.0915
Low-temp Door-Type Energy Star Dishwasher	New	Education	All	3.8163
Low-temp Door-Type Energy Star Dishwasher	New	Grocery	All	0.7113
Low-temp Door-Type Energy Star Dishwasher	New	Healthcare	All	2.7731
Low-temp Door-Type Energy Star Dishwasher	New	Lodging	All	5.5299
Low-temp Door-Type Energy Star Dishwasher	New	Misc.	All	0.1570
Low-temp Door-Type Energy Star Dishwasher	New	Office	All	0.5578
Low-temp Door-Type Energy Star Dishwasher	New	Restaurant	All	2.2106
Low-temp Door-Type Energy Star Dishwasher	New	Retail	All	0.3477
Low-temp Door-Type Energy Star Dishwasher	New	Warehouse	All	0.2717
Motion Faucet Controls	Existing	Education	All	0.4414
Motion Faucet Controls	Existing	Grocery	All	0.3931
Motion Faucet Controls	Existing	Healthcare	All	0.7240
Motion Faucet Controls	Existing	Lodging	All	2.3839
Motion Faucet Controls	Existing	Misc.	All	0.0897
Motion Faucet Controls	Existing	Office	All	0.0672
Motion Faucet Controls	Existing	Restaurant	All	1.6830
Motion Faucet Controls	Existing	Retail	All	0.1963
Motion Faucet Controls	Existing	Warehouse	All	0.1541
Motion Faucet Controls, 12 s flow duration	New	Education	All	2.3895
Motion Faucet Controls, 12 s flow duration	New	Grocery	All	2.2958
Motion Faucet Controls, 12 s flow duration	New	Healthcare	All	2.7446
Motion Faucet Controls, 12 s flow duration	New	Lodging	All	3.2739
Motion Faucet Controls, 12 s flow duration	New	Misc.	All	1.0388
Motion Faucet Controls, 12 s flow duration	New	Office	All	0.8394
Motion Faucet Controls, 12 s flow duration	New	Restaurant	All	3.1631
Motion Faucet Controls, 12 s flow duration	New	Retail	All	1.6899
Motion Faucet Controls, 12 s flow duration	New	Warehouse	All	1.4766
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Education	All	1.1082
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Grocery	All	0.1413
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Healthcare	All	0.6971
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Lodging	All	2.1551
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Misc.	All	0.0295
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Office	All	0.1091
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Restaurant	All	0.5182
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Retail	All	0.0666
Multi-tank Conveyor Dishwasher - Energy Star	Existing	Warehouse	All	0.0517
Multi-tank Conveyor Dishwasher - Energy Star	New	Education	All	7.4185
Multi-tank Conveyor Dishwasher - Energy Star	New	Grocery	All	1.9795
Multi-tank Conveyor Dishwasher - Energy Star	New	Healthcare	All	5.9981
Multi-tank Conveyor Dishwasher - Energy Star	New	Lodging	All	9.2162
Multi-tank Conveyor Dishwasher - Energy Star	New	Misc.	All	0.4735
Multi-tank Conveyor Dishwasher - Energy Star	New	Office	All	1.5860
Multi-tank Conveyor Dishwasher - Energy Star	New	Restaurant	All	5.0909
Multi-tank Conveyor Dishwasher - Energy Star	New	Retail	All	1.0191
Multi-tank Conveyor Dishwasher - Energy Star	New	Warehouse	All	0.8052
Ozone injection laundry systems	Existing	Education	All	0.3074
Ozone injection laundry systems	Existing	Grocery	All	0.0375
Ozone injection laundry systems	Existing	Healthcare	All	0.1898
Ozone injection laundry systems	Existing	Lodging	All	0.6283
Ozone injection laundry systems	Existing	Misc.	All	0.0039
Ozone injection laundry systems	Existing	Office	All	0.0145
Ozone injection laundry systems	Existing	Restaurant	All	0.1399
Ozone injection laundry systems	Existing	Retail	All	0.0088

Description	Vintage	Segment	Climate Zone	B/c Ratio
Ozone injection laundry systems	Existing	Warehouse	All	0.0068
Ozone injection laundry systems	New	Education	All	0.3074
Ozone injection laundry systems	New	Grocery	All	0.0375
Ozone injection laundry systems	New	Healthcare	All	0.1898
Ozone injection laundry systems	New	Lodging	All	0.6283
Ozone injection laundry systems	New	Misc.	All	0.0039
Ozone injection laundry systems	New	Office	All	0.0145
Ozone injection laundry systems	New	Restaurant	All	0.1399
Ozone injection laundry systems	New	Retail	All	0.0088
Ozone injection laundry systems	New	Warehouse	All	0.0068
Pool Cover	Existing	Education	All	1.1190
Pool Cover	Existing	Grocery	All	0.1140
Pool Cover	Existing	Healthcare	All	0.3196
Pool Cover	Existing	Lodging	All	0.3565
Pool Cover	Existing	Misc.	All	0.0776
Pool Cover	Existing	Office	All	0.1344
Pool Cover	Existing	Restaurant	All	0.0229
Pool Cover	Existing	Retail	All	0.0348
Pool Cover	Existing	Warehouse	All	0.0748
Pool Cover	New	Education	All	1.1190
Pool Cover	New	Grocery	All	0.1140
Pool Cover	New	Healthcare	All	0.3196
Pool Cover	New	Lodging	All	0.3565
Pool Cover	New	Misc.	All	0.0776
Pool Cover	New	Office	All	0.1344
Pool Cover	New	Restaurant	All	0.0229
Pool Cover	New	Retail	All	0.0348
Pool Cover	New	Warehouse	All	0.0748
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Education	All	4.6010
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Grocery	All	0.4738
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Healthcare	All	1.3254
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Lodging	All	1.4778
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Misc.	All	0.3228
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Office	All	0.5582
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Restaurant	All	0.0952
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Retail	All	0.1446
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	Existing	Warehouse	All	0.3110
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Education	All	4.6010
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Grocery	All	0.4738
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Healthcare	All	1.3254
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Lodging	All	1.4778
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Misc.	All	0.3228
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Office	All	0.5582
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Restaurant	All	0.0952
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Retail	All	0.1446
Pool Spa Solar Heat, 79 sf collector area, pool is storage volume	New	Warehouse	All	0.3110
Recirculation Controls	Existing	Education	All	2.8919
Recirculation Controls	Existing	Grocery	All	0.6476
Recirculation Controls	Existing	Healthcare	All	2.0992
Recirculation Controls	Existing	Lodging	All	4.1957
Recirculation Controls	Existing	Misc.	All	0.1505
Recirculation Controls	Existing	Office	All	0.2530
Recirculation Controls	Existing	Restaurant	All	3.4759
Recirculation Controls	Existing	Retail	All	0.1899
Recirculation Controls	Existing	Warehouse	All	0.2625

Description	Vintage	Segment	Climate Zone	B/c Ratio
Recirculation Controls	New	Education	All	5.6808
Recirculation Controls	New	Grocery	All	1.9656
Recirculation Controls	New	Healthcare	All	4.7108
Recirculation Controls	New	Lodging	All	6.8401
Recirculation Controls	New	Misc.	All	0.5197
Recirculation Controls	New	Office	All	0.8495
Recirculation Controls	New	Restaurant	All	6.2540
Recirculation Controls	New	Retail	All	0.6486
Recirculation Controls	New	Warehouse	All	0.8791
Refrigeration system superheat recovery DHW	Existing	Education	All	1.4336
Refrigeration system superheat recovery DHW	Existing	Grocery	All	0.1947
Refrigeration system superheat recovery DHW	Existing	Healthcare	All	0.9260
Refrigeration system superheat recovery DHW	Existing	Lodging	All	2.6142
Refrigeration system superheat recovery DHW	Existing	Misc.	All	0.0206
Refrigeration system superheat recovery DHW	Existing	Office	All	0.0760
Refrigeration system superheat recovery DHW	Existing	Restaurant	All	0.6965
Refrigeration system superheat recovery DHW	Existing	Retail	All	0.0464
Refrigeration system superheat recovery DHW	Existing	Warehouse	All	0.0360
Refrigeration system superheat recovery DHW	New	Education	All	1.4336
Refrigeration system superheat recovery DHW	New	Grocery	All	0.1947
Refrigeration system superheat recovery DHW	New	Healthcare	All	0.9260
Refrigeration system superheat recovery DHW	New	Lodging	All	2.6142
Refrigeration system superheat recovery DHW	New	Misc.	All	0.0206
Refrigeration system superheat recovery DHW	New	Office	All	0.0760
Refrigeration system superheat recovery DHW	New	Restaurant	All	0.6965
Refrigeration system superheat recovery DHW	New	Retail	All	0.0464
Refrigeration system superheat recovery DHW	New	Warehouse	All	0.0360
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Education	All	3.1425
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Grocery	All	3.1671
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Healthcare	All	2.7449
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Lodging	All	2.1725
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Misc.	All	2.7848
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Office	All	2.4606
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Restaurant	All	4.1835
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Retail	All	2.3950
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Warehouse	All	1.1588
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Education	All	3.1425
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Grocery	All	3.1671
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Healthcare	All	2.7449
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Lodging	All	2.1725
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Misc.	All	2.7848
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Office	All	2.4606
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Restaurant	All	4.1835
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Retail	All	2.3950
Roof insulation (retrofit only) - Tier 1: Min R-30	New	Warehouse	All	1.1588
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Education	All	2.2528
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Grocery	All	2.2718
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Healthcare	All	1.9492
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Lodging	All	1.5221
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Misc.	All	1.9794
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Office	All	1.7356
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Restaurant	All	3.0759
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Retail	All	1.6868
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Warehouse	All	0.7930
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Education	All	0.0475

Description	Vintage	Segment	Climate Zone	B/c Ratio
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Grocery	All	0.0480
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Healthcare	All	0.0402
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Lodging	All	0.0304
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Misc.	All	0.0409
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Office	All	0.0352
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Restaurant	All	0.0693
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Retail	All	0.0341
Roof insulation (retrofit only) - Tier 2: Min R-45	New	Warehouse	All	0.0150
SolarWall 26ga	Existing	Education	All	0.7905
SolarWall 26ga	Existing	Grocery	All	0.7457
SolarWall 26ga	Existing	Healthcare	All	0.5646
SolarWall 26ga	Existing	Lodging	All	0.5061
SolarWall 26ga	Existing	Misc.	All	0.3681
SolarWall 26ga	Existing	Office	All	0.4404
SolarWall 26ga	Existing	Restaurant	All	0.4913
SolarWall 26ga	Existing	Retail	All	0.4937
SolarWall 26ga	Existing	Warehouse	All	0.3390
SolarWall 26ga	New	Education	All	0.7905
SolarWall 26ga	New	Grocery	All	0.7457
SolarWall 26ga	New	Healthcare	All	0.5646
SolarWall 26ga	New	Lodging	All	0.5061
SolarWall 26ga	New	Misc.	All	0.3681
SolarWall 26ga	New	Office	All	0.4404
SolarWall 26ga	New	Restaurant	All	0.4913
SolarWall 26ga	New	Retail	All	0.4937
SolarWall 26ga	New	Warehouse	All	0.3390
Steam System Efficiency Improvements	Existing	Education	All	1.0425
Steam System Efficiency Improvements	Existing	Grocery	All	0.7372
Steam System Efficiency Improvements	Existing	Healthcare	All	0.6416
Steam System Efficiency Improvements	Existing	Lodging	All	0.6393
Steam System Efficiency Improvements	Existing	Misc.	All	0.2579
Steam System Efficiency Improvements	Existing	Office	All	0.4486
Steam System Efficiency Improvements	Existing	Restaurant	All	0.2588
Steam System Efficiency Improvements	Existing	Retail	All	0.4555
Steam System Efficiency Improvements	Existing	Warehouse	All	0.3790
Steam System Efficiency Improvements	New	Education	All	1.0425
Steam System Efficiency Improvements	New	Grocery	All	0.7372
Steam System Efficiency Improvements	New	Healthcare	All	0.6416
Steam System Efficiency Improvements	New	Lodging	All	0.6393
Steam System Efficiency Improvements	New	Misc.	All	0.2579
Steam System Efficiency Improvements	New	Office	All	0.4486
Steam System Efficiency Improvements	New	Restaurant	All	0.2588
Steam System Efficiency Improvements	New	Retail	All	0.4555
Steam System Efficiency Improvements	New	Warehouse	All	0.3790
Variable Volume Air System	Existing	Education	All	1.0017
Variable Volume Air System	Existing	Grocery	All	1.2590
Variable Volume Air System	Existing	Healthcare	All	0.8612
Variable Volume Air System	Existing	Lodging	All	0.7028
Variable Volume Air System	Existing	Misc.	All	0.9214
Variable Volume Air System	Existing	Office	All	0.7635
Variable Volume Air System	Existing	Restaurant	All	1.5357
Variable Volume Air System	Existing	Retail	All	0.9312
Variable Volume Air System	Existing	Warehouse	All	0.5468
Variable Volume Air System	New	Education	All	1.0017
Variable Volume Air System	New	Grocery	All	1.2590

