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NYSERDA Residential Statewide Baseline Study

Volume 4: Residential Short-Term Potential Study Results

Final Report

November 2015
Revised February 2016

Report Number 15-07

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NYSERDA Residential Statewide Baseline Study

Volume 4: Residential Short-Term Potential Study Results

Final Report

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Abstract for Volume 4

Volume 4 presents results from a potential study of technical, economic, and achievable residential energy efficiency opportunities in New York State over the next three and five years (2016 and 2018, respectively) from a base year of 2013. As part of a larger statewide residential baseline study that was conducted from 2011–2014, GDS Associates, under the oversight of the Tetra Tech project manager, has conducted this potential study with the objective to identify energy efficiency opportunities within the residential (including non-master-metered multifamily buildings) sector. Recommendations are also presented, where appropriate in light of the State's recent Clean Energy Fund and Reforming Energy Vision proceedings, for potential strategies to pursue those opportunities found to be cost-effective. All results were developed using a bottom-up approach and customized residential energy efficiency potential assessment and benefit-cost screening models with input from and consideration by NYSERDA Evaluation and Program staff, the Department of Public Service (DPS), and the E2 Working Group.[1] To help inform these models, current electric, natural gas, and other fossil-fueled energy using equipment and related information was collected through a combination of telephone and Web surveys and on-site inspections with residential single-family and multifamily customers located within the State's three climate zones. These data collection efforts were conducted by Tetra Tech, GDS, and PSD project team members. Sensitivity analyses were also conducted to assess potential impacts of an alternate discount rate, lower installed cost, and increased market penetrations of energy using equipment.

There are five volumes for the Residential Baseline Study. This fourth volume provides the results of the residential short term potential study. The other volumes describe the single-family baseline results (Volume 1), multifamily baseline results (Volume 2), HVAC market assessment (Volume 3), and methodology and data tables (Volume 5).

Keywords

Residential energy efficiency, technical potential, economic potential, achievable potential

[1] Prior to the creation of the E2 Working Group, the former Evaluation Advisory Group held a similar role on this study.

Acknowledgements

The Tetra Tech evaluation team thanks Carley Murray, Jonathon Steiner, and Jennifer Meissner of NYSERDA for the leadership, guidance, critical review, and assistance they provided throughout the residential baseline study. The team would like to thank GDS Associates (led by Scott Albert) for their effort in developing this potential component of the residential statewide baseline study. Finally, this was a collaborative effort with many parties providing advice and review throughout the process, including Bill Saxonis from the New York State Department of Public Service, E2 Working Group, NYSERDA program staff, and evaluation consultants.

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1 Introduction

1.1 Background and Study Objectives

In 2013 and 2014, NYSERDA, in collaboration with the E2 Working Group[2] Statewide Study Subcommittee led by the New York State Department of Public Service (DPS), conducted a residential statewide baseline study. The NYSERDA evaluation group, in coordination with the lead contractor of this study, Tetra Tech MA, Inc. (Tetra Tech), and its subcontractors, Performance Systems Development (PSD), and GDS Associates, Inc. (GDS), developed and implemented a detailed work plan to complete this study.

This study included the single-family and multifamily residential housing segments and a broad range of energy uses and efficiency measures. The overall objective of the study is to understand the residential building stock and associated energy use, including the saturations of energy consuming equipment (electric, natural gas, and other fossil fuels) and the penetrations of energy efficient equipment, building characteristics and energy management practices. The study also collected customer household and demographic information that can be correlated with energy usage features. In addition, this study included estimates of technical, economic and achievable potential for energy efficiency using the primary data collected to define the baseline.

The objective of the potential study is to identify and quantify energy efficiency opportunities within the residential (including nonmaster-metered multifamily buildings) sector. In light of the State's recent Clean Energy Fund and Reforming Energy Vision proceedings, results from this study can be used to identify specific energy end-uses and energy efficiency market areas that could benefit from attention through new strategic program design.

Residential energy users throughout New York State were included in the scope of this study. Random samples were drawn individually by each of the major electric utilities from their residential accounts. Those utility samples represented 90 percent of the State's residential households. Samples were designed to ensure some representation in each of the 10 Economic Development Regions, and to meet 90/10 confidence level statewide and for the three climate zones (4, 5 and 6 as discussed in more detail in

[2] Prior to the creation of the E2 Working Group, the former Evaluation Advisory Group held a similar role on this study.

section 2) for most data collection activities. Having robust sample sizes in the climate zones is important to identifying differences that should be considered in program planning and to calculate more accurate energy savings for the potential analysis and future program evaluations. In particular, climate zone 4, which includes New York City (NYC), Long Island (LI), and other densely populated Downstate areas, has some very distinct differences from Upstate New York represented by climate zones 5 and 6.

The project has three main components:

- **Residential Baseline Study.** The evaluation team conducted a comprehensive statewide baseline study of the residential market across a broad range of customer segments and energy measures, including (1) new and existing single-family buildings (one to four units), and (2) new and existing multifamily buildings (five units or more), including dwelling units, common areas, and whole buildings. Data were first collected through a combination of Web and telephone surveys. On-site inspections and data collection was then completed for a sample of the Web and telephone survey respondents along with residential contact sample lists from other sources as described in the methodology volume.
- **HVAC Market Assessment.** Data were collected in baseline study surveys and on-site inspections, contractor interviews, and distributor sales reports to assess the market for non-electric heating, air conditioning, and water heating equipment. Data on the baseline efficiency of new equipment installed in New York State were gathered during HVAC contactor interviews and from D&R International (D&R) which reported New York State-specific Heating, Air-conditioning and Refrigeration Distributors International (HARDI) sales data for 2013. This information will be used to set more accurate baselines for calculating program energy savings.
- **Residential Potential Study.** The data for the baseline analysis and the HVAC market assessment were then used for the potential analysis. The analysis identified the technical, economic, and achievable residential energy efficiency opportunities in New York over the next three and five years, (2016 and 2018, respectively) from a base year of 2013.

Volume 4 presents results from the potential study of technical, economic, and achievable residential energy efficiency opportunities in New York over the next three and five years (2016 and 2018, respectively). Other volumes describe the single-family baseline results (Volume 1), multifamily baseline results (Volume 2), HVAC market assessment (Volume 3), and the methodology and data tables (Volume 5).

All results were developed using a bottom-up approach, customized residential energy efficiency potential assessment and benefit-cost screening models, with input from and consideration by NYSERDA Evaluation and Program staff, the Department of Public Service (DPS) and the E2 Working Group. One of the benefits of a bottom-up modeling approach is its ability to quantify energy efficiency potential at the individual energy end-use and measure level, thus enhancing the value of results from this potential study as a useful strategic program design and targeted planning tool.

Cost-effectiveness criteria have been incorporated within the benefit-cost screening model, including avoided energy costs developed between NYSERDA and the DPS and/or utilized in the long-term potential study recently conducted by NYSERDA.[3] To help inform these models, current electric, natural gas and other fossil-fueled energy using equipment and related information was collected through a combination of telephone sand Web surveys and on-site inspections with residential single-family and multifamily customers located within the State's three climate zones. Sensitivity analyses were conducted to assess potential impacts of an alternate discount rate, lower installed cost, and increased market penetrations of energy using equipment.

1.2 Methodology

The methodology for the entire Residential Statewide Baseline study is in the Methodology and Data Tables (Volume 5). This section summarizes the methodology, data comparisons, and data weighting for the Potential Study.

1.3 Short-Term Potential Study Scope

The purpose of this study is to estimate the additional technical, economic, and achievable residential energy efficiency opportunities in New York over the next three and five years (2016 and 2018) from a base year of 2013. Key tasks performed in this effort included:

- **Reviewing existing data sources** – that can provide useful and up-to-date data for the development of the efficiency potential assessment. These data sources included existing data, related studies (as detailed in the Study Methodology appendix of this report) and forecasts to the extent practicable in meeting the study objectives.