Description	Vintage	Segment	Climate Zone	B/c Ratio
Variable Volume Air System	New	Healthcare	All	0.8612
Variable Volume Air System	New	Lodging	All	0.7028
Variable Volume Air System	New	Misc.	All	0.9214
Variable Volume Air System	New	Office	All	0.7635
Variable Volume Air System	New	Restaurant	All	1.5357
Variable Volume Air System	New	Retail	All	0.9312
Variable Volume Air System	New	Warehouse	All	0.5468
Ventilation Hood / Makeup Air	Existing	Education	All	0.3543
Ventilation Hood / Makeup Air	Existing	Grocery	All	0.4460
Ventilation Hood / Makeup Air	Existing	Healthcare	All	0.3044
Ventilation Hood / Makeup Air	Existing	Lodging	All	0.2482
Ventilation Hood / Makeup Air	Existing	Misc.	All	0.3258
Ventilation Hood / Makeup Air	Existing	Office	All	0.2697
Ventilation Hood / Makeup Air	Existing	Restaurant	All	0.5450
Ventilation Hood / Makeup Air	Existing	Retail	All	0.3293
Ventilation Hood / Makeup Air	Existing	Warehouse	All	0.1929
Ventilation Hood / Makeup Air	New	Education	All	0.3543
Ventilation Hood / Makeup Air	New	Grocery	All	0.4460
Ventilation Hood / Makeup Air	New	Healthcare	All	0.3044
Ventilation Hood / Makeup Air	New	Lodging	All	0.2482
Ventilation Hood / Makeup Air	New	Misc.	All	0.3258
Ventilation Hood / Makeup Air	New	Office	All	0.2697
Ventilation Hood / Makeup Air	New	Restaurant	All	0.5450
Ventilation Hood / Makeup Air	New	Retail	All	0.3293
Ventilation Hood / Makeup Air	New	Warehouse	All	0.1929
Wall insulation - Tier 2: Min R-19	Existing	Education	All	3.6928
Wall insulation - Tier 2: Min R-19	Existing	Grocery	All	3.5248
Wall insulation - Tier 2: Min R-19	Existing	Healthcare	All	2.8038
Wall insulation - Tier 2: Min R-19	Existing	Lodging	All	2.5551
Wall insulation - Tier 2: Min R-19	Existing	Misc.	All	1.9340
Wall insulation - Tier 2: Min R-19	Existing	Office	All	2.2657
Wall insulation - Tier 2: Min R-19	Existing	Restaurant	All	2.4906
Wall insulation - Tier 2: Min R-19	Existing	Retail	All	2.5011
Wall insulation - Tier 2: Min R-19	Existing	Warehouse	All	1.7967
Wall insulation - Tier 2: Min R-19	New	Education	All	0.4537
Wall insulation - Tier 2: Min R-19	New	Grocery	All	0.4274
Wall insulation - Tier 2: Min R-19	New	Healthcare	All	0.3221
Wall insulation - Tier 2: Min R-19	New	Lodging	All	0.2883
Wall insulation - Tier 2: Min R-19	New	Misc.	All	0.2090
Wall insulation - Tier 2: Min R-19	New	Office	All	0.2505
Wall insulation - Tier 2: Min R-19	New	Restaurant	All	0.2798
Wall insulation - Tier 2: Min R-19	New	Retail	All	0.2812
Wall insulation - Tier 2: Min R-19	New	Warehouse	All	0.1923
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Education	All	3.4828
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Grocery	All	3.3216
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Healthcare	All	2.6326
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Lodging	All	2.3960
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Misc.	All	1.8080
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Office	All	2.1216
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Restaurant	All	2.3348
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Retail	All	2.3448
Wall insulation (Retrofit Only) - Tier 1: Min R-11	Existing	Warehouse	All	1.6785
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Education	All	3.4828
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Grocery	All	3.3216
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Healthcare	All	2.6326

Description	Vintage	Segment	Climate Zone	B/c Ratio
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Lodging	All	2.3960
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Misc.	All	1.8080
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Office	All	2.1216
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Restaurant	All	2.3348
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Retail	All	2.3448
Wall insulation (Retrofit Only) - Tier 1: Min R-11	New	Warehouse	All	1.6785
Windows - Add Argon to Vinyl Lowe	Existing	Education	All	3.2207
Windows - Add Argon to Vinyl Lowe	Existing	Grocery	All	3.8633
Windows - Add Argon to Vinyl Lowe	Existing	Healthcare	All	2.8433
Windows - Add Argon to Vinyl Lowe	Existing	Lodging	All	2.3926
Windows - Add Argon to Vinyl Lowe	Existing	Misc.	All	3.0073
Windows - Add Argon to Vinyl Lowe	Existing	Office	All	2.5685
Windows - Add Argon to Vinyl Lowe	Existing	Restaurant	All	4.4921
Windows - Add Argon to Vinyl Lowe	Existing	Retail	All	3.0338
Windows - Add Argon to Vinyl Lowe	Existing	Warehouse	All	1.9204
Windows - Add Argon to Vinyl Lowe	New	Education	All	2.7649
Windows - Add Argon to Vinyl Lowe	New	Grocery	All	3.3528
Windows - Add Argon to Vinyl Lowe	New	Healthcare	All	2.4256
Windows - Add Argon to Vinyl Lowe	New	Lodging	All	2.0259
Windows - Add Argon to Vinyl Lowe	New	Misc.	All	2.5726
Windows - Add Argon to Vinyl Lowe	New	Office	All	2.1812
Windows - Add Argon to Vinyl Lowe	New	Restaurant	All	3.9406
Windows - Add Argon to Vinyl Lowe	New	Retail	All	2.5964
Windows - Add Argon to Vinyl Lowe	New	Warehouse	All	1.6135
Windows - Add Low E and Argon to Vinyl Tint	Existing	Education	All	10.8030
Windows - Add Low E and Argon to Vinyl Tint	Existing	Grocery	All	10.5730
Windows - Add Low E and Argon to Vinyl Tint	Existing	Healthcare	All	10.9264
Windows - Add Low E and Argon to Vinyl Tint	Existing	Lodging	All	11.0639
Windows - Add Low E and Argon to Vinyl Tint	Existing	Misc.	All	10.8738
Windows - Add Low E and Argon to Vinyl Tint	Existing	Office	All	11.0114
Windows - Add Low E and Argon to Vinyl Tint	Existing	Restaurant	All	10.3198
Windows - Add Low E and Argon to Vinyl Tint	Existing	Retail	All	10.8651
Windows - Add Low E and Argon to Vinyl Tint	Existing	Warehouse	All	11.1975
Windows - Add Low E and Argon to Vinyl Tint	New	Education	All	10.8030
Windows - Add Low E and Argon to Vinyl Tint	New	Grocery	All	10.5730
Windows - Add Low E and Argon to Vinyl Tint	New	Healthcare	All	10.9264
Windows - Add Low E and Argon to Vinyl Tint	New	Lodging	All	11.0639
Windows - Add Low E and Argon to Vinyl Tint	New	Misc.	All	10.8738
Windows - Add Low E and Argon to Vinyl Tint	New	Office	All	11.0114
Windows - Add Low E and Argon to Vinyl Tint	New	Restaurant	All	10.3198
Windows - Add Low E and Argon to Vinyl Tint	New	Retail	All	10.8651
Windows - Add Low E and Argon to Vinyl Tint	New	Warehouse	All	11.1975
Windows - Add Low E to Vinyl Tint	Existing	Education	All	4.0321
Windows - Add Low E to Vinyl Tint	Existing	Grocery	All	4.7455
Windows - Add Low E to Vinyl Tint	Existing	Healthcare	All	3.6003
Windows - Add Low E to Vinyl Tint	Existing	Lodging	All	3.0714
Windows - Add Low E to Vinyl Tint	Existing	Misc.	All	3.7891
Windows - Add Low E to Vinyl Tint	Existing	Office	All	3.2795
Windows - Add Low E to Vinyl Tint	Existing	Restaurant	All	5.4180
Windows - Add Low E to Vinyl Tint	Existing	Retail	All	3.8195
Windows - Add Low E to Vinyl Tint	Existing	Warehouse	All	2.5014
Windows - Add Low E to Vinyl Tint	New	Education	All	3.3644
Windows - Add Low E to Vinyl Tint	New	Grocery	All	4.0220
Windows - Add Low E to Vinyl Tint	New	Healthcare	All	2.9761
Windows - Add Low E to Vinyl Tint	New	Lodging	All	2.5103

Description	Vintage	Segment	Climate Zone	B/c Ratio
Windows - Add Low E to Vinyl Tint	New	Misc.	All	3.1450
Windows - Add Low E to Vinyl Tint	New	Office	All	2.6924
Windows - Add Low E to Vinyl Tint	New	Restaurant	All	4.6612
Windows - Add Low E to Vinyl Tint	New	Retail	All	3.1723
Windows - Add Low E to Vinyl Tint	New	Warehouse	All	2.0200
Windows - Non-Tinted AL Code to Class 36	Existing	Education	All	1.5028
Windows - Non-Tinted AL Code to Class 36	Existing	Grocery	All	1.8791
Windows - Non-Tinted AL Code to Class 36	Existing	Healthcare	All	1.2958
Windows - Non-Tinted AL Code to Class 36	Existing	Lodging	All	1.0609
Windows - Non-Tinted AL Code to Class 36	Existing	Misc.	All	1.3846
Windows - Non-Tinted AL Code to Class 36	Existing	Office	All	1.1510
Windows - Non-Tinted AL Code to Class 36	Existing	Restaurant	All	2.2795
Windows - Non-Tinted AL Code to Class 36	Existing	Retail	All	1.3991
Windows - Non-Tinted AL Code to Class 36	Existing	Warehouse	All	0.8280
Windows - Non-Tinted AL Code to Class 36	New	Education	All	1.4319
Windows - Non-Tinted AL Code to Class 36	New	Grocery	All	1.7935
Windows - Non-Tinted AL Code to Class 36	New	Healthcare	All	1.2335
Windows - Non-Tinted AL Code to Class 36	New	Lodging	All	1.0087
Windows - Non-Tinted AL Code to Class 36	New	Misc.	All	1.3185
Windows - Non-Tinted AL Code to Class 36	New	Office	All	1.0949
Windows - Non-Tinted AL Code to Class 36	New	Restaurant	All	2.1798
Windows - Non-Tinted AL Code to Class 36	New	Retail	All	1.3324
Windows - Non-Tinted AL Code to Class 36	New	Warehouse	All	0.7864
Windows - Non-Tinted AL Code to Class 40	Existing	Education	All	2.2575
Windows - Non-Tinted AL Code to Class 40	Existing	Grocery	All	2.7712
Windows - Non-Tinted AL Code to Class 40	Existing	Healthcare	All	1.9667
Windows - Non-Tinted AL Code to Class 40	Existing	Lodging	All	1.6292
Windows - Non-Tinted AL Code to Class 40	Existing	Misc.	All	2.0921
Windows - Non-Tinted AL Code to Class 40	Existing	Office	All	1.7597
Windows - Non-Tinted AL Code to Class 40	Existing	Restaurant	All	3.2975
Windows - Non-Tinted AL Code to Class 40	Existing	Retail	All	2.1126
Windows - Non-Tinted AL Code to Class 40	Existing	Warehouse	All	1.2868
Windows - Non-Tinted AL Code to Class 40	New	Education	All	2.1835
Windows - Non-Tinted AL Code to Class 40	New	Grocery	All	2.6851
Windows - Non-Tinted AL Code to Class 40	New	Healthcare	All	1.9003
Windows - Non-Tinted AL Code to Class 40	New	Lodging	All	1.5724
Windows - Non-Tinted AL Code to Class 40	New	Misc.	All	2.0224
Windows - Non-Tinted AL Code to Class 40	New	Office	All	1.6990
Windows - Non-Tinted AL Code to Class 40	New	Restaurant	All	3.2009
Windows - Non-Tinted AL Code to Class 40	New	Retail	All	2.0423
Windows - Non-Tinted AL Code to Class 40	New	Warehouse	All	1.2404
Windows - Non-Tinted AL Code to Class 45	Existing	Education	All	1.3676
Windows - Non-Tinted AL Code to Class 45	Existing	Grocery	All	1.7157
Windows - Non-Tinted AL Code to Class 45	Existing	Healthcare	All	1.1770
Windows - Non-Tinted AL Code to Class 45	Existing	Lodging	All	0.9616
Windows - Non-Tinted AL Code to Class 45	Existing	Misc.	All	1.2586
Windows - Non-Tinted AL Code to Class 45	Existing	Office	All	1.0442
Windows - Non-Tinted AL Code to Class 45	Existing	Restaurant	All	2.0887
Windows - Non-Tinted AL Code to Class 45	Existing	Retail	All	1.2720
Windows - Non-Tinted AL Code to Class 45	Existing	Warehouse	All	0.7490
Windows - Non-Tinted AL Code to Class 45	New	Education	All	1.2970
Windows - Non-Tinted AL Code to Class 45	New	Grocery	All	1.6301
Windows - Non-Tinted AL Code to Class 45	New	Healthcare	All	1.1153
Windows - Non-Tinted AL Code to Class 45	New	Lodging	All	0.9102
Windows - Non-Tinted AL Code to Class 45	New	Misc.	All	1.1931

Description	Vintage	Segment	Climate Zone	B/c Ratio
Windows - Non-Tinted AL Code to Class 45	New	Office	All	0.9887
Windows - Non-Tinted AL Code to Class 45	New	Restaurant	All	1.9881
Windows - Non-Tinted AL Code to Class 45	New	Retail	All	1.2058
Windows - Non-Tinted AL Code to Class 45	New	Warehouse	All	0.7082
Windows - Tinted AL Code to Class 36	Existing	Education	All	1.3154
Windows - Tinted AL Code to Class 36	Existing	Grocery	All	1.6524
Windows - Tinted AL Code to Class 36	Existing	Healthcare	All	1.1313
Windows - Tinted AL Code to Class 36	Existing	Lodging	All	0.9235
Windows - Tinted AL Code to Class 36	Existing	Misc.	All	1.2101
Windows - Tinted AL Code to Class 36	Existing	Office	All	1.0031
Windows - Tinted AL Code to Class 36	Existing	Restaurant	All	2.0144
Windows - Tinted AL Code to Class 36	Existing	Retail	All	1.2231
Windows - Tinted AL Code to Class 36	Existing	Warehouse	All	0.7188
Windows - Tinted AL Code to Class 36	New	Education	All	1.0823
Windows - Tinted AL Code to Class 36	New	Grocery	All	1.3675
Windows - Tinted AL Code to Class 36	New	Healthcare	All	0.9279
Windows - Tinted AL Code to Class 36	New	Lodging	All	0.7548
Windows - Tinted AL Code to Class 36	New	Misc.	All	0.9939
Windows - Tinted AL Code to Class 36	New	Office	All	0.8210
Windows - Tinted AL Code to Class 36	New	Restaurant	All	1.6776
Windows - Tinted AL Code to Class 36	New	Retail	All	1.0048
Windows - Tinted AL Code to Class 36	New	Warehouse	All	0.5854
Windows - Tinted AL Code to Class 45	Existing	Education	All	0.3124
Windows - Tinted AL Code to Class 45	Existing	Grocery	All	0.4024
Windows - Tinted AL Code to Class 45	Existing	Healthcare	All	0.2651
Windows - Tinted AL Code to Class 45	Existing	Lodging	All	0.2132
Windows - Tinted AL Code to Class 45	Existing	Misc.	All	0.2852
Windows - Tinted AL Code to Class 45	Existing	Office	All	0.2329
Windows - Tinted AL Code to Class 45	Existing	Restaurant	All	0.5044
Windows - Tinted AL Code to Class 45	Existing	Retail	All	0.2885
Windows - Tinted AL Code to Class 45	Existing	Warehouse	All	0.1635
Windows - Tinted AL Code to Class 45	New	Education	All	0.0005
Windows - Tinted AL Code to Class 45	New	Grocery	All	0.0007
Windows - Tinted AL Code to Class 45	New	Healthcare	All	0.0004
Windows - Tinted AL Code to Class 45	New	Lodging	All	0.0003
Windows - Tinted AL Code to Class 45	New	Misc.	All	0.0005
Windows - Tinted AL Code to Class 45	New	Office	All	0.0004
Windows - Tinted AL Code to Class 45	New	Restaurant	All	0.0008
Windows - Tinted AL Code to Class 45	New	Retail	All	0.0005
Windows - Tinted AL Code to Class 45	New	Warehouse	All	0.0003

Description	Vintage	Segment	Climate Zone	B/c Ratio
Combination Boiler and Hot Water Heater	Early Retirement	FoodMfg	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	FoodMfg	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	LumberWood	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	LumberWood	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	MetalsFab	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	MetalsFab	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	Other	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	Other	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	PaperMfg	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	PaperMfg	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	StoneClayGlass	All	0.2068
Combination Boiler and Hot Water Heater	Early Retirement	StoneClayGlass	All	0.2068
Combination Boiler and Hot Water Heater	Turnover	FoodMfg	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	FoodMfg	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	LumberWood	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	LumberWood	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	MetalsFab	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	MetalsFab	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	Other	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	Other	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	PaperMfg	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	PaperMfg	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	StoneClayGlass	All	0.2557
Combination Boiler and Hot Water Heater	Turnover	StoneClayGlass	All	0.2557
Direct Fired Radiant Heater	Early Retirement	FoodMfg	All	3.6702
Direct Fired Radiant Heater	Early Retirement	LumberWood	All	3.6702
Direct Fired Radiant Heater	Early Retirement	MetalsFab	All	3.6702
Direct Fired Radiant Heater	Early Retirement	Other	All	3.6702
Direct Fired Radiant Heater	Early Retirement	PaperMfg	All	3.6702
Direct Fired Radiant Heater	Early Retirement	StoneClayGlass	All	3.6702
Direct Fired Radiant Heater	Turnover	FoodMfg	All	8.5566
Direct Fired Radiant Heater	Turnover	LumberWood	All	8.5566
Direct Fired Radiant Heater	Turnover	MetalsFab	All	8.5566
Direct Fired Radiant Heater	Turnover	Other	All	8.5566
Direct Fired Radiant Heater	Turnover	PaperMfg	All	8.5566
Direct Fired Radiant Heater	Turnover	StoneClayGlass	All	8.5566
High Efficiency Condensing Boiler	Early Retirement	FoodMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	FoodMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	FoodMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	FoodMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	LumberWood	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	LumberWood	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	LumberWood	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	LumberWood	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	MetalsFab	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	MetalsFab	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	MetalsFab	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	MetalsFab	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	MetalsFab	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	Other	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	Other	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	Other	All	0.2080

Description	Vintage	Segment	Climate Zone	B/c Ratio
High Efficiency Condensing Boiler	Early Retirement	Other	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	PaperMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	PaperMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	PaperMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	PaperMfg	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	StoneClayGlass	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	StoneClayGlass	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	StoneClayGlass	All	0.2080
High Efficiency Condensing Boiler	Early Retirement	StoneClayGlass	All	0.2080
High Efficiency Condensing Boiler	Turnover	FoodMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	FoodMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	FoodMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	FoodMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	LumberWood	All	0.2602
High Efficiency Condensing Boiler	Turnover	LumberWood	All	0.2602
High Efficiency Condensing Boiler	Turnover	LumberWood	All	0.2602
High Efficiency Condensing Boiler	Turnover	LumberWood	All	0.2602
High Efficiency Condensing Boiler	Turnover	MetalsFab	All	0.2602
High Efficiency Condensing Boiler	Turnover	MetalsFab	All	0.2602
High Efficiency Condensing Boiler	Turnover	MetalsFab	All	0.2602
High Efficiency Condensing Boiler	Turnover	MetalsFab	All	0.2602
High Efficiency Condensing Boiler	Turnover	Other	All	0.2602
High Efficiency Condensing Boiler	Turnover	Other	All	0.2602
High Efficiency Condensing Boiler	Turnover	Other	All	0.2602
High Efficiency Condensing Boiler	Turnover	Other	All	0.2602
High Efficiency Condensing Boiler	Turnover	PaperMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	PaperMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	PaperMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	PaperMfg	All	0.2602
High Efficiency Condensing Boiler	Turnover	StoneClayGlass	All	0.2602
High Efficiency Condensing Boiler	Turnover	StoneClayGlass	All	0.2602
High Efficiency Condensing Boiler	Turnover	StoneClayGlass	All	0.2602
High Efficiency Condensing Boiler	Turnover	StoneClayGlass	All	0.2602
High Efficiency Condensing Furnace	Early Retirement	FoodMfg	All	0.6556
High Efficiency Condensing Furnace	Early Retirement	LumberWood	All	0.6556
High Efficiency Condensing Furnace	Early Retirement	MetalsFab	All	0.6556
High Efficiency Condensing Furnace	Early Retirement	Other	All	0.6556
High Efficiency Condensing Furnace	Early Retirement	PaperMfg	All	0.6556
High Efficiency Condensing Furnace	Early Retirement	StoneClayGlass	All	0.6556
High Efficiency Condensing Furnace	Turnover	FoodMfg	All	1.8014
High Efficiency Condensing Furnace	Turnover	LumberWood	All	1.8014
High Efficiency Condensing Furnace	Turnover	MetalsFab	All	1.8014
High Efficiency Condensing Furnace	Turnover	Other	All	1.8014
High Efficiency Condensing Furnace	Turnover	PaperMfg	All	1.8014
High Efficiency Condensing Furnace	Turnover	StoneClayGlass	All	1.8014
High Efficiency Condensing Unit Heater 92% AFUE	Early Retirement	FoodMfg	All	0.8255
High Efficiency Condensing Unit Heater 92% AFUE	Early Retirement	LumberWood	All	0.8255
High Efficiency Condensing Unit Heater 92% AFUE	Early Retirement	MetalsFab	All	0.8255
High Efficiency Condensing Unit Heater 92% AFUE	Early Retirement	Other	All	0.8255
High Efficiency Condensing Unit Heater 92% AFUE	Early Retirement	PaperMfg	All	0.8255
High Efficiency Condensing Unit Heater 92% AFUE	Early Retirement	StoneClayGlass	All	0.8255

Description	Vintage	Segment	Climate Zone	B/c Ratio
High Efficiency Condensing Unit Heater 92% AFUE	Turnover	FoodMfg	All	0.7701
High Efficiency Condensing Unit Heater 92% AFUE	Turnover	LumberWood	All	0.7701
High Efficiency Condensing Unit Heater 92% AFUE	Turnover	MetalsFab	All	0.7701
High Efficiency Condensing Unit Heater 92% AFUE	Turnover	Other	All	0.7701
High Efficiency Condensing Unit Heater 92% AFUE	Turnover	PaperMfg	All	0.7701
High Efficiency Condensing Unit Heater 92% AFUE	Turnover	StoneClayGlass	All	0.7701
High Efficiency Non-Condensing Unit Heater	Early Retirement	FoodMfg	All	0.6691
High Efficiency Non-Condensing Unit Heater	Early Retirement	LumberWood	All	0.6691
High Efficiency Non-Condensing Unit Heater	Early Retirement	MetalsFab	All	0.6691
High Efficiency Non-Condensing Unit Heater	Early Retirement	Other	All	0.6691
High Efficiency Non-Condensing Unit Heater	Early Retirement	PaperMfg	All	0.6691
High Efficiency Non-Condensing Unit Heater	Early Retirement	StoneClayGlass	All	0.6691
High Efficiency Non-Condensing Unit Heater	Turnover	FoodMfg	All	0.4516
High Efficiency Non-Condensing Unit Heater	Turnover	LumberWood	All	0.4516
High Efficiency Non-Condensing Unit Heater	Turnover	MetalsFab	All	0.4516
High Efficiency Non-Condensing Unit Heater	Turnover	Other	All	0.4516
High Efficiency Non-Condensing Unit Heater	Turnover	PaperMfg	All	0.4516
High Efficiency Non-Condensing Unit Heater	Turnover	StoneClayGlass	All	0.4516
Process Heating: High Efficiency Furnace	Early Retirement	FoodMfg	All	0.6556
Process Heating: High Efficiency Furnace	Early Retirement	LumberWood	All	0.6556
Process Heating: High Efficiency Furnace	Early Retirement	MetalsFab	All	0.6556
Process Heating: High Efficiency Furnace	Early Retirement	Other	All	0.6556
Process Heating: High Efficiency Furnace	Early Retirement	PaperMfg	All	0.6556
Process Heating: High Efficiency Furnace	Early Retirement	StoneClayGlass	All	0.6556
Process Heating: High Efficiency Furnace	Turnover	FoodMfg	All	1.8014
Process Heating: High Efficiency Furnace	Turnover	LumberWood	All	1.8014
Process Heating: High Efficiency Furnace	Turnover	MetalsFab	All	1.8014
Process Heating: High Efficiency Furnace	Turnover	Other	All	1.8014
Process Heating: High Efficiency Furnace	Turnover	PaperMfg	All	1.8014
Process Heating: High Efficiency Furnace	Turnover	StoneClayGlass	All	1.8014

Description	Vintage	Segment	Climate Zone	B/c Ratio
Boiler Power Burner	Existing	FoodMfg	All	0.4056
Boiler Power Burner	Existing	LumberWood	All	0.4056
Boiler Power Burner	Existing	MetalsFab	All	0.4056
Boiler Power Burner	Existing	Other	All	0.4056
Boiler Power Burner	Existing	PaperMfg	All	0.4056
Boiler Power Burner	Existing	StoneClayGlass	All	0.4056
Boiler Repair/Maintenance	Existing	FoodMfg	All	0.1038
Boiler Repair/Maintenance	Existing	LumberWood	All	0.1038
Boiler Repair/Maintenance	Existing	MetalsFab	All	0.1038
Boiler Repair/Maintenance	Existing	Other	All	0.1038
Boiler Repair/Maintenance	Existing	PaperMfg	All	0.1038
Boiler Repair/Maintenance	Existing	StoneClayGlass	All	0.1038
Boiler Stack Economizer	Existing	FoodMfg	All	0.4382
Boiler Stack Economizer	Existing	LumberWood	All	0.4382
Boiler Stack Economizer	Existing	MetalsFab	All	0.4382
Boiler Stack Economizer	Existing	Other	All	0.4382
Boiler Stack Economizer	Existing	PaperMfg	All	0.4382
Boiler Stack Economizer	Existing	StoneClayGlass	All	0.4382
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	FoodMfg	All	0.2948
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	LumberWood	All	0.2948
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	MetalsFab	All	0.2948
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	Other	All	0.2948
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	PaperMfg	All	0.2948
Boiler Steam Trap - min. 300 kBtu in, pressure of 7 psig or >	Existing	StoneClayGlass	All	0.2948
Boiler vent damper - min. 1000 kBtu input	Existing	FoodMfg	All	0.4189
Boiler vent damper - min. 1000 kBtu input	Existing	LumberWood	All	0.4189
Boiler vent damper - min. 1000 kBtu input	Existing	MetalsFab	All	0.4189
Boiler vent damper - min. 1000 kBtu input	Existing	Other	All	0.4189
Boiler vent damper - min. 1000 kBtu input	Existing	PaperMfg	All	0.4189
Boiler vent damper - min. 1000 kBtu input	Existing	StoneClayGlass	All	0.4189
Demand Controlled Ventilation	Existing	FoodMfg	All	2.8553
Demand Controlled Ventilation	Existing	LumberWood	All	2.8553
Demand Controlled Ventilation	Existing	MetalsFab	All	2.8553
Demand Controlled Ventilation	Existing	Other	All	2.8553
Demand Controlled Ventilation	Existing	PaperMfg	All	2.8553
Demand Controlled Ventilation	Existing	StoneClayGlass	All	2.8553
Duct Sealing and Insulation	Existing	FoodMfg	All	0.3753
Duct Sealing and Insulation	Existing	LumberWood	All	0.3753
Duct Sealing and Insulation	Existing	MetalsFab	All	0.3753
Duct Sealing and Insulation	Existing	Other	All	0.3753
Duct Sealing and Insulation	Existing	PaperMfg	All	0.3753
Duct Sealing and Insulation	Existing	StoneClayGlass	All	0.3753
HVAC Controls	Existing	FoodMfg	All	0.2902
HVAC Controls	Existing	LumberWood	All	0.2902
HVAC Controls	Existing	MetalsFab	All	0.2902
HVAC Controls	Existing	Other	All	0.2902
HVAC Controls	Existing	PaperMfg	All	0.2902
HVAC Controls	Existing	StoneClayGlass	All	0.2902
HVAC System Commissioning	Existing	FoodMfg	All	0.8250
HVAC System Commissioning	Existing	LumberWood	All	0.8250
HVAC System Commissioning	Existing	MetalsFab	All	0.8250
HVAC System Commissioning	Existing	Other	All	0.8250
HVAC System Commissioning	Existing	PaperMfg	All	0.8250