[3] NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State, Volume 1: Study Overview*. Prepared by Optimal Energy, American Council for an Energy Efficient Economy and Vermont Energy Investment Corporation.

- **Identifying primary research needs** – to obtain data on the percent of existing equipment that is already efficient, as well as the potential for future market transformation. This potential study component identified data that was collected through other phases of the broader Residential Baseline Study to support the potential analysis. These primary residential end-use saturation and energy efficiency penetration data was supplemented based on a review of other available data sources.
- **Energy Efficiency Measure Database Development** – based on review of existing program data, other related existing data sources, survey of key actors in New York and using other data collected from previous project tasks. An up-to-date list of energy efficiency measures (including currently available and soon-to-be commercially available technologies) was compiled in collaboration with the evaluation team, NYSERDA Program, Evaluation, DPS and E2 Working Group staff. This list included data on full/incremental installed measure costs, measure energy savings, useful lives, current baseline saturation and penetrations of energy efficiency equipment, percentage of the market that is currently efficient, as well as all relevant sources including primary data collected through this project and the New York Technical Reference Manual (TRM).
- **Load forecast development** – to document electricity, natural gas and other fossil-fuel consumption by climate zone in New York's residential sector. This evaluation component relied on the electric and fossil fuel sales forecasts used in NYSERDA's recently completed long-term potential study.[4]
- **Assessment of residential energy efficiency potential** – utilizing a "bottom-up" approach in the residential sector to calculate the technical, economic and achievable potential of nearly 900 energy efficiency measures or sets of measures for the five year period, 2014 through 2018 with focus on years three and five (2016 and 2018, respectively). A bottom-up approach first starts with the savings and costs associated with replacing one piece of equipment with its efficient counterpart, and then multiplies these values by the number of units available to be replaced over the study period. The definitions used in this study for energy efficiency potential estimates are as follows:
    - **Technical potential** – the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end-users to adopt the efficiency measures. It is often estimated as a "snapshot" in time assuming immediate implementation of all technologically feasible energy saving measures, with additional efficiency opportunities assumed as they arise from activities such as new construction.

[4] NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State, Final Report*, Number 14-19, *Volume 1: Study Overview*. Prepared by Optimal Energy, American Council for an Energy-Efficient Economy and Vermont Energy Investment Corporation. Section 2.4 Energy Sales Forecast, page 8-10.

- **Economic potential** – refers to the subset of the technical potential that is cost-effective as compared to conventional supply-side energy resources. Both technical and economic potential are theoretical numbers that assume immediate implementation of efficiency measures, with no regard for the gradual "ramping up" process of market adoption, either naturally or with program inducement. In addition, they ignore market barriers to ensuring actual implementation of efficiency. Finally, they only consider the costs of efficiency measures themselves, ignoring any programmatic costs (e.g., marketing, analysis, administration) that would be necessary to capture them.
- **Achievable potential** – the amount of energy use that efficiency can realistically be expected to displace assuming different market penetration scenarios for cost-effective energy efficiency measures. Achievable potential takes into account real-world barriers to convincing end-users to adopt cost-effective energy efficiency measures, the non-measure costs of delivering programs (for administration, marketing, tracking systems, monitoring and evaluation, etc.) and the capability of programs and administrators to ramp up program activity over time.[5] Achievable potential savings is a subset of economic potential.

- As described in more detail in Section 2 of this report, this potential study evaluates a base-case achievable potential scenario and three sensitivity scenarios:
  - *Base-Case Scenario:* For the base-case, achievable potential represents the amount of energy use that efficiency can realistically be expected to displace assuming support from public, utility, or other program channels that effectively reduces or covers 50 percent of the total installed measure cost (incremental cost for replace-on-burnout measures and full cost for retrofit measures) and no spending cap. The base case scenario also assumes that only 50 percent market adoption of the total economic potential for individual measures can be achieved within the five-year study period at this level of support.
  - *Sensitivity Scenario #1:* For this scenario, the Real Discount Rate used in the Base-Case Achievable Potential scenario is reduced from 5.5 percent[6] to 0.55 percent[7] to reflect a more realistic current discount rate being used for cost-effectiveness assessment purposes in a neighboring jurisdiction.
  - *Sensitivity Scenario #2:* For this scenario, in addition to locking in the lower real discount rate, it is assumed that NYSERDA and other efforts to animate the market will effectively reduce energy efficient end-use installed measure costs and increase market penetrations by 5 percent across the board by 2018.

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5 These definitions are derived from the November 2007 National Action Plan for Energy Efficiency "Guide for Conducting Energy Efficiency Potential Studies."

6 NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State, Final Report* Number, *Volume 1: Study Overview*. Prepared by Optimal Energy, American Council for an Energy-Efficient Economy and Vermont Energy Investment Corporation. Section 2.8.2 Discounting and Present Values.

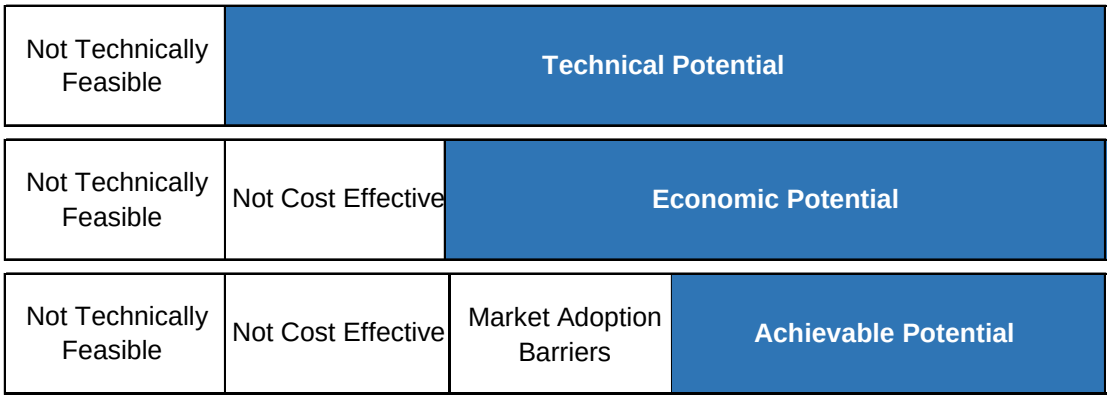
7 This is equivalent to a 2.78 percent Nominal Discount Rate at 2.22 percent inflation, and is consistent with values being used in a neighboring state (i.e., Massachusetts) and the federal government for project cost effectiveness assessment.

- *Sensitivity Scenario #3:* For this scenario, in addition to locking in the lower discount rate and 5 percent reduction in energy efficient end-use installed measure costs, it is assumed that NYSERDA and other efforts to animate the market will increase market penetrations by 10 percent across the board by 2018.

As previously noted, the scope of this study distinguishes among three types of energy efficiency potential: (1) technical, (2) economic, and (3) achievable potential. The definitions used in this study for energy efficiency potential estimates are from the 2007 National Action Plan for Energy Efficiency (NAPEE) report. Figure 1provides a graphical representation of the relationship of the various definitions of energy efficiency potential.

Figure 1. Types of Energy Efficiency Potential

Source: Information from "Guide to Resource Planning with Energy Efficiency" November 2007. US EPA. Figure 2-1.More information on input assumptions and methodologies used when conducting each of these tasks is included in Section 2 and Appendix A of this report.



1.4 Study Limitations

Although this study uses the best and most current available data, many assumptions may have reasonable alternatives that would yield somewhat different results (e.g., different current end-use equipment base cases, measure-specific savings, costs and measure lives, avoided energy costs, discount rates, etc.). Furthermore, although the lists of energy efficiency measures examined in this study represent most commercially available measures and some emerging technologies, these measure lists are not exhaustive. Finally there was no attempt to assign a dollar value to non-energy impacts (non-resource benefits) such as increased comfort or increased safety, which may in turn support some personal choices to implement particular measures that may otherwise not be cost-effective or are only marginally cost-effective.

Thus, the various potential estimates are specific to and limited by the detailed measures list and assumptions described in this study. As new and improved energy efficiency products and strategies emerge and as regulatory, market, and behavioral barriers are reduced through New York's proposed Clean Energy Fund, Reforming the Energy Vision, and other market transformational activities, the achievable potential estimates might reasonably be expected to increase. The main outputs of this study are summary data tables and figures identifying the potential for additional energy efficiency opportunities in New York over the three and five year period (2016 and 2018, respectively) from a base year of 2013. Wherever possible, this study makes use of actual New York residential customer data collected through telephone, Web, and on-site inspections. Given the magnitude of efficiency measures included for consideration in this study, in cases where New York customer-specific information was not available, data on measure characteristics, savings, costs and penetration rates were compiled through a combination of secondary research (including reviews of other previous relevant studies), manufacturer specifications and direct calculation through energy calculators and building simulation modeling. More details on all data sources used in this report are included in Section 2 and Appendix A of this report. Collectively, these primary and secondary data sources provided an important and extensive foundation for estimates of electric energy, natural gas, and other fossil fuel savings potential by measure type and residential customer end-use.

1.5 Results Overview

Table 1 shows that cost-effective electric energy efficiency resources can play a significantly expanded role in New York's energy resource mix over the next three and five years from a base year of 2013. For New York State, the cumulative achievable potential (based on Sensitivity Scenario #1[8]) for electricity savings is 7.5 percent of forecast kilowatt-hour sales by the year 2016. The cumulative achievable potential for non-electric savings is 3.3 percent of forecast million British thermal units (MMBtu) sales for 2016. By 2018, these achievable electric and non-electric savings are estimated at 13.5 percent and 6.1 percent respectively. Combining both electric and non-electric energy usage into a single statewide residential energy unit (in trillion British thermal units [tBtu]), as also shown in this table,

[8] As described later in this report, Achievable Potential Sensitivity Scenario #1 is the same as the Base-Case Achievable Potential, except that the Real Discount Rate of 5.5 percent is reduced to 0.55 percent. Results from Sensitivity Scenario #1 have been used throughout this report as the most likely achievable potential base case scenario, to be consistent with more current real discount rate assumptions being used in the region. This lower discount rate is consistent but slightly higher than the 2014 real discount rates specified for use in the White House Office of Management and Budget's Memo for Heads of Departments and Agencies "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" – http://www.whitehouse.gov/sites/default/files/omb/memoranda/2014/m-14-05.pdf

New York has the potential to achieve 8 percent savings through aggressive implementation of energy efficiency activities by 2018. The cost to achieve these savings, based on the full or incremental cost associated with installation of all measures, is estimated at $10.2 billion.[9] These savings could be achieved either through rebate programs, more broad based market transformation initiatives, or a combination of approaches that collectively work to reduce the cost of installed measures or increase the penetration of cost-effective energy efficiency measures and practices across the State. Under current total cost assumptions, the $10.2 billion would yield $26.8 billion in avoided energy cost benefit ($2.6 of benefit for every $1 spent) and the investment would pay back in 4.7 years. Other less costly and more transformative program strategies that effectively reduced installed measure costs would only make the benefit per expenditure and payback more positive.

Table 1. Electric & Non-electric Energy Efficiency Potential Cumulative Savings Summary by Year 3 (2016) and Year 5 (2018)

Electric Sales - Residential Single Family & Multifamily						
2016 GWh[10] (Annual Sales in Year 3)	51,188					
2018 GWh (Annual Sales in Year 5)	51,718					
Electric Energy Efficiency Potential (GWH)						
Statewide Potential	**Technical Potential**	**Economic Potential**	**Achievable Base Case**	**Achievable Scenario 1**	**Achievable Scenario 2**	**Achievable Scenario 3**
Cumulative Savings by 2016 (Year 3)	23,521	21,364	3,754	3,856	4,060	4,265
Cumulative Savings by 2018 (Year 5)	23,692	21,494	6,795	6,996	7,469	7,953
Electric Energy Efficiency Potential Percent of Residential Sector Sales)						
Percent of 2016 Annual Sales	45.9	41.7	7.3	7.5	7.9	8.3
Percent of 2018 Annual Sales	45.8	41.6	13.1	13.5	14.4	15.4

9 Full costs would apply to retrofit measures, while incremental costs would apply to measures being replaced on burnout or at the end of their useful lives. In both situations, the $10.2 billion cost to achieve value reflects the total cost for installation of all measures specified in the Achievable Potential Sensitivity Scenario #1, regardless of what percentage of those costs are paid for by program participants, rebates, or other program administrative strategies (although for all sensitivity scenarios, a 50 percent rebate of installed cost and 20 percent program administration cost are assumed).

10 Gigawatt-hour. A large measurement of energy, with approximately enough energy to power over a hundred New York homes for a year.

Table 1 continued

Non-electric Sales - Residential Single Family & Multifamily						
2016 TBtu (Annual Sales in Year 3)	529					
2018 TBtu (Annual Sales in Year 5)	524					
Non-electric Energy Efficiency Potential (in TBtu)						
Statewide Potential	**Technical Potential**	**Economic Potential**	**Achievable Base Case**	**Achievable Scenario 1**	**Achievable Scenario 2**	**Achievable Scenario 3**
Cumulative Savings by 2016 (Year 3)	134	58	15	17	18	19
Cumulative Savings by 2018 (Year 5)	135	58	26	32	34	36
Non-electric Energy Efficiency Potential (% of Residential Sector Sales)						
Percent of 2016 Annual Sales	25.3	10.9	2.8	3.3	3.5	3.6
Percent of 2018 Annual Sales	25.7	11.1	5.0	6.1	6.5	6.9
Total Electric & Non-electric Sales - Residential Single Family & Multifamily						
2016 TBtu (Annual Sales in Year 3)	704					
2018TBtu (Annual Sales in Year 5)	701					
Total Electric & Non-electric Energy Efficiency Potential (TBtu)						
Statewide Potential	**Technical Potential**	**Economic Potential**	**Achievable Base Case**	**Achievable Scenario 1**	**Achievable Scenario 2**	**Achievable Scenario 3**
Cumulative Savings by 2016 (Year 3)	214	131	27	31	32	34
Cumulative Savings by 2018 (Year 5)	216	131	49	56	59	63
Total Electric & Non-electric Energy Efficiency Potential (% of Residential Sector Sales)						
Percent of 2016 Annual Sales	30.5	18.6	3.9	4.3	4.6	4.8
Percent of 2018 Annual Sales	30.8	18.8	7.0	8.0	8.5	9.0
Cost to Achieve by 2016 ($B)	$90.9	$25.3	$3.9	$5.4	$5.2	$5.5
Cost to Achieve by 2018 ($B)	$98.1	$27.4	$6.8	$10.2	$9.9	$10.5
Total Benefits 2016 ($B)	$64.7	$51.1	$8.8	$13.9	$14.3	$15.0
Total Benefits 2018 ($B)	$70.4	$55.3	$15.7	$26.8	$27.3	$28.9

As shown in Figure 2, the greatest achievable potential for electric energy efficiency savings exists within climate zone 4 (61 percent of the total statewide gigawatt-hour (GWh) savings). The greatest potential for non-electric energy efficiency potential can also be found in climate zone 4 (58 percent of the total statewide TBtu savings). The potential in climate zone 4 is directly tied to the fact that this climate zone includes New York City, Westchester County, and Long Island and represents 62 percent of the State's population, 60 percent of the occupied housing units [11] in the State, and substantially higher avoided fuel costs than the other climate zones. Although there are significant savings opportunities in climate zones 5 and 6, program designs that focus on climate zone 4 could yield greater savings results in a shorter time period than can be achieved elsewhere. Although the unique challenges of delivering energy efficiency within the New York City, Westchester County and Long Island regions would need to be effectively identified, addressed, and overcome.