Description	Vintage	Segment	Climate Zone	B/c Ratio
HVAC System Commissioning	Existing	StoneClayGlass	All	0.8250
Improved Process Heating Controls	Existing	FoodMfg	All	14.1105
Improved Process Heating Controls	Existing	LumberWood	All	14.1106
Improved Process Heating Controls	Existing	MetalsFab	All	14.1105
Improved Process Heating Controls	Existing	Other	All	14.1109
Improved Process Heating Controls	Existing	PaperMfg	All	14.1104
Improved Process Heating Controls	Existing	StoneClayGlass	All	14.1103
Optimized Furnace Operations/Improved O&M	Existing	FoodMfg	All	16.3786
Optimized Furnace Operations/Improved O&M	Existing	LumberWood	All	16.3789
Optimized Furnace Operations/Improved O&M	Existing	MetalsFab	All	16.3788
Optimized Furnace Operations/Improved O&M	Existing	Other	All	16.3771
Optimized Furnace Operations/Improved O&M	Existing	PaperMfg	All	16.3794
Optimized Furnace Operations/Improved O&M	Existing	StoneClayGlass	All	16.3778
Refrigeration system superheat recovery	Existing	FoodMfg	All	0.0372
Refrigeration system superheat recovery	Existing	LumberWood	All	0.0372
Refrigeration system superheat recovery	Existing	MetalsFab	All	0.0372
Refrigeration system superheat recovery	Existing	Other	All	0.0372
Refrigeration system superheat recovery	Existing	PaperMfg	All	0.0372
Refrigeration system superheat recovery	Existing	StoneClayGlass	All	0.0372
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	FoodMfg	All	1.2384
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	LumberWood	All	1.2384
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	MetalsFab	All	1.2384
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	Other	All	1.2384
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	PaperMfg	All	1.2384
Roof insulation (retrofit only) - Tier 1: Min R-30	Existing	StoneClayGlass	All	1.2384
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	FoodMfg	All	0.8357
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	LumberWood	All	0.8357
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	MetalsFab	All	0.8357
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	Other	All	0.8357
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	PaperMfg	All	0.8357
Roof insulation (retrofit only) - Tier 2: Min R-45	Existing	StoneClayGlass	All	0.8357
Space Heating O&M	Existing	FoodMfg	All	0.8088
Space Heating O&M	Existing	LumberWood	All	0.8088
Space Heating O&M	Existing	MetalsFab	All	0.8088
Space Heating O&M	Existing	Other	All	0.8088
Space Heating O&M	Existing	PaperMfg	All	0.8088
Space Heating O&M	Existing	StoneClayGlass	All	0.8088
Steam System Efficiency Improvements	Existing	FoodMfg	All	0.4009
Steam System Efficiency Improvements	Existing	LumberWood	All	0.4009
Steam System Efficiency Improvements	Existing	MetalsFab	All	0.4009
Steam System Efficiency Improvements	Existing	Other	All	0.4009
Steam System Efficiency Improvements	Existing	PaperMfg	All	0.4009
Steam System Efficiency Improvements	Existing	StoneClayGlass	All	0.4009
Wall insulation (retrofit only) - Tier 1: Min R-11	Existing	FoodMfg	All	1.8303
Wall insulation (retrofit only) - Tier 1: Min R-11	Existing	LumberWood	All	1.8303
Wall insulation (retrofit only) - Tier 1: Min R-11	Existing	MetalsFab	All	1.8303
Wall insulation (retrofit only) - Tier 1: Min R-11	Existing	Other	All	1.8303
Wall insulation (retrofit only) - Tier 1: Min R-11	Existing	PaperMfg	All	1.8303
Wall insulation (retrofit only) - Tier 1: Min R-11	Existing	StoneClayGlass	All	1.8303
Wall insulation (retrofit only) - Tier 2: Min R-19	Existing	FoodMfg	All	1.9683
Wall insulation (retrofit only) - Tier 2: Min R-19	Existing	LumberWood	All	1.9683
Wall insulation (retrofit only) - Tier 2: Min R-19	Existing	MetalsFab	All	1.9683
Wall insulation (retrofit only) - Tier 2: Min R-19	Existing	Other	All	1.9683

Description	Vintage	Segment	Climate Zone	B/c Ratio
Wall insulation (retrofit only) - Tier 2: Min R-19	Existing	PaperMfg	All	1.9683
Wall insulation (retrofit only) - Tier 2: Min R-19	Existing	StoneClayGlass	All	1.9683
Waste Water Heat Exchanger	Existing	FoodMfg	All	0.0299
Waste Water Heat Exchanger	Existing	LumberWood	All	0.0299
Waste Water Heat Exchanger	Existing	MetalsFab	All	0.0299
Waste Water Heat Exchanger	Existing	Other	All	0.0299
Waste Water Heat Exchanger	Existing	PaperMfg	All	0.0299
Waste Water Heat Exchanger	Existing	StoneClayGlass	All	0.0299
Windows - Add Argon to Vinyl Lowe	Existing	FoodMfg	All	2.1575
Windows - Add Argon to Vinyl Lowe	Existing	LumberWood	All	2.1575
Windows - Add Argon to Vinyl Lowe	Existing	MetalsFab	All	2.1575
Windows - Add Argon to Vinyl Lowe	Existing	Other	All	2.1575
Windows - Add Argon to Vinyl Lowe	Existing	PaperMfg	All	2.1575
Windows - Add Argon to Vinyl Lowe	Existing	StoneClayGlass	All	2.1575
Windows - Add Low E and Argon to Vinyl Tint	Existing	FoodMfg	All	14.3420
Windows - Add Low E and Argon to Vinyl Tint	Existing	LumberWood	All	14.3420
Windows - Add Low E and Argon to Vinyl Tint	Existing	MetalsFab	All	14.3420
Windows - Add Low E and Argon to Vinyl Tint	Existing	Other	All	14.3420
Windows - Add Low E and Argon to Vinyl Tint	Existing	PaperMfg	All	14.3420
Windows - Add Low E and Argon to Vinyl Tint	Existing	StoneClayGlass	All	14.3420
Windows - Add Low E to Vinyl Tint	Existing	FoodMfg	All	2.8975
Windows - Add Low E to Vinyl Tint	Existing	LumberWood	All	2.8975
Windows - Add Low E to Vinyl Tint	Existing	MetalsFab	All	2.8975
Windows - Add Low E to Vinyl Tint	Existing	Other	All	2.8975
Windows - Add Low E to Vinyl Tint	Existing	PaperMfg	All	2.8975
Windows - Add Low E to Vinyl Tint	Existing	StoneClayGlass	All	2.8975
Windows - Non-Tinted AL Code to Class 36	Existing	FoodMfg	All	0.8804
Windows - Non-Tinted AL Code to Class 36	Existing	LumberWood	All	0.8804
Windows - Non-Tinted AL Code to Class 36	Existing	MetalsFab	All	0.8804
Windows - Non-Tinted AL Code to Class 36	Existing	Other	All	0.8804
Windows - Non-Tinted AL Code to Class 36	Existing	PaperMfg	All	0.8804
Windows - Non-Tinted AL Code to Class 36	Existing	StoneClayGlass	All	0.8804
Windows - Non-Tinted AL Code to Class 40	Existing	FoodMfg	All	1.3997
Windows - Non-Tinted AL Code to Class 40	Existing	LumberWood	All	1.3997
Windows - Non-Tinted AL Code to Class 40	Existing	MetalsFab	All	1.3997
Windows - Non-Tinted AL Code to Class 40	Existing	Other	All	1.3997
Windows - Non-Tinted AL Code to Class 40	Existing	PaperMfg	All	1.3997
Windows - Non-Tinted AL Code to Class 40	Existing	StoneClayGlass	All	1.3997
Windows - Non-Tinted AL Code to Class 45	Existing	FoodMfg	All	0.7933
Windows - Non-Tinted AL Code to Class 45	Existing	LumberWood	All	0.7933
Windows - Non-Tinted AL Code to Class 45	Existing	MetalsFab	All	0.7933
Windows - Non-Tinted AL Code to Class 45	Existing	Other	All	0.7933
Windows - Non-Tinted AL Code to Class 45	Existing	PaperMfg	All	0.7933
Windows - Non-Tinted AL Code to Class 45	Existing	StoneClayGlass	All	0.7933
Windows - Tinted AL Code to Class 36	Existing	FoodMfg	All	0.7602
Windows - Tinted AL Code to Class 36	Existing	LumberWood	All	0.7602
Windows - Tinted AL Code to Class 36	Existing	MetalsFab	All	0.7602
Windows - Tinted AL Code to Class 36	Existing	Other	All	0.7602
Windows - Tinted AL Code to Class 36	Existing	PaperMfg	All	0.7602
Windows - Tinted AL Code to Class 36	Existing	StoneClayGlass	All	0.7602
Windows - Tinted AL Code to Class 45	Existing	FoodMfg	All	0.1684
Windows - Tinted AL Code to Class 45	Existing	LumberWood	All	0.1684
Windows - Tinted AL Code to Class 45	Existing	MetalsFab	All	0.1684

Description	Vintage	Segment	Climate Zone	B/c Ratio
Windows - Tinted AL Code to Class 45	Existing	Other	All	0.1684
Windows - Tinted AL Code to Class 45	Existing	PaperMfg	All	0.1684
Windows - Tinted AL Code to Class 45	Existing	StoneClayGlass	All	0.1684

Cascade Natural Gas Corporation
Conservation Plan 2017
Appendix B - Outreach

Community Energy Challenge & CEC Partnership



Smart Energy
Simple Steps
Serious Savings

January 5th, 2016

To: Monica Cowlshaw
Manager, Energy Efficiency & Community Outreach
Cascade Natural Gas Corporation

CC: Kary Burin

From: Jeff Aslan
Energy Program Manager
Sustainable Connections

Ross Quigley
Manager
Community Energy Challenge
Opportunity Council

Monica,

To keep our request for sponsorship for the Community Energy Challenge simple, Sustainable Connections (SC) and the Opportunity Council (OC) are submitting this comprehensive partnership proposal to Cascade Natural Gas (CNGC). We are proposing to support CNGC's natural gas saving goals with several specific targeted efforts that produce measureable results while providing the company with positive exposure as a business and sustainability leader in Whatcom, Skagit and Island Counties. SC, OC and CNGC share the goals of increasing the uptake of energy efficient practices and technologies. Your support is integral to our success.

I just wanted to give you a quick update on SC's energy program sponsorship and the work that we've done to date with the Community Energy Challenge. Here are a couple of things that are coming up soon and a list of the exposure that CNGC has received so far this year. As always, let me know if you have any questions.

Proposed 2016 partnership elements – Total cost: \$6,000

1) Sustainable Connections Energy Program Support - \$3,000

Sustainable Connections' Energy program operates the commercial energy services program helping small businesses in Whatcom, Skagit and Island counties with making energy efficiency improvements. Through this program we help businesses identify and implement a variety of types of energy efficiency projects, many of which are rebate-eligible natural gas efficiency measures. In 2015 we had the following successes:

- We have sent out reports to 63 new businesses that had energy assessments through the CEC in 2015 so far. Each of these businesses receives a customized report detailing all of our recommended measures to save energy along with links to CNGC's rebates and CNGC's logo on it.
- We have advised dozens of clients and contractors on the availability of CNGC's prescriptive rebates and have submitted numerous projects for potential custom rebates. We expect many of these clients to commit to projects in 2016.
- In 2015, we obtained a CNGC rebate for Fountain Laundry to replace its commercial washers, saving 1080 therms, and also for the Table to get a new gas fryer, saving 548 therms.
- We have dozens of business clients who implemented gas savings measures in 2015 for which there is not currently a CNGC rebate. Examples include high efficiency boilers under 300 kBtu input, adding programmable thermostats, fixing stuck open economizers, and air sealing projects. It is difficult to quantify the exact savings achieved without a utility program to account for these measures, but a list of completed measures in 2015 could be generated from our database.
- We display CNGC's logo on our printed marketing materials, social media and during events, reaching many CNGC customers looking for smart ways to upgrade their systems. A detailed list of sponsorship benefits is available here:
<http://sustainableconnections.org/membership/sponsorship-2016/why-partner>

Coming Up:

- We will be hiring additional staff to conduct more energy assessments in 2016
- We have many projects that are at the feasibility stage that we hope to finalize in 2016 including weatherization projects and boiler upgrades that would qualify for CNGC's rebates
- We can distribute CNGC's Energy Savings Kits to commercial customers and track implementation.

2) Opportunity Council Community Energy Challenge Residential Program Support- \$3,000

These funds will be utilized to support the continuing operation of the residential one-stop-shop, which is offering services not only in Whatcom but also Skagit and Island Counties as well.

Cascade Natural Gas's logo will continue to be included on residential outreach materials, and CNGC will continue to be recognized as a partner in OC presentations about the CEC.