Figure 2. Electric and Non-electric Energy Efficiency Potential Savings – By Climate Zone

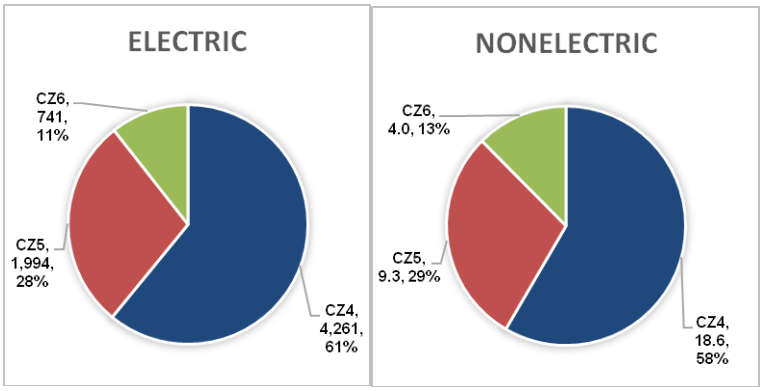


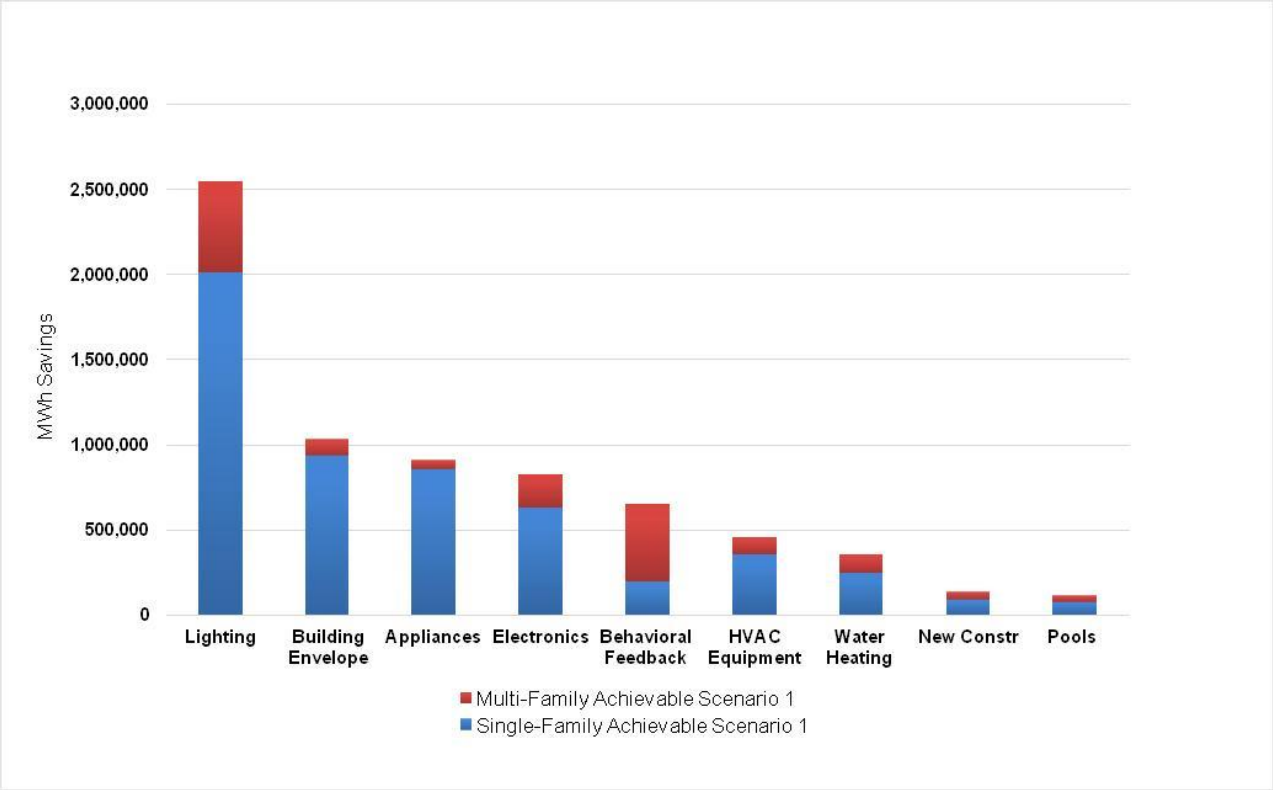
Figure 3 through Figure 5 shows how the achievable statewide energy savings potentials are allocated across New York's residential electric and non-electric energy end uses. As seen in these figures, a majority (66 percent) of the achievable electric energy savings comes from lighting, building envelope improvements, and electric appliance end uses, at 36, 15, and 13 percent, respectively. For natural gas savings, a majority (82 percent) of the achievable potential comes from building envelope, water heating, and HVAC equipment end uses, at 38, 24, and 20 percent, respectively. For petroleum fuel savings, a majority (89 percent) of the achievable potential comes from building envelope, HVAC equipment and water heating end uses, at 64, 16, and 9 percent, respectively. One reason for the substantial potential for energy savings through building envelope improvements is the aging residential building stock in New York – with more than 75 percent of all single-family homes currently across the State built before

[11] US Census Bureau: Profile of General Demographic Characteristics 2010—New York State and Counties.

1980 (35 years and older).[12] Increased focus on overcoming barriers in this market and promoting installation of air sealing and insulation measures could yield valuable energy savings results. Behavioral feedback measures also show a high percentage of savings potential for both electric and non-electric measures (9.2 and 16.3 percent respectively), especially within the multifamily building sector. These measures can encourage tenants to modify their energy using behaviors by providing both direct (through in-home displays) and indirect feedback (through monthly emails or letters that compare actual energy usage to average usage of similar buildings/tenant units in the neighborhood). Given the extremely low cost for energy saved, the short-term nature of these measures (currently one year measure life for indirect measures and three years for direct measures) and the magnitude of multifamily tenant units especially in climate zone 4, it is no surprise that that these measures show large opportunities for energy savings in this short-term potential study.

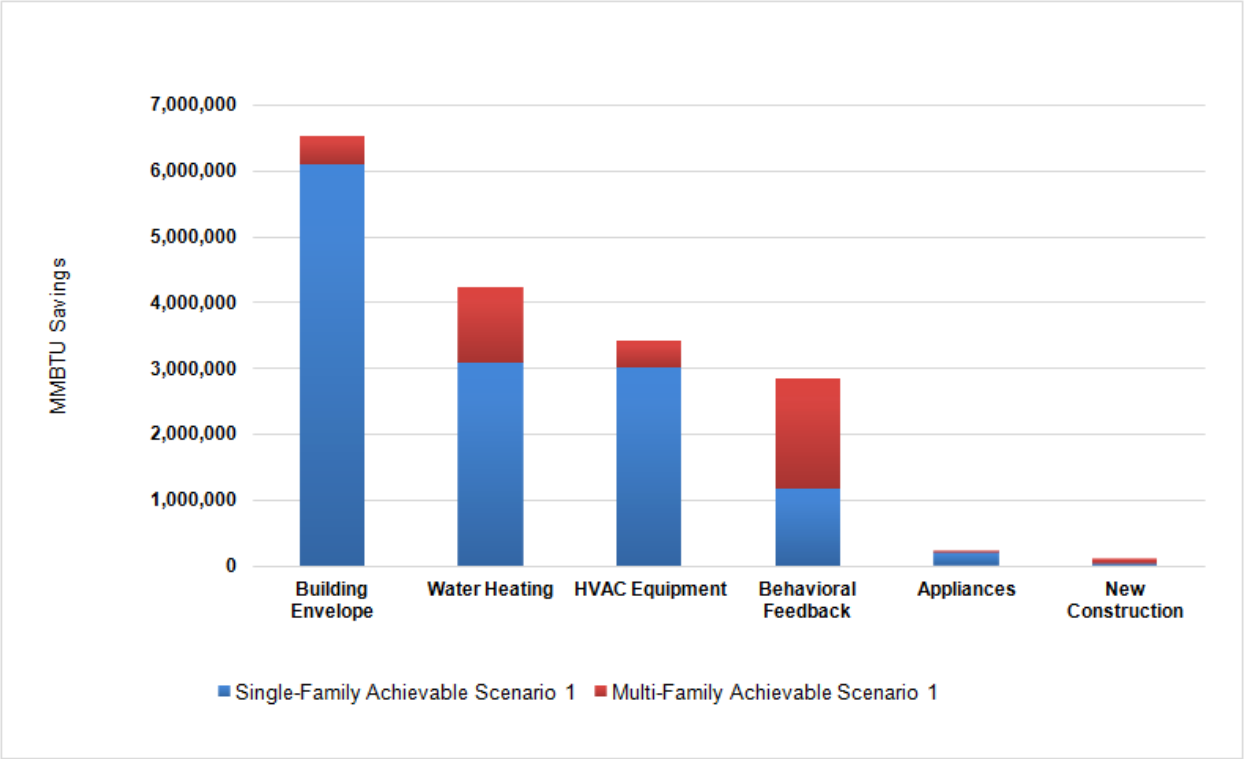
12 *NYSERDA Residential Statewide Baseline Study – Volume 1: Single-family Report,* Table 8.

Figure 3. Residential Achievable Cumulative Electric Savings Potential by End Use



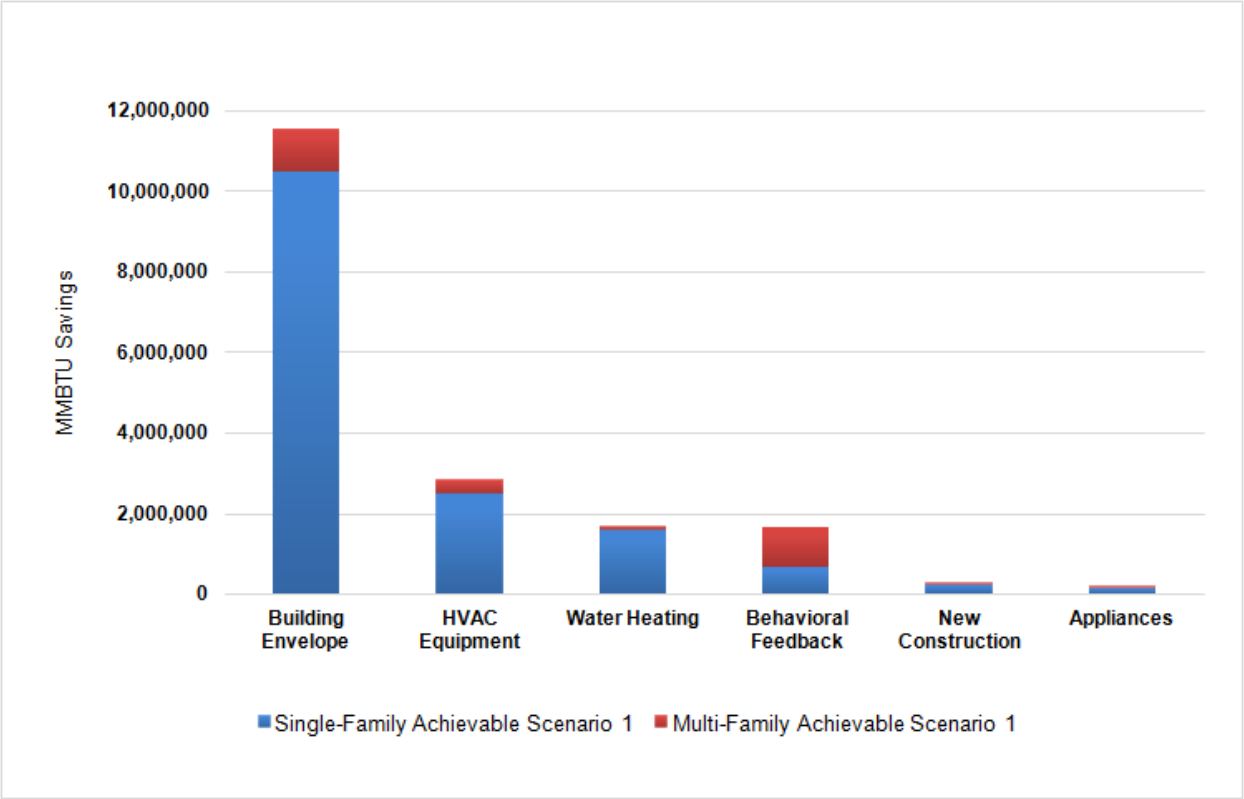
	Lighting	Building Envelope	Appliances	Electronics	Behavioral Feedback
Percent of Achievable Scenario 1	36.3	14.7	13.0	11.7	9.2
Multi-Family (MWh)	525,590	88,048	52,152	188,474	451,877
Single Family (MWh)	2,012,353	938,899	856,954	632,961	195,037
	HVAC Equipment	**Water Heating**	**New Construction**	**Pools**	
Percent of Achievable Scenario 1	6.5	5.0	1.9	1.6	
Multi-Family (MWh)	93,667	103,056	45,175	39,004	
Single Family (MWh)	359,918	249,183	88,489	74,985	

Figure 4. Residential Achievable Cumulative Natural Gas Savings Potential by End Use



	Building Envelope	Water Heating	HVAC Equipment	Behavioral Feedback	Appliances	New Construction
Percent of Natural Gas Achievable Scenario 1	37.7	24.4	19.7	16.3	1.2	0.6
Multifamily (MMBtu)	419,265	1,143,570	391,540	1,632,005	17,571	69,079
Single Family (MMBtu)	6,096,061	3,080,181	3,006,677	1,190,025	191,511	39,552

Figure 5. Residential Achievable Cumulative Petroleum Fuels Savings Potential by End Use



	Building Envelope	Water Heating	HVAC Equipment	Behavioral Feedback	Appliances	New Construction
Percent of Petroleum Achievable Scenario 1	63.8	15.6	9.2	9.1	1.4	0.9
Multifamily (MMBtu)	1,013,445	305,986	75,594	965,001	28,875	21,502
Single Family (MMBtu)	10,489,740	2,505,557	1,583,104	670,935	226,635	135,110

In summary:

- Substantial achievable potential remains for energy efficiency improvements in New York's residential single-family and multifamily (non-master metered) buildings sectors.
  - By 2016 (3 year): 7.5 percent electric and 3.3 percent non-electric savings, based on Achievable Potential Sensitivity Scenario #1 (lower discount rate) (4.3 percent total)

    - By 2018 (5 year): 13.5 percent electric and 6.1 percent non-electric savings, based on Achievable Potential Sensitivity Scenario #1 (lower discount rate)(8 percent total) [13]
    - Potential additional savings of up to 15.4 percent electric and 6.9 percent non-electric (9 percent total) of energy sales by 2018, based on more aggressive cost reduction and market penetration scenarios.