OC Staff will provide individualized assistance with accessing CNGC's rebate programs. To date, more than 2,000 residential customers have received assessments through the CEC with many thousands more receiving targeted outreach materials. More than 1,200 households receiving the assessment implemented at least one major recommended measure through the program (greater than 50% of those receiving assessments). Furthermore, our survey results show that about 1/4 of households that received the

assessment made energy efficiency improvements outside of the CEC, but based on our recommendations. Many of these improvements have been heating system replacements involving CNGC rebates.

Between October 2014 and October 2015 the CEC completed 92 projects where CNGC provided the primary heat source. These projects accessed an estimated \$27,000 in rebates from CNGC.

On average, the CEC is able to reduce homeowners estimated energy consumption by ~21%. This is the equivalent of \$470 of savings annually (includes gas and electricity). CNGC's funding for this program is leveraged by both Washington State Community Energy Efficiency Program funding and Northwest Clean Air Agency Greenhouse Gas Mitigation Program funding.

In 2016, the residential program expects to be completing the majority of the work for three new pilot programs: a 2-project multi-family weatherization pilot, a 12-project lower-to-moderate income weatherization pilot, and a 3-project toward net-zero retrofit pilot. All of these, where gas heat is the existing condition, should be great opportunities to feature the CNGC conservation program.

Your support is an important part of our success. Thank you again.

Sincerely,



Jeff Aslan
Energy Program Manager
Sustainable Connections



Ross Quigley
Manager
Community Energy Challenge
Opportunity Council

Sustainable Living Center Partnership

Cascade Natural Gas Custom Sponsorship 2016

Sustainable Living Center (SLC) values the partnership of Cascade Natural Gas in promoting SLC efforts and providing technical, in-kind, and financial support to SLC. In return, SLC provides brand promotion, consumer education and awareness, and quality control inspections. SLC provides an extension of CNG conservation efforts for the Walla Walla Valley. This document provides an outline of a custom sponsorship agreement between CNG Conservation efforts and SLC.

1. **Brand Promotion:** In outreach and recognition materials, SLC promotes the CNG brand. Examples include the SLC Website, Community Energy Efficiency Program Resource Guide, SLC Public Workshop Series handouts and promotional materials as applicable.
2. **Consumer Education and Awareness:** Our customers rely on us and our approved contractors to help them make decisions on upgrades for their homes. Part of our responsibility lies in ensuring customers receive education about their options, are aware of rebates that may be available, and provide them with the tools necessary to successfully navigate the rebate process.
3. **Quality Control Inspections:** QC is a necessary component of any weatherization program. In addition to qualifying a residence for upgrades, quality control inspections provide validation for the program recommendations as well as ensure the work is completed to program standards. While SLC conducts QC for the CEEP program, it has the capacity to provide CNG specific inspections at residences specified by CNG also.

To further quantify these components, SLC will provide the following:

- Logo displayed on back page of the 2015-2016 CEEP Informational Handout as a Sponsor/partner.
 - Platinum Sponsor - \$2,500.00
 - Gold Sponsor - \$1,500.00
 - Silver Sponsor - \$750.00
- Logo displayed on 2016 SLC Public Workshop Series advertising and brochures, including lecture handouts (14 workshops planned).
- Logo placed on our 2016 Sponsor Banner displayed at outreach events such as Fourth of July in the Park, Ducky Derby, Your Green Life Festival, Diversity Day, and similar community events.
- Logo displayed on a sponsor Thank you/recognition banner at our Builders ReSupply store.
- Company description/logo, and link to partner website from the SLC website
- SLC BPI certified auditors and office staff will provide consumers with information about CNG rebates and offers as well as providing each customer with a copy of the 2015-2016 CEEP Informational Handout which provides all information needed to apply for eligible rebates as



500 Tausick Way, Walla Walla, WA 99362 · Telephone 509.524.5218 · Fax 509.524.5209. Email info@sustainablelivingcenter.com

well as tips and resources to navigate the CEEP process. Informational Handout will include a full page (5.5" x 8") of CNG developed content.

- SLC office staff will assist customers who need additional help in completing rebates or who have additional questions.
- SLC offers CNG customers CNG's Energy Savings Kits at the WEC office and at training and outreach events as applicable
- Quality Control efforts-CNG specified addresses and/or optional SLC provided addresses. See current MOU for pricing and details.

SLC may also assist with CNG initiatives, building relationships, and other less tangible activities as is appropriate and within its capacity.

Changes to this agreement may be made at any time and this agreement does not constitute a contract. It is the goal of SLC to provide a quality partnership that will be mutually beneficial to SLC and CNG, as well as providing enhanced services to our mutual customers.

For questions or additional information please contact us at info@sustainablelivingcenter.com or via phone (509)524-5218.

GUEP Co-branded Bill Insert 2016



In the Community to Serve®

**GEORGETOWN UNIVERSITY
ENERGY PRIZE**

ANACORTES, WA | BELLINGHAM, WA | BEND, OR | WALLA WALLA, WA

Cascade is proud to partner with four city-finalists in a national two year, **\$5 million prize** competition to reduce energy use through ingenuity and community wide engagement. **Find out how you can get involved!**

Are you a Washington residential customer and ready to reduce your energy usage? Upgrade to high-efficiency appliances, install insulation and claim your Cascade rebate.

Cascade Natural Gas Corporation Residential Rebates*:

**High-Efficiency Natural Gas Combined
Domestic Hot Water and Hydronic Space Heating**
AFUE 90%+ - **\$825**

High-Efficiency Natural Gas Furnace
AFUE 95%+ - **\$250**

High-Efficiency Natural Gas Fireplace
FE .70+ / AFUE 80%+ - **\$150/\$250**

**Condensing High-Efficiency
Natural Gas Tankless Water Heater**
EF 0.91+ - **\$150**

Whole House Residential Air Sealing
Equal to or less than 0.0003 Specific Leakage Area
through pre and post blower door testing - **\$100**

Wall Insulation
≥ R-11 or fill cavity - **\$.35/sqft**

Floor Insulation
≥ R-30 or fill cavity to min. R-19 - **\$.30/sqft**

Ceiling or Attic
≥ R-38 - **\$.30/sqft**

And don't forget about our FREE Energy Savings Kits! Apply online today.

Visit: www.cngc.com/conservation | Call: 1-866-626-4479

**Additional restrictions and minimum equipment specifications apply, contact us for details.
AFUE : Annual Fuel Utilization Efficiency | FE: Fireplace Efficiency | EF: Energy Factor*

Washington: Contact Cascade Natural Gas Corp. for information on natural gas commercial and residential conservation incentives.

Oregon: Contact Energy Trust of Oregon for information on natural gas commercial and residential conservation incentives.

**Visit: www.cngc.com/conservation
Call: 1-866-626-4479**

**Visit: www.energytrust.org
Call: 1-866-368-7878**



In the Community to Serve®

**Good luck to all of
our city-finalists!**

BEND

DO JUST ONE THING

Your local guide to starting small—and going big.

Our team of energy heroes can get really big things done (maybe even \$5 million big!), if we all work together to reduce our energy use.

It's true! Making one change each month can have a big impact in the amount of energy that you use (or don't use). It's easy. And it all starts with you. So come on! Let's do your thing!

See how you can start saving by doing just one thing a month.



THE BEND
ENERGY
CHALLENGE

www.BendEnergyChallenge.org

WALLA WALLA

\$5 MILLION IS ON THE LINE!

JOIN IN WITH WALLA WALLA POWER PLAY!

YOU CAN:

- Save money on your utility bills
- Improve the comfort in your home
- Win Big! City of Walla Walla residents can compete for a \$1,000 cash prize
- Play BINGO! Earn a chance to WIN awesome prizes in the monthly BINGO drawings
- Help Walla Walla win the \$5 million Georgetown University Energy Prize (www.guep.org)
- Reduce your environmental footprint
 - Set a great example for your family & friends
 - Improve our communities' quality of life



SustainableLivingCenter.com

ANACORTES

Celebrate Earth Day by doing your part to save energy and help Anacortes win \$5,000,000!

All you have to do to win is lose! We're here to help you find the best ways to reduce your bills, improve your home's comfort and give the Earth a clean, green future by saving energy in your home.

The energy you never need to use is the cleanest energy there is! Visit our Bayshore Office on 6th & Commercial to see what programs are best for you.



Anacortes Community Energy
www.acechallenge.org

www.AceChallenge.org

BELLINGHAM

WE NEED YOUR HELP!

Bellingham is currently tied for 4th place in a competition to save energy. The winning city receives \$5 million and we're asking for your help.

NOT SURE WHAT YOU CAN DO?

Visit BellinghamEnergyPrize.org for simple steps and expert help. From the smallest reminders like shortening your showers to big projects like installing solar panels, the website contains helpful information for you to save energy right now!



Start Saving! Right Meow!

BellinghamEnergyPrize.org

CIP focused Coloring Book Cover 2016

Contact us to learn more!

To learn more about earning rebates on qualifying high-efficiency natural gas upgrades, visit us online at

www.cngc.com/conservation

or call **866.626.4479**

To learn more about Natural Gas, visit

www.safeathomewithleo.com



Know what's below.
Call before you dig.



**CASCADE
NATURAL GAS**

C O R P O R A T I O N [®]

A Subsidiary of MDU Resources Group, Inc.

In the Community to Serve[®]

Did you know?

The ancient Chinese were the first to discover underground deposits of natural gas. In 600 BC, Confucius wrote of wells 100 ft deep... The Chinese piped the gas to where it was needed through long, hollow bamboo poles.*

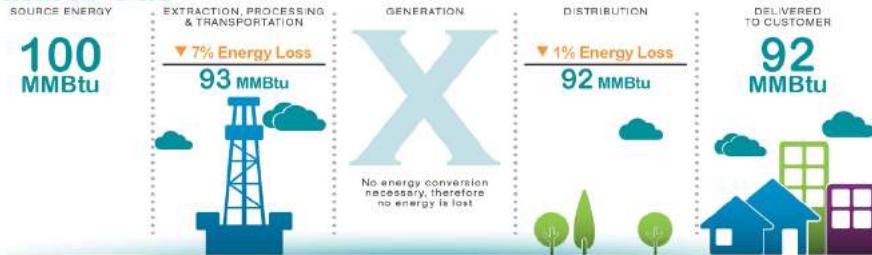
*For more cool facts about natural gas, visit: cngc.e-smartonline.net

Around the first century the King of Persia (Iran) built his kitchen in his palace around a natural gas flame that had been ignited by lightning. This was probably the first real use of natural gas in a home.*

Electricity



Natural Gas



Courtesy of American Gas Association

Use natural gas because less is lost getting to your home!

Hey Parents!

Cascade cares about Energy-Efficiency.

What are some ways you can help the environment?

Earn money back while lowering your energy bills with rebates on qualifying natural gas high-efficiency upgrades!

Here's one way to help - Replace a wood burning fireplace with a natural gas hearth. They are better for air quality both inside and outside your home!

Here's another - Conserve the energy you use!

Have your parents check out our rebates!

High-Efficiency Natural Gas Fireplace
FE 70%/ AFUE 80% - \$150/\$250

High-Efficiency Natural Gas Furnace, 95% AFUE - \$250

Conventional High-Efficiency

Natural Gas Water Heater, EF 0.67 - \$125

Condensing High-Efficiency Natural Gas

Backflow Hot Water Heater, 0.91 EF - \$125

Energy Star Certified or Built Green Certified Homes, \$600
Doors, Insulation, Air Sealing, and more!

Energy Experience Handout

The use of natural gas comes with an obligation to promote safety and efficient energy consumption through responsible environmental stewardship.



In the Community to Serve®

Important Safety Tips to Remember:

Natural gas has a combustible range from 5% to 15% gas to air mixture. Although explosions are extremely rare, you can help prevent them by playing it safe around natural gas.

In order to detect natural gas leaks you can follow your senses.

Smell



Sight



Hearing



- Natural gas in its natural state does not smell
- Natural gas companies add a chemical called mercaptan that smells like sulfur or rotten eggs to help detect leaks

- Bubbles rising in a puddle or other pool of liquid
- Dust or dirt blowing from a hole in the ground
- Dead or dying vegetation in unexpected locations

- Hissing (small perforation) or roaring (large break)

If you suspect a natural gas leak follow the below steps.

1. Evacuate the building or leave the area where leak is suspected.
2. Ask your parent or an adult to call 911 or Cascade Natural Gas Corporation (CNGC) at 1-888-522-1130. Do not use your cell phone or landlines anywhere near the leak to call.
3. Don't do anything that would create a spark around the leak, such as flipping a light switch or using a garage door opener.
4. Cascade Natural Gas will come out and investigate the leak free of charge.
5. Do not re-enter the structure until the gas company representative says it's okay.

Help prevent leaks! Remind your parents and neighbors to always call 811 before they dig in their yard to have their underground utilities marked.

Contact CNGC for info on the safe & efficient use of natural gas at home.



**Know what's below.
Call before you dig.**

1-888-522-1130

WWW.CNGC.COM

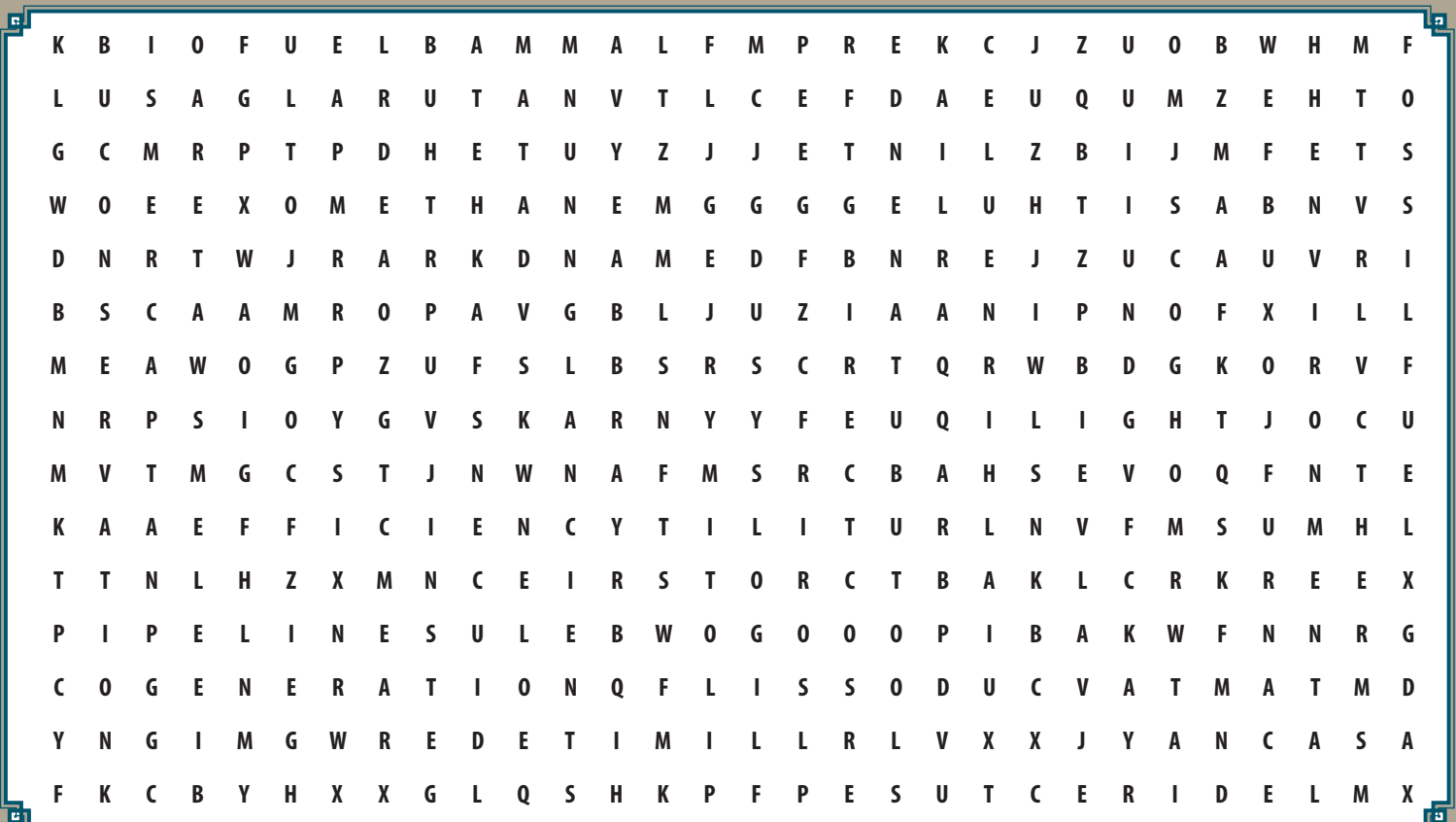
Promote Energy-Efficiency

Natural gas can be used in a variety of ways - fireplaces, cooking, water heating, and space heating just to name a few. If your home has natural gas, it's a great time to encourage high-efficiency upgrades and low cost/ no cost actions you can take to reduce overall energy use. Here are a few tips to reducing your usage:

- Remove obstructions - Keep airways and ducts free flowing and change furnace filters regularly
- Use drapes effectively - Open drapes during the day to absorb the sun's warmth then close them at night
- Set the stage - Set programmable thermostats between 65-70 , reduce temps when away and at night
- Reduce waste - Use less hot water (Cascade has free energy savings kit, contact us for details)
- Caulk & weather strip doors & windows - An efficient and inexpensive way to lower your heating bills
- Upgrade a home's insulation and appliances to high-efficiency options

Remind friends and family that CNGC offers rebates for upgrading to qualified natural gas high-efficiency measures including furnaces, fireplaces, insulation and more. Check out our website for current offers.

The ins and outs of Natural Gas



- | | | | | |
|-------------|---------------|--------------|---------------|------------|
| ANCIENT | ANTHROPOGENIC | BARBECUE | BIOFUEL | BUTANE |
| CITY GATE | COGENERATION | CONSERVATION | CUBIC FOOT | DEMAND |
| DIRECT USE | EFFICIENCY | ENERGY | ENVIRONMENTAL | FLAMMABLE |
| FOSSIL FUEL | FURNACE | HEATER | LIGHT | LIMITED |
| LIQUEFY | MERCAPTAN | METER | METHANE | MIGRATE |
| NATURAL GAS | PILOT | PIPELINE | POROUS | PROPANE |
| RANGE | RENEWABLE | SEISMIC | THERMS | THERMOSTAT |
| UTILITY | VALVE | VAPOR | WATER | WELL |

Yakima Baseball Campaign Field Poster



In the Community to Serve®

**WE LOVE A GOOD TRIPLE PLAY...
DON'T YOU?**

COMFORT

Natural Gas provides consistent, comfortable and reliable heating for your home and business - Especially when paired with natural gas water heating and cooking.

EFFICIENCY

Upgrade to qualifying high-efficiency natural gas appliances to leverage your energy investment - Don't forget to check with your local utility for available rebates.

SAFETY

Call 811 two business days before you dig, to have underground utility lines marked. It's free of charge and helps keep everyone safe.

**WWW.CNGC.COM
(888) 522-1130**



**Know what's below.
Call before you dig.**

Sports Team Coupon

ENJOY A TREAT!

OFFER EXPIRES 9/15/16
LIMIT: (1) PER GUEST



Present this coupon at the Big Apple Concession Stand to receive a **FREE** Regular Popcorn, Paleta, Tim's Chips, or Bimbo Brand Product.

Cascade Natural Gas proudly supports our community partners and encourages the responsible and sustainable use of energy. Using natural gas to provide heat, water heat and cooking in your home or business is the most efficient use of our precious natural resources. However, even the cleanest energy sources must be used efficiently and effectively.

Cascade encourages residential and business customers to install high-efficiency equipment as often as possible. Our cash rebates can help offset the cost of implementation on qualified improvements.

Washington Homeowners: Cascade offers cash rebates to customers to purchase energy-efficient natural gas equipment and measures. Learn how these conservation rebates and community partnerships are making a difference for real customers.

Call Today For More Info.

1.866.626.4479

www.cngc.com

COMFORT

Natural Gas provides consistent, comfortable and reliable heating for your home and business - Especially when paired with natural gas water heating and cooking.

EFFICIENCY

Upgrade to qualifying high-efficiency natural gas appliances to leverage your energy investment - Don't forget to check with your local utility for available rebates.

SAFETY

Call 811 two business days before you dig, to have underground utility lines marked. It's free of charge and helps keep everyone safe.



**Know what's below.
Call before you dig.**



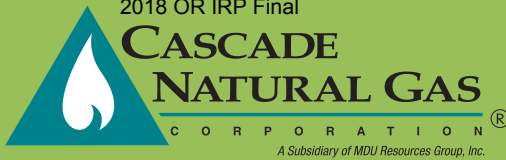
**CASCADE
NATURAL GAS**

C O R P O R A T I O N

A Subsidiary of MDU Resources Group, Inc.

In the Community to Serve®

Longview Program Ad - Triple Play



In the Community to Serve®

We LOVE a good triple play, don't you?

Comfort - Natural Gas provides consistent, comfortable and reliable heating for your home and business - Especially when paired with natural gas water heating and cooking

Efficiency - Upgrade to qualifying high-efficiency natural gas appliances to leverage your energy investment - Don't forget to check with your local utility for available rebates

Safety - Call 811 two business days before you dig to have underground utility lines marked. It's free of charge and helps keep everyone safe



www.cngc.com

1-888-522-1130



**Know what's below.
Call before you dig.**

Longview Football Message



Page 128



In the Community to Serve®

Spotlight on Efficiency & Safety

CNGC.COM/CONSERVATION

866.626.4479

- **Contact Cascade Natural Gas Corporation before tackling your next renovation to receive rebates on eligible insulation and high-efficiency natural gas upgrades.**
- **Call 811 two business days before you dig to have underground utility lines marked. It's free and helps keep everyone safe!**



**Know what's below.
Call before you dig.**

January, June, September, & November Bill Insert Samples



We have a dream...

That one day, ALL our customers will enjoy the affordability and comfort that comes with high-efficiency natural gas upgrades paired with ENERGY STAR® homes.



WWW.CNGC.COM/CONSERVATION

RESIDENTIAL REBATES

**ENERGY STAR
Certified New Home - \$600**

**High-Efficiency
Natural Gas Furnace - \$250**

**For more information,
visit us online!**

**NEW YEAR. NEW HOME.
NEW FURNACE?**

Enjoy the warmth and comfort even more, by earning a rebate for high-efficiency natural gas upgrades*!

Contact Cascade Natural Gas Corporation to learn about incentives for conserving energy.



To find a Trade Ally near you visit :
www.cngc.com/conservation
or call 1-866-626-4479.

** Additional restrictions apply, please contact us for details.*

1/16



DECLARE YOUR INDEPENDENCE!
FREEDOM from higher energy bills doesn't have to be at the cost of comfort. Our rebates for high-efficiency upgrades will save you money while increasing your **COMFORT**.

WWW.CNGC.COM/CONSERVATION



Residential Rebates*

High-Efficiency Natural Gas Combined Domestic Hot Water and Hydronic Space Heating AFUE 90%* - **\$825**

Condensing High-Efficiency Natural Gas Tankless Water Heater EF 0.91* - **\$150**

Conventional High-Efficiency Natural Gas Water Heater .67* EF - **\$45**

Don't forget our free energy savings kits - apply online!

**FEEL AT LIBERTY TO SAVE ENERGY
WHILE EARNING A REBATE!**

Even in the summer months, you can save money on heating your home's water by upgrading to a qualifying energy-efficient appliance.

Let us help you gain independence from high energy bills with a Cascade Natural Gas rebate on qualifying upgrades.

For information on additional incentives and to find Trade Ally contractors, visit www.cngc.com/conservation or call 1-866-626-4479.

**Additional restrictions and minimum equipment specifications apply, please contact us for details. AFUE: Annual Fuel Utilization Efficiency FE: Fireplace Efficiency EF: Energy Factor*

06/16



WWW.CNGC.COM/CONSERVATION

Make it come true with High-efficiency Natural Gas appliances and rebates today!



RESIDENTIAL REBATES

**ENERGY STAR®
Certified New Home - \$600**

**BUILT GREEN®
Certified Home - \$600**

For more information,
visit us online!

It's time for the Fall Parade of Homes Tours!

Check out your local Home Builders Association for their scheduled 2016 Home Tour this fall and look for featured high-efficiency natural gas appliances.

Include high-efficiency natural gas upgrades and appliances in your new home for comfort, reliability and to get the most from your investment!

For information on incentives and to find Trade Ally contractors, visit www.cngc.com/conservation or call 1-866-626-4479.



9/16



WWW.CNGC.COM/CONSERVATION

Provide a loving and warm welcome this holiday season!

Ensure you have plenty of warm water with a new high-efficiency conventional or tankless natural gas water heater.



RESIDENTIAL REBATES*

Conventional High-Efficiency Natural Gas Water Heater
.67+ EF: \$45

Condensing High-Efficiency Natural Gas Tankless Water Heater 0.91+ EF: \$150

Don't forget our free energy savings kits - apply online!

When you're ready to upgrade your Natural Gas water heating solution, check with your contractor to be sure it's a high-efficiency model to qualify for a Cascade rebate!



For information on available incentives and to find Trade Ally contractors, visit www.cngc.com/conservation or call 1-866-626-4479.

*Additional restrictions and minimum equipment specifications apply, please contact us for details.
EF: Energy Factor.

11/16

SICBA Home Tour In-Home Signage Ex. HE Water Heaters

This smart home uses a:

*Natural Gas
High Efficiency
Water Heater*

*Saving money and
energy all year long.*



In the Community to Serve®

**For rebates, call 866.626.4479, or
visit www.cngc.com/conservation.**

Home Tour Lawn Sign

Proudly going **green** with clean, reliable Natural Gas.



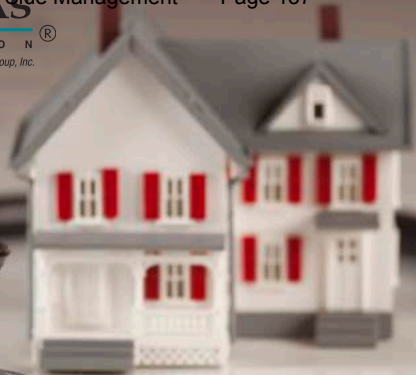
In the Community to Serve[®]

Rebates available for high-efficiency natural gas
upgrades at www.cngc.com/conservation.

SICBA Membership Directory 2016



In the Community to Serve[®]



Want a **HEALTHY, HAPPY** home?

An energy-efficient home that's properly insulated and ventilated can help provide a comfortable and healthy home environment.

Paired with a "healthy bottom line" from rebates for eligible natural gas upgrades and lower utility bills, means everybody's happy!

Call 866.626.4479 or visit cngc.com/conservation.

CWHBA Home Tour Ad

Imagine Your Dream Home

Appendix D

2018 DERARPS Final Management Page 139

Make it come true with high-efficiency Natural Gas today!



Have big plans for your home? Include high-efficiency Natural Gas upgrades and appliances to get the most from your investment. For rebates from Cascade Natural Gas on qualifying upgrades, call **1-866-626-4479** or visit us online at www.cngc.com/conservation.