- The total cost (including participant and program-related cost) to achieve this combined potential by 2018 is estimated at $10.2 billion dollars ($5.4 billion for 2016 achievable potential). This cost could be lower if program initiatives were successful in reducing the total installed cost of energy efficiency measures (through more targeted upstream or barrier busting initiatives, or focus on low-cost, high savings measures), or if administrative costs for program implementation were reduced.
    - Nearly 10 percent of total 2018 residential electric sector sales can be achieved at a lifetime levelized cost of less than $0.05/kWh, for electric measures.
    - More than 4 percent of total 2018 residential non-electric sector sales can be achieved for less than $10/MMBtu for non-electric measures.
- The best region within the State from which to tap this potential exists in climate zone 4, although the unique challenges of delivering energy efficiency within the New York City, Westchester County, and Long Island regions would need to be effectively identified, addressed, and overcome.
- Measure areas with the greatest opportunities for cost-effective, achievable savings include:
    - Electric Measures – lighting (including replacement of existing inefficient lighting with ENERGY STAR® specialty compact fluorescent lightbulbs (CFLs) in single-family and multifamily locations and installation of LED screw-in lighting in single-family homes), building envelope and appliances (with focus on removal of second refrigerators, freezers and room air conditioners).
    - Non-electric Measures – building envelope, water heating, and HVAC.
    - Behavioral measures – mainly multifamily building sector .
- If the soft costs and other installed costs of measures across the marketplace decrease by 5 percent and continued support for energy efficiency successfully increases the market penetration of efficient residential energy using equipment by 10 percent, the State has the potential to see even greater savings – over 15 percent of 2018 electricity sales and approximately 7 percent of 2018 non-electric sales.

As discussed in more detail in the following section, results from this short-term potential study align with findings from the long-term potential study completed earlier in 2014.

[13] To convert electric savings into common unit Btu's a conversion factor of 3,412.142 Btu/kWh was used.

1.5.1 Comparison of Short-Term and Long-Term Studies

In addition to this short-term potential study, NYSERDA recently completed a long-term potential study.[14] This section compares the overall approaches and results of both studies. Although the short-term and long-term potential studies have different objectives, data sources, and methodologies, they both indicate that there are significant cost-effective potential energy savings in New York's residential sector across energy and fuel types. The long-term study was designed to estimate the potential of energy efficiency over a 20-year period, with consideration given to expected load growth for various fuels, changing energy prices, and changes in performance and cost of available technologies. In contrast, the short-term potential study was designed to focus on specific energy efficiency measures that could be implemented in the next 3 to 5 years, based on detailed energy and technology data collection via surveys of existing residential households representative of New York State.

The economic and achievable potentials for electric savings are presented in Table 2; non-electric savings are presented in Table 3. Each table (electric and non-electric) is divided into three sections as follows:

- Residential Sales Forecast – These benchmark values indicate the electric and fossil fuel sales forecasts for 2018 and 2030 used in NYSERDA's recently completed long-term potential study.[15]
- Energy Efficiency Potential – This section presents the estimated economic and achievable base case potentials from both the short-term and long-term studies.
- Comparison of Short- and Long-Term Study Results in years 2018 and 2030 – This section compares the short-term and long-term study results by showing the estimated short-term savings by 2018 as a percentage of the estimated long-term savings by 2030 for both economic and achievable base case potentials.

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14 NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State, Volume 1: Study Overview*. Prepared by Optimal Energy, American Council for an Energy-Efficient Economy and Vermont Energy Investment Corporation.

15 NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State, Final Report* Number, *Volume 1: Study Overview*. Prepared by Optimal Energy, American Council for an Energy-Efficient Economy and Vermont Energy Investment Corporation. Section 2.4 Energy Sales Forecast, page 8-10.

Table 2. Comparison of Short- and Long-Term Study Results – Residential Electric Energy Savings [16]

Residential Electric Sales Forecast		
2018 GWh	51,718	
2030 GWh	54,815	
Cumulative Electric Energy Efficiency Potential (GWh)		
Statewide Potential	**Economic Potential**	**Achievable Base Case**
Short-Term Savings by 2018	21,494	6,795
Long-Term Savings by 2030	28,553	9,415
Comparison of Short- and Long-Term Study Results (Short-Term Savings by 2018 as a percentage of Long-Term Savings by 2030)		
Short-Term Savings by 2018 as a percentage of Long-Term Savings by 2030	75% of LT 2030 savings	72% of LT 2030 savings

Table 3. Comparison of Short- and Long-Term Study Results – Residential Non-electric Savings

Residential Non-electric Sales Forecast		
2018 Trillion British Thermal Units (TBtu)	524	
2030 TBtu	500	
Non-electric Energy Efficiency Potential (TBtu)		
Statewide Potential	**Economic Potential**	**Achievable Base Case**
Short Term Savings by 2018	58.1	26.1
Long Term Savings by 2030	221.0	75.8
Comparison of Short- and Long Term Study Results (Short Term Savings by 2018 as a percentage of Long Term Savings by 2030)		
Statewide Potential	**Economic Potential**	**Achievable Base Case**
Short Term Savings by 2018 as a percentage of Long Term Savings by 2030	26% of LT 2030 savings	34% of LT 2030 savings

16 Peak kW reduction potential was not assessed as part of the short- or long-term potential study.

As shown in Table 2 and Table 3 above, results from both studies indicate that significant potential exists to implement energy efficiency measures in the residential sector. For example, estimates of achievable electric potential in both studies are consistent with each other in that they represent 32% and 33%, respectively, of economic potential estimated in the short-term study (for 2018) and the long-term study (for 2030). Apparent differences in results are primarily attributable to changes in energy prices, technology performance, and measure cost projected over the 20-year period of the long-term study that are necessarily excluded from the short-term study.

2 Methodology and Key Assumptions

This section of the report provides information on the key assumptions used to develop the technical, economic, and achievable potential estimates for this study. Assumptions are organized by three main topic areas as follows:

- Measure list and database development, including measure baseline values determination
- Electric and non-electric sales forecasts
- Energy efficiency potential assumptions (technical, economic and achievable potential base case and sensitivity scenarios), including cost-effectiveness modeling assumptions

More detail on the methodologies used to complete this project and compile these key assumptions is included in Appendix A. Table 4 identifies the residential building types and energy end uses assessed in this study.

Table 4. Residential Building Types and End-Use Measure Categories

Residential Building Type
Single-Family
Multi Family (non-master metered)
Existing Homes
New Construction
Energy Using Equipment/End-Use Measures
Building Envelope
Space Conditioning (heating/cooling)
Water Heating
Lighting
Appliances
Electronics
Other (pools, behavioral feedback, etc.)

An up-to-date list of energy efficiency measures was compiled, with results being incorporated into a final list of nearly 900 measures potentially applicable for use within existing or newly constructed single-family and multifamily homes. Table 5 identifies the number of measures included within the final measure list by measure/end-use category. The final list was entered into spreadsheet models used in this study and populated with all necessary data for the potential assessment including:

- Incremental/full installed measure costs
- Measure energy savings
- Useful lives
- Current baseline saturation measure-specific energy using equipment
- Percentage of the market for each measure that is currently efficient (penetration of efficient equipment)

All sources for these data points are documented within spreadsheet models, which have been provided to NYSERDA for their records and potential future use. More information on assumptions and how individual measures were characterized is presented in the following section. A detailed list of the data sources used to compile all model inputs is provided in the Appendix A of this report. Appendix B provides an itemization of all measures utilized in this study.

Table 5. Summary of Residential Measures

End-Use Measure Type	Number of Measures on List
Building Envelope	216
Space Conditioning (heating/cooling)	261
Water Heating	144
Lighting	60
Appliances	84
Electronics	36
Other (pools, feedback devices, etc.)	44
Total	899

This list includes electric, natural gas and other fossil (petroleum) fuel measures that could be relatively easily substituted for existing technologies on a retrofit or replace-on-burnout basis. The large number of building envelope and space conditioning measures reflects the fact that different measures have been created in these categories for each of the three separate climate zones in New York (with different savings and cost implications by climate zone and for new construction versus retrofit applications).

Replace-on-burnout applies to equipment replacements that are made normally in the market when a piece of equipment is at the end of its useful life. A retrofit measure is eligible to be replaced at any time in the life of the equipment or building. Replace-on-burnout measures are generally characterized by incremental measure costs and savings (e.g., the costs and savings of a high-efficiency versus standard efficiency air conditioner); whereas retrofit measures are generally characterized by full costs and savings (e.g., the full costs and savings associated with adding ceiling insulation into an existing attic). For new construction, energy efficiency measures can be implemented when each new home or building is constructed, thus the rate of availability is a direct function of the rate of new construction.

2.1 Measure Characterization

A significant amount of data is needed to estimate the savings potential for individual energy efficiency measures or programs across the entire existing residential single-family and non-master-metered multifamily markets in New York. Data specific to New York was used wherever it was available and up-to-date. Considerable effort was expended to identify, review and document all available data sources. This review allowed for development of reasonable and supportable assumptions regarding measure lives, installed costs (where appropriate), electric and/or fossil fuel savings and saturations for each measure included in the final list of measures in this study.

Costs and savings for new construction and replace-on-burnout measures are calculated as the incremental difference between the code or standards minimum measure and the energy efficient measure cost and savings. This approach was utilized because the consumer must select an efficiency level that at least meets the minimum equipment code or standard. The incremental cost is calculated as the difference between the cost of high efficiency (HE) and standard (code compliant) equipment. However, for early retirement (retrofit) measures, cost and savings are considered to be the "full" cost of the measure, because it is common practice within retrofit programs to assume that customers would not typically replace fully functional energy using equipment before the end of its useful life. [17]

[17] In addition to second refrigerator/freezer and room air conditioner removals, other retrofit measures modeled in this study include building envelope, pipe wrap and tank wrap, water saving/aerator devises, HVAC tune-ups, and behavioral measures. Retrofit measures were modeled at full cost versus incremental cost and savings over the short (5 year) study period were based on the difference between energy usage of the existing equipment (prior to application of the new measure or behavior) versus the energy usage post application.

2.1.1 Measure Savings

Measure savings are estimates of annual measure savings as a percentage of base equipment usage. These estimates were developed from various sources, including:

- New York Technical Resource Manual (TRM)[18]
- Existing deemed savings databases
- Building energy simulation software (such as the REM/Rate model) and engineering analyses
- Secondary sources such as the American Council for an Energy-Efficient Economy (ACEEE), U.S. Department of Energy (DOE), Energy Information Administration (EIA), ENERGY STAR and other technical potential studies.
- Program evaluations conducted by utilities and program administrators

2.1.2 Measure Costs

Measure costs represent either incremental or full costs, and typically include the incremental cost of measure installation for replace-on-burnout and end of life projects. For purposes of this study, nominal measure costs were held constant over time. This general assumption is being made due to the fact that historically many measure costs (e.g., CFL bulbs, ENERGY STAR appliances) have declined over time, while some measure costs have increased over time (e.g., fiberglass insulation). Cost estimates were obtained from the following types of data sources:

- Existing deemed savings databases
- Secondary sources such as ACEEE, ENERGY STAR, National Renewable Energy Laboratory (NREL), Northeast Energy Efficiency Partnerships (NEEP), Northwest Energy Efficiency Alliance (NEEA), incremental cost study reports and other technical potential studies
- Retail store pricing (such as websites of Home Depot and Lowe's) and industry experts
- NYSERDA evaluation and market assessment reports
- RS Means[19] cost data and RS Means city cost indexes to allow for adjustments of cost differences by region within the State

[18] New York Department of Public Service, 2010. *New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs Residential, Multi-Family, and Commercial/Industrial Measures.* Prepared by New York Advisory Evaluation Contractor Team: TecMarket Works.

[19] RS Means is the name of the company that produces the RS Means Estimation Database for construction costs used by both public and private stakeholders to help estimate and control costs like labor, materials, overhead, etc.

When assessing which of these data sources to utilize, priority was placed on the source(s) that would yield the most current, New York-relevant value possible for each individual measure. This data source prioritization approach was also used for determining measure life assumptions. A measure assumption source list is provided in the following section.

2.1.3 Measure Life

Measure life represents the number of years that energy-using equipment is expected to operate. The measure life estimates have been obtained from the following data sources:

- Evaluation reports and other program TRMs.
- Savings calculators and life-cycle cost analyses.
- The California Database for Energy Efficient Resources (DEER) database.
- Secondary sources such as ACEEE, ENERGY STAR and other technical potential studies.
- Manufacturer data.
- Other research and technical reports on energy efficiency programs and measures.

2.1.4 Baseline and Efficient Technology Saturations

To assess the amount of energy efficiency savings still available, estimates of the current saturation of baseline equipment and energy efficiency measures are necessary. These estimates were acquired through three methods:

- Telephone and Web surveys of single and multifamily homes. [20]
- On-site inspections at a sub-sample of homes derived from those telephone and Web surveys.[20]
- HVAC contractor surveys. [21]

Other sources included:

- NYSERDA evaluation and market assessment reports.
- New York and regional market characterization studies.
- Other recently completed energy-related saturation surveys.
- 2009 EIA Residential Energy Consumption Survey (RECS).

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20 As described in Volumes 1and 2 of this report.

21 As described in Volume 3 of this report.

2.1.5 Measure Baseline Value Determination

Through careful review and assessment of the multiple sources previously noted were identified for each of the nearly 900 individual measures, as the basis for deriving energy savings. Table 6 provides a high-level summary of the data sources used to develop baselines for each measure end-use category. More details on measure-specific baselines and data sources is provided in tables included in Appendix A.

Table 6. High-Level Summary of Baseline Assumptions – By End-Use Category

Measure/End-Use Category	Baseline Data Sources/Assumptions
Appliances	Weighted average efficiency of standard efficiency appliances from telephone and Web surveys and on-site inspections Deemed values NY Technical Reference Manual (NY TRM) Standard efficiency from ENERGY STAR appliance calculator Federal standards for new construction
Electronics	NYSERDA Advanced Power Strip Research Report (APSRR) ENERGY STAR Office Equipment calculator ENERGY STAR Appliance calculator
Lighting	Telephone and Web survey and on-site inspection data, where available Replacement of standard incandescent and other specialty interior & exterior bulbs with energy efficient counterparts (recognizing raised baseline to 29, 43, 53, & 72W halogen bulbs as new replacement standard) NMR Hours of Use (HOU) Study
Water Heating	Telephone and Web survey and on-site inspection data, where available Deemed values NY TRM algorithms Standard EF's (various configurations and fuel types, single and multifamily) Minimum pipe wrap lengths Average shower durations Standard showerhead and faucet aerator gallons per minute, minutes per day, gallons per year Massachusetts Technical Reference Manual (MA TRM)
Modeling and Building Envelope /HVAC Impacts	Baseline information on ceiling, attic, wall, foundation insulation levels, thermostats, heating, cooling and water heating equipment, ducts, air infiltration, windows, exterior doors based on phone and on-site inspection data, where available Models were weighted by climate zone, model type (1 story or 2 story) and equipment Each climate zone, was calibrated for base usage for boiler and furnace equipment types and average fuel usage for smaller and larger homes The base models used the insulation efficiencies and heating equipment from the on-site inspections The models used the American Fact Finder to allocate household heating fuel per climate zone, bedrooms by climate zone with 1 or 2 bedroom for 1 story and 3+ bedroom for 2 story for model allocation and phone survey equipment allocation for boiler, furnace, electric resistance or electric heat pump The multifamily used a high rise and low rise model allocation for calibration of base usage
HVAC Equipment	HVAC equipment measures calibrated in model using standard baselines from on-site inspection data Minimum federal standard Seasonal Energy Efficiency Rating (SEER), Annual Fuel Utilization Efficiency (AFUE) values
Other (Pools, Wells and Behavioral)	Standard gallons per minute, hours of operation per year Opinion Dynamics Corporation (ODC) Mass Indirect Feedback Evaluation and proxy natural gas indirect feedback evaluation
New Construction	Baseline for all is International Energy Conservation Code (IECC) 2009 NYS TRM Appendix A Minimum federal standards