Know what's below.
Call before you dig.



In the Community to Serve®

Fall & Spring LCCA CIP Promotions



2018 OR IRP Final
Know what's below.
Call before you dig.

Appendix D
Demand Side Management



PLANNING FOR YOUR ENERGY NEEDS?

Savvy home owners know space and water heating have a significant impact on a home's comfort, not to mention future energy bills.

Install high-efficiency natural gas equipment to minimize energy use and receive rebates from Cascade Natural Gas to help offset your investment in comfort and reliability.

To Do List

- Review your choices - furnaces, water heaters and more...
- Check out Cascade's website @ www.cngc.com/conservation or call 1-866-626-4479
- Install high-efficiency upgrades through a Trade Ally Contractor
- Apply for a rebate & start saving!



In the Community to Serve®



In the Community to Serve®

BATH

Warmth and Comfort
with Natural Gas!

Serve all of your hot water
needs with a high-efficiency
tankless hot water heater!

Rebates Available
To learn more, call 866.626.4479
www.cngc.com/conservation



Bonus Coupon

2016 Cascade Natural Gas Customer Rebate Bonus Coupon*

If rebate is submitted** before 9/1/16

\$100 OR \$50

If rebate is submitted** after 9/1/16

Coupon valid only in conjunction with an eligible rebate application, and cannot be used in payment towards a gas bill. A rebate check will be mailed to the customer with verification of active gas account and approved rebate application.



A Subsidiary of MDU Resources Group, Inc.

*In the Community to Serve**

TO REDEEM COUPON WITH AN ONLINE APPLICATION SCAN AND UPLOAD ALONG WITH YOUR INVOICE

The Cascade Natural Gas Corp. Conservation Incentive Program is proud to team up with contractors in our Trade Ally network to offer you a "bonus rebate" for installing rebate-qualified measures.

TRADE ALLY COMPANY

TRADE ALLY REPRESENTATIVE SIGNATURE

CUSTOMER SIGNATURE

- *Limit 1 coupon per customer, per measure
- *Only valid for measures installed in 2016
- *Coupon must be attached to invoice and signed both by Trade Ally and customer
- *Coupon does not signify endorsement or warranty of work performed
- *Must be a Cascade Natural Gas customer on a qualifying rate schedule

- *Coupon is non-transferable and is for distribution solely by designated Trade Ally - note all coupons are individually numbered
- *Funds will be issued following approval of rebate application attached to coupon
- **Submission date is the date application is stamped by post office or entered on line

WWW.CNGC.COM/CONSERVATION OR CALL 866-626-4479



Congratulations

...ON THE STEPS YOU ARE TAKING TOWARD ENERGY-EFFICIENCY IN YOUR HOME!

EXPLORE THE CASCADE CONSERVATION CORNER WEBSITE AT

WWW.CNGC.COM/CONSERVATION

FOR INFORMATION ON AVAILABLE RESIDENTIAL AND COMMERCIAL REBATES INCLUDING:

FURNACES, WATER HEATERS, INSULATION, FIREPLACES

AND

FREE ENERGY SAVINGS KITS

Future of Energy Ad

REBATES turn a *good investment*
Appendix D
in energy efficiency programs
2014-2015 Rebate Program
a GREAT INVESTMENT!

Commercial Incentives Available
for cost-effective, energy-efficient
natural gas upgrades.

efficiency



Call: 866-626-4479, or visit:
www.cngc.com/conservation



**CASCADE
NATURAL GAS**

C O R P O R A T I O N [®]

A Subsidiary of MDU Resources Group, Inc.

In the Community to Serve[®]

Columbia Center Spring 2016 Standee

Appendix D
2012-2013 Residential Management Report 49

REBATES turn a *good investment* in energy efficiency into a **GREAT INVESTMENT!**



Commercial Incentives Available
for cost-effective, energy-efficient
natural gas upgrades.



In the Community to Serve[®]

www.cngc.com/conservation

You've upgraded your gadgets...

Appendix D
2012 Oil & Gas Business Management Agent 50



*... is it time to upgrade to a
high-efficiency natural gas furnace?*



Rebates Available
866-626-4479



In the Community to Serve®

www.cngc.com/conservation

Gas Fired Heating Promotion

Appendix D
Demand Side Management

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Cascade Natural Gas Commercial and Industrial Conservation Incentive Program wants to give you extra cash rebates on qualified high efficiency gas fired equipment - that's cash in the bank for you.



Incentive rates are increasing by **20 percent** on qualifying commercial and industrial high-efficiency gas fired heating equipment installed between September 1 and December 31, 2016.*

EQUIPMENT AND EFFICIENCY TYPE	BONUS SEPTEMBER 1 - DECEMBER 31
WARM AIR FURNACE	
91% Min AFUE - \$3.00/kbtuh	NOW \$3.60/kbtuh
HVAC UNIT HEATER	
86% Min AFUE - \$1.50/kbtuh	NOW \$1.80/kbtuh
CONDENSING UNIT HEATER	
92% Min AFUE - \$3.00/kbtuh	NOW \$3.60/kbtuh
RADIANT HEATING	
\$6.95/kbtuh	NOW \$8.35

This Energy Efficient Gas Heating Equipment Promotion is available for qualifying, commercial customers installing high efficiency warm air furnances, unit heaters, condensing unit heaters and direct fired radiant heaters between September 1 and December 31, 2016. All incentive amounts will increase by 20% for qualified installations during the promotional period.

If you are unsure whether or not you qualify please contact Bill Prillaman at 503.329.5372 or william.w.prillaman.jr@lmco.com to determine your eligibility.

**Offered only to qualified commercial CNGC customers who heat their buildings with natural gas on qualifying commercial rate schedules (including 504, 505, 511, 570 and 577). All other program requirements must be met to qualify for this bonus - contact CNGC for further details.*



In the Community to Serve®

cngc.com/conservation

Commercial Measures	Measure Type	End Use	20-year Cumulative Technical Potential (therms)	20-year Cumulative Achievable Potential (therms)	20-year Cumulative Cost Effective Potential (therms)	% of Total Sector C/E Potential	Average Levelized Cost (\$/CE therm)
Com - Gas Showerhead	Retrofit	Water Heating	690,009	586,507	586,507	9%	-\$2.76
Com - Gas Steamer	Replace on Burnout	Cooking	563,442	478,926	478,926	7%	-\$0.90
Com - Gas Combi Oven	Replace on Burnout	Cooking	230,288	195,745	195,745	3%	-\$0.43
Com - VFD Venthood	Retrofit	Heating	387	329	329	0%	\$0.00
Com - Energy Star Convection Oven	Replace on Burnout	Cooking	102,065	86,755	86,755	1%	\$0.00
Com - Demand Control Ventilation	Retrofit	Heating	606,733	515,723	515,723	8%	\$0.03
Com - Hot Water Temperature Reset	Retrofit	Heating	40,485	34,412	34,412	1%	\$0.09
Com - SPC High efficiency Boiler	Replace on Burnout	Heating	288,023	244,820	244,820	4%	\$0.09
Com - Roof Insulation	Retrofit	Weatherization	155,424	132,110	132,110	2%	\$0.18
Com - Energy Star Fryer	Replace on Burnout	Cooking	341,501	290,276	290,276	4%	\$0.22
Com - Cond Furnace	Replace on Burnout	Heating	108,582	92,295	89,738	1%	\$0.24
Com - Gas Griddle	Replace on Burnout	Cooking	100,108	85,092	70,829	1%	\$0.31
Com - DHW Condensing Tankless	Replace on Burnout	Water Heating	605,700	514,845	514,845	8%	\$0.33
Com - Gas Fryer	Replace on Burnout	Cooking	234,231	199,096	195,522	3%	\$0.37
Com - Steam Trap Maintenance	Retrofit	Heating	205,968	175,073	175,073	3%	\$0.41
Com - SFC	Retrofit	Behavioral	1,115,492	948,168	948,168	14%	\$0.45
Com - High Efficiency Unit Heater	Replace on Burnout	Heating	673	572	493	0%	\$0.53
Com - Wall Insulation	Retrofit	Weatherization	126,781	107,764	107,764	2%	\$0.60
Com - Steam Balance	Retrofit	Heating	27,722	23,564	9,765	0%	\$1.30
Com - DDC HVAC Controls	New Construction	Heating	2,037,487	1,731,864	1,632,108	25%	\$1.49
Com - Windows Upgrade (New)	New Construction	Weatherization	198,032	168,328	168,328	3%	\$1.67
Com - AC Heat Recovery, HW	Retrofit	Water Heating	400,215	340,183	-	0%	\$3.77
Com - Gas-fired HP, Heating	Replace on Burnout	Heating	16,294	13,850	-	0%	\$5.23
Com - Highly Insulated Windows (NEW)	New Construction	Weatherization	21,041	17,885	-	0%	\$5.32
Com - HVAC System Commissioning	New Construction	Cooling	415,798	353,429	7,718	0%	\$5.57
Com - Highly Insulated Windows (RET)	Retrofit	Weatherization	166,554	141,571	-	0%	\$5.69
Com - Windows Upgrade (RET)	Retrofit	Weatherization	164,105	139,489	-	0%	\$6.28
Com - VIP, R-35 wall (NEW)	New Construction	Weatherization	45,170	38,395	-	0%	\$7.79
Com - Smart/Dynamic Windows (NEW)	New Construction	Weatherization	92,025	78,221	-	0%	\$7.93
Com - Gas-fired HP HW	Replace on Burnout	Water Heating	74,341	63,190	-	0%	\$9.17
Com - Advanced Ventilation Controls	Retrofit	Ventilation	125,871	106,990	102,266	2%	\$9.39
Com - Gas Conv. Oven	Replace on Burnout	Cooking	78,412	66,650	50,659	1%	\$12.47
Com - Energy Recovery Ventilator - Gas Heating	Retrofit	Heating	2,606,156	2,215,233	-	0%	\$14.28
COM - VIP, R-35 wall (RET-no ins'l'n)	Retrofit	Weatherization	23,597	20,057	-	0%	\$16.26
Com - VIP, R-35 wall (RET-R-11)	Retrofit	Weatherization	55,239	46,953	-	0%	\$17.78
Com - Smart/Dynamic Windows (RET)	Retrofit	Weatherization	161,854	137,576	-	0%	\$33.75
Commercial Totals & Weighted Average Levelized Cost			12,225,805	10,391,934	6,638,878	100%	\$0.48

Industrial Measures	Measure Type	End Use	20-year Cumulative Technical Potential (therms)	20-year Cumulative Achievable Potential (therms)	20-year Cumulative Cost Effective Potential (therms)	% of Total Sector C/E Potential	Average Levelized Cost (\$/CE therm)
Ind- Steam line pipe insulation	Retrofit	Process Heating	47,192	40,113	40,113	2%	\$0.01
Ind- Vent Damper Control	Retrofit	Process Heating	63,637	54,092	54,092	3%	\$0.02
Ind- Boiler Load Control	Retrofit	Process Heating	69,102	58,736	58,736	4%	\$0.02
Ind- Process Boiler Insulation	Retrofit	Process Heating	74,077	62,965	62,965	4%	\$0.02
Ind- Steam Trap Maintenance	Retrofit	Process Heating	102,039	86,733	86,733	5%	\$0.02
Ind- Boiler Tune-up	Retrofit	Process Heating	246,830	209,805	209,805	13%	\$0.03
Ind- High Efficiency Unit Heater	Replace on Burnout	HVAC	78,907	67,071	67,071	4%	\$0.04
Ind- Boiler Heat Recovery	Retrofit	Process Heating	103,881	88,299	88,299	5%	\$0.04
Ind- Roof insulation- R0-R30	Retrofit	HVAC	167,951	142,758	142,758	9%	\$0.06
Ind- Wall Insulation- R0- R11	Retrofit	HVAC	164,644	139,948	139,948	9%	\$0.07
Ind- Burner upgrades	Retrofit	Process Heating	372,770	316,854	316,854	19%	\$0.07
Ind- High Efficiency Boiler	Replace on Burnout	Process Heating	156,879	133,347	133,347	8%	\$0.09
Ind- Greenhouse Upgrade	Retrofit	Other	73,971	62,875	62,875	4%	\$0.23
Ind- Gas-fired HP Water Heater	Replace on Burnout	Water Heating	50,640	43,044	43,044	3%	\$0.29
Ind- Steam Balance	Retrofit	Process Heating	160,518	136,440	121,289	7%	\$0.38
Ind- Wall Insulation- VIP, R0-R35	Retrofit	HVAC	24,011	20,409	-	0%	\$1.83
Industrial Totals & Weighted Average Levelized Cost			1,957,048	1,663,491	1,627,931	100%	\$0.09

Residential Measures	Measure Type	End Use	20-year Cumulative Technical Potential (therms)	20-year Cumulative Achievable Potential (therms)	20-year Cumulative Cost Effective Potential (therms)	% of Total Sector C/E Potential	Average Levelized Cost (\$/CE therm)
Res - Elec Hi-eff Clothes Washer - Gas DHW	Replace on Burnout	Appliance	74,771	63,555	63,555	1%	-\$3.14
Res Kitchen Faucet Aerators, 1.5 gpm- Gas	Retrofit	Water Heating	104,683	88,980	88,980	1%	-\$2.33
Res Bathroom Faucet Aerators, 1.0 gpm- Gas	Retrofit	Water Heating	111,493	94,769	94,769	1%	-\$2.32
Res Showerhead, 1.50 GPM - Gas	Retrofit	Water Heating	284,915	242,178	242,178	2%	-\$2.05
Res Showerhead (NEW Only), 1.50 GPM - Gas	New Construction	Water Heating	323,897	275,312	275,312	2%	-\$2.03
Res Showerwand, 1.50 GPM - Gas	Retrofit	Water Heating	42,019	35,716	35,716	0%	-\$1.82
Res - Gas Hearth	Replace on Burnout	Heating	101,464	86,245	86,245	1%	\$0.00
Res - Window Replacement (U<.20), Gas SH, Z2 (NEW ONLY)	New Construction	Weatherization	294,633	250,438	250,438	2%	\$0.17
Res - Window Replacement (U<.20), Gas SH, Z2	Replace on Burnout	Weatherization	477,415	405,803	405,803	3%	\$0.19
Res - Window Replacement (U=.30), Gas SH, Z2, MH	Replace on Burnout	Weatherization	543	462	462	0%	\$0.44
Res 0.70+ EF Gas Storage Water Heater	Replace on Burnout	Water Heating	1,117,733	950,073	950,073	8%	\$0.47
Res Tankless Gas Hot Water Heater (NEW ONLY)	New Construction	Water Heating	736,252	625,814	625,814	5%	\$0.48
Res - Window Replacement (U<.20), Gas SH, Z2, MH	Replace on Burnout	Weatherization	779	662	530	0%	\$0.56
Res - AFUE 90 to 95 Furnace, Z2 - SF	Replace on Burnout	Heating	8,933	7,593	7,593	0%	\$0.60
Res - AFUE 90 to 95 Furnace, Z2	Replace on Burnout	Heating	16	13	-	0%	\$0.76
Res - AFUE 90 to 95 Furnace, Z2	Replace on Burnout	Heating	92,187	78,359	78,359	1%	\$0.80
Res - HRV, Gas SH, Z2	Retrofit	Weatherization	19,589	16,651	122	0%	\$0.81
Res - Path 2 MECH + DHW Gas Heat Gas DHW	New Construction	Water Heating	1,760,002	1,496,002	1,496,002	12%	\$0.84
Res - Smart Tstat	Retrofit	Heating	897,111	762,545	762,545	6%	\$0.96

Residential Measures	Measure Type	End Use	20-year Cumulative Technical Potential (therms)	20-year Cumulative Achievable Potential (therms)	20-year Cumulative Cost Effective Potential (therms)	% of Total Sector C/E Potential	Average Levelized Cost (\$/CE therm)
Res Absorption Gas Heat Pump Water Heater-Z2	Replace on Burnout	Water Heating	284,290	241,647	-	0%	\$1.01
Res - Path 3 MECH + DHW 2 Gas Heat Gas DHW	New Construction	Water Heating	1,960,508	1,666,432	1,666,432	14%	\$1.14
Res - Path 1 ORIECC-Shell Gas Heat Gas DHW	New Construction	Weatherization	1,715,445	1,458,128	1,458,128	12%	\$1.38
Res-Behavior Savings (RET)	Retrofit	Behavioral	174,669	148,469	148,469	1%	\$1.43
Res-Behavior Savings (NEW)	New Construction	Behavioral	60,418	51,355	51,355	0%	\$1.43
Res - Path 3 MECH + DHW 2 Gas Heat Ele DHW	New Construction	Water Heating	644,766	548,051	548,051	5%	\$1.54
Res - Wx insulation (wall), Gas SH, Z2	Retrofit	Weatherization	193,942	164,851	164,851	1%	\$1.55
Res Smart Devices Home Automation (RET)	Retrofit	Behavioral	149,386	126,978	113,679	1%	\$1.68
Res - Duct Sealing, Gas SH, Z2	Retrofit	Weatherization	226,590	192,601	3,644	0%	\$1.70
Res - AFUE 98/96 Furnace, Z2 - SF	Replace on Burnout	Heating	16,265	13,825	-	0%	\$1.78
Res Smart Devices Home Automation (NEW)	New Construction	Behavioral	112,272	95,431	91,011	1%	\$1.88
Res - Wx insulation (floor), Gas SH, Z2	Retrofit	Weatherization	192,956	164,013	164,013	1%	\$2.21
Res - AFUE 98/96 Furnace, Z2	Replace on Burnout	Heating	111	94	-	0%	\$2.63
Res - AFUE 98/96 Furnace, Z2 (NEW ONLY)	New Construction	Heating	8,556	7,273	-	0%	\$2.69
Res Absorption Gas Heat Pump Water Heater-Z2 (NEW ONLY)	New Construction	Water Heating	285,464	242,645	-	0%	\$3.22
Res Tankless Gas Hot Water Heater-Z2	Replace on Burnout	Water Heating	1,823,651	1,550,103	-	0%	\$3.95
Res - Path 4 Advanced Whole Home Gas Heat Ele DHW	New Construction	Heating	361,698	307,443	307,443	3%	\$4.01
Res - Path 3 MECH + DHW 2 Ele Heat Gas DHW	New Construction	Water Heating	286,512	243,535	243,535	2%	\$4.02
Res - Path 4 Advanced Whole Home Gas Heat Gas DHW	New Construction	Heating	2,027,344	1,723,242	1,723,242	14%	\$4.05
Res - Wx insulation (ceiling), NEW, ET, Gas SH, Z2	New Construction	Weatherization	102,887	87,454	-	0%	\$5.59
Res - Wx insulation (ceiling), RET, ET, Gas SH, Z2	Retrofit	Weatherization	176,336	149,885	-	0%	\$9.10
Res - Elec Hi-eff Dishwasher - Gas DHW - SF	Replace on Burnout	Appliance	3,721	3,163	-	0%	\$10.69
Res - Elec Hi-eff Dishwasher - Gas DHW	Replace on Burnout	Appliance	28	23	-	0%	\$16.11
Res - Wx insulation (wall), NEW, ET, Gas SH, Z2	New Construction	Weatherization	136,693	116,189	-	0%	\$20.72
Res - Wx insulation (wall), RET, ET, Gas SH, Z2	Retrofit	Weatherization	187,849	159,672	-	0%	\$31.20
Res 0.67/0.70 EF Gas Storage Water Heater for Multi-Family Centralized Hot Water System	Replace on Burnout	Water Heating	136	115	-	0%	\$32.21
Residential Totals & Weighted Average Levelized Cost			17,580,928	14,943,789	12,148,348	100%	\$1.35

Cascade Natural Gas 20-Year Cost-Effective DSM Savings Projection (Gross Therms)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	Total
Commercial	80,473	87,318	86,783	82,199	84,020	85,403	84,880	81,729	84,441	80,071	81,573	81,049	83,301	84,193	86,101	81,831	84,222	82,440	83,536	80,530	1,666,094
New Buildings Construction	113,002	110,748	110,072	109,397	108,727	108,683	108,021	107,363	106,710	106,062	96,634	87,317	78,110	69,011	68,595	68,482	67,771	67,364	50,220	33,279	1,775,468
Retrofit	111,384	113,638	110,346	111,429	108,990	107,148	106,455	104,585	100,775	100,179	100,179	92,254	91,617	82,735	78,723	67,425	64,385	63,443	62,397	45,227	1,828,489
Replace on Burnout	96,000	97,000	87,674	82,105	76,589	71,127	65,718	60,362	55,057	49,804	44,602	39,450	29,442	24,414	24,294	24,174	19,245	19,150	19,057	18,563	1,004,229
Strategic Energy Management	5,510	5,510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,020
Industrial	43,589	40,048	48,434	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	55,379	1,076,899
Retrofit	9,879	12,202	10,656	8,985	8,884	8,769	8,472	8,998	8,850	8,142	8,846	8,253	8,484	8,239	7,827	7,538	7,704	6,688	6,626	4,636	106,720
Replace on Burnout	104,467	111,351	115,266	115,944	118,372	120,962	123,459	125,794	128,301	131,676	133,802	136,142	138,492	139,974	141,801	143,458	144,978	146,761	148,466	150,075	2,617,543
Residential	27,240	31,555	37,802	49,460	57,116	70,879	76,798	78,654	79,398	83,391	83,635	83,635	83,635	84,103	84,328	84,546	84,921	85,294	85,664	86,033	1,438,534
Retrofit	18,550	17,853	16,743	18,857	20,178	19,153	18,193	16,802	15,835	14,934	14,099	13,322	12,601	11,926	11,299	10,717	10,171	9,666	9,195	8,755	288,850
Replace on Burnout	609,093	631,223	621,804	633,755	638,256	647,504	647,376	639,667	638,924	630,490	618,505	596,802	581,298	559,974	558,346	543,250	538,777	536,284	520,939	483,178	11,875,448
Total	609,093	631,223	621,804	633,755	638,256	647,504	647,376	639,667	638,924	630,490	618,505	596,802	581,298	559,974	558,346	543,250	538,777	536,284	520,939	483,178	11,875,448

Cascade Natural Gas 20-Year Cost-Effective DSM Savings Projection (Net Therms as found in Annual Report)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	Total
Commercial	81,286	88,200	87,659	83,029	84,868	86,266	85,738	82,555	85,294	80,880	82,397	81,868	84,142	85,043	86,071	82,658	85,073	83,272	84,784	81,344	1,683,327
New Buildings Construction	87,598	85,851	85,327	84,804	84,285	84,251	83,737	83,227	82,711	82,219	74,910	67,688	60,550	53,497	53,174	52,854	52,536	52,220	38,330	25,988	1,376,177
Retrofit	86,344	88,091	85,500	86,379	84,489	83,061	82,534	81,074	81,359	78,130	77,658	71,515	71,021	64,136	61,025	52,268	49,911	49,168	48,730	35,292	1,417,944
Replace on Burnout	96,000	97,000	87,674	82,105	76,589	71,127	65,718	60,362	55,057	49,804	44,602	39,450	29,442	24,414	24,294	24,174	19,245	19,150	19,057	18,563	1,004,229
Strategic Energy Management	5,510	5,510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,020
Industrial	34,071	35,239	38,739	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	44,303	861,699
Retrofit	7,903	9,761	8,556	7,188	7,107	7,015	6,778	7,199	7,080	6,514	7,077	6,603	6,787	6,591	6,262	6,031	6,164	5,350	5,301	3,709	134,976
Replace on Burnout	104,467	111,351	113,266	115,944	118,372	120,962	123,459	125,794	128,301	131,676	133,802	136,142	138,492	139,974	141,801	143,458	144,978	146,761	148,466	150,075	2,617,543
Residential	26,846	31,102	37,294	48,955	56,615	70,338	76,217	78,035	78,761	82,924	82,672	82,909	83,139	83,364	83,582	83,794	84,159	84,523	84,884	85,243	1,425,557
Retrofit	18,187	17,503	16,415	18,487	19,783	18,778	17,836	16,472	15,524	14,641	13,822	13,061	12,354	11,692	11,078	10,506	9,972	9,476	9,015	8,584	283,887
Replace on Burnout	548,212	569,609	560,470	574,195	576,411	586,101	586,310	579,021	578,401	571,081	561,244	543,538	530,231	513,014	512,490	500,045	496,940	494,314	483,108	453,311	10,814,448
Total	609,093	631,223	621,804	633,755	638,256	647,504	647,376	639,667	638,924	630,490	618,505	596,802	581,298	559,974	558,346	543,250	538,777	536,284	520,939	483,178	11,875,448

Gross Total Resource Cost of Annual Gross Savings Projection (Therms)

Sector	Sector (New, Existing, MT)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Commercial	New Commercial	\$597,833	\$675,138	\$684,106	\$639,077	\$658,920	\$670,223	\$670,074	\$637,518	\$664,759	\$630,943
	Existing Commercial	\$1,086,425	\$1,076,304	\$1,062,029	\$1,053,638	\$1,045,438	\$1,031,897	\$1,021,147	\$1,014,823	\$1,003,315	\$993,464
	Commercial MT	\$23,151	\$23,612	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Industrial	Industrial	\$87,822	\$101,662	\$95,380	\$90,878	\$90,350	\$88,723	\$86,521	\$89,938	\$87,955	\$84,018
Residential	New Residential	\$2,606,598	\$2,764,218	\$2,812,796	\$2,880,273	\$2,941,702	\$3,007,068	\$3,070,184	\$3,129,350	\$3,192,898	\$3,246,179
	Existing Residential	\$629,091	\$711,602	\$808,279	\$902,051	\$963,433	\$1,102,548	\$1,183,573	\$1,232,997	\$1,255,223	\$1,250,917
	Total:	\$5,030,920	\$5,352,538	\$5,462,591	\$5,565,916	\$5,699,843	\$5,900,459	\$6,031,500	\$6,104,627	\$6,204,150	\$6,205,521

Sector	Sector (New, Existing, MT)	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	Total
Commercial	New Commercial	\$646,338	\$632,415	\$656,808	\$663,778	\$682,754	\$637,667	\$663,479	\$650,385	\$665,745	\$627,355	\$13,055,317
	Existing Commercial	\$906,171	\$826,969	\$729,914	\$623,907	\$621,546	\$630,795	\$616,998	\$616,775	\$463,722	\$326,044	\$16,751,322
	Commercial MT	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$46,763
Industrial	Industrial	\$87,320	\$84,301	\$84,835	\$83,487	\$81,125	\$79,384	\$80,088	\$74,598	\$74,197	\$63,546	\$1,696,130
Residential	New Residential	\$3,278,172	\$3,336,580	\$3,395,261	\$3,432,685	\$3,478,565	\$3,520,349	\$3,557,642	\$3,601,406	\$3,643,204	\$3,682,738	\$64,577,869
	Existing Residential	\$1,170,178	\$1,177,194	\$1,184,340	\$1,191,637	\$1,199,008	\$1,206,480	\$1,214,023	\$1,221,624	\$1,229,292	\$1,237,011	\$22,070,502
	Total:	\$6,088,179	\$6,057,459	\$6,051,160	\$5,995,494	\$6,062,998	\$6,074,675	\$6,132,230	\$6,164,788	\$6,076,160	\$5,936,694	\$118,197,902