2.1.6 Load Forecast Determination

To ensure consistency and comparability with the recently completed long-term energy efficiency potential study, load forecasts specified within that study were utilized.[22] The long-term potential study provided separate sales forecasts for electricity, natural gas and other fossil (petroleum) fuels. The electricity residential forecast was a single statewide forecast that covered the period from 1990 to 2035. The natural gas and petroleum fuels forecasts ran for the period 2013 through 2035, with separate forecasts for the following four regions of New York State:

- Upstate
- Hudson Valley
- New York City
- Long Island

To prepare the sales forecasts from the long-term potential study for use in this short-term (three and five year) residential potential study effort, the statewide electric sales forecast was allocated across New York's three climate zones (4, 5 and 6) using U.S. Census data. The sales forecast from the long-term potential study was divided up by the three climate zones based on their household population percentage relative to the entire state. Similarly, the regional natural gas and petroleum fuels forecasts from the long-term study were allocated to climate zones.

22 NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State, Volume 1: Study Overview*. NYSERDA Report 14-19. Prepared by Optimal Energy, American Council for an Energy-Efficient Economy and Vermont Energy Investment Corporation.

Figure 6. Climate Zone Map for New York State

Source: 2009 IECC Climate Zone Map – New York State, www.energycode.pnl.gov.

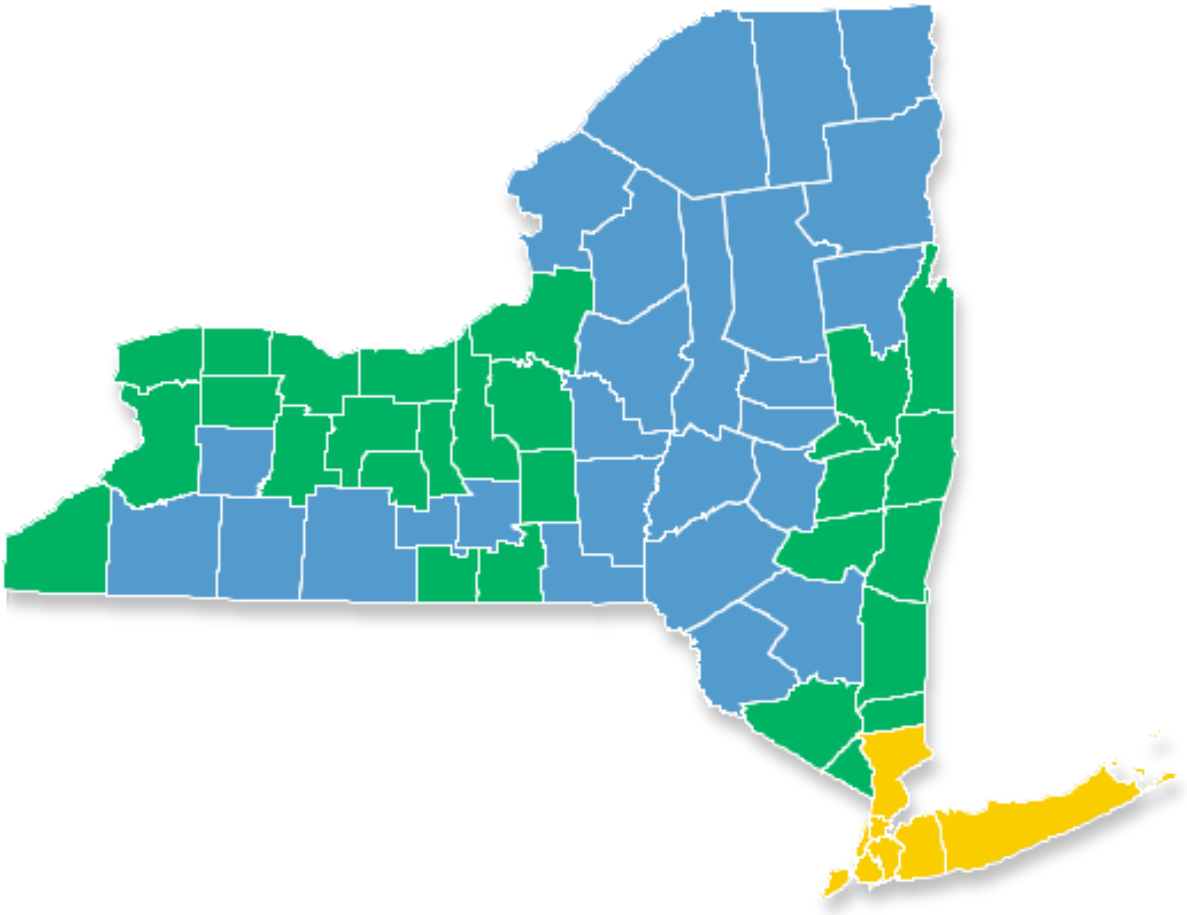

Table 6. New York State Climate Zone by County

Source: http://energycode.pnl.gov/EnergyCodeReqs/?state=New%20York)

Climate Zone 4			
Bronx	Nassau	Queens	Suffolk
Kings	New York	Richmond	Westchester
Climate Zone 5			
Albany	Erie	Ontario	Saratoga
Cayuga	Genesee	Orange	Schenectady
Chautauqua	Greene	Orleans	Seneca
Chemung	Livingston	Oswego	Tioga
Columbia	Monroe	Putnam	Washington
Cortland	Niagara	Rensselaer	Wayne
Dutchess	Onondaga	Rockland	Yates
Climate Zone 6			
Allegany	Franklin	Montgomery	Sullivan
Broome	Fulton	Oneida	Tompkins
Cattaraugus	Hamilton	Otsego	Ulster
Chenango	Herkimer	Schoharie	Warren
Clinton	Jefferson	Schuyler	Wyoming
Delaware	Lewis	St. Lawrence	
Essex	Madison	Steuben	

Table 7 provides a summary of the 2013–2018 sales forecasts by energy type, taken from the long-term potential study for use in this study.

Table 7. Electric, Natural Gas and Petroleum Fuel Sales Forecasts by New York Climate Zone [23]

Year	Statewide			Climate Zone 4			Climate Zone 5			Climate Zone 6		
	Electric GWh	Gas TBtu	Fossil TBtu	Electric GWh	Gas TBtu	Fossil TBtu	Electric GWh	Gas TBtu	Fossil TBtu	Electric GWh	Gas TBtu	Fossil TBtu
2013	50,388	399.7	137.5	31,349	146.3	53.0	13,936	18.4	16.4	5,103	235.0	68.2
2014	50,656	399.7	134.5	31,516	146.3	51.8	14,010	18.4	16.0	5,130	235.0	66.6
2015	50,922	399.7	131.8	31,682	146.3	50.8	14,084	18.4	15.7	5,157	235.0	65.3
2016	51,188	399.7	129.3	31,847	146.3	49.8	14,158	18.4	15.4	5,184	235.0	64.1
2017	51,454	399.7	126.8	32,012	146.3	48.9	14,231	18.4	15.1	5,211	235.0	62.8
2018	51,718	399.7	124.4	32,177	146.3	48.0	14,304	18.4	14.8	5,237	235.0	61.7
Percent Change from 2013	3	0	-10									

Electricity sales are projected to increase by three percent over the five-year study period (2014–2018) from a 2013 base. While natural gas sales remain unchanged and other fossil (petroleum) fuel sales are projected to drop by 10 percent over this same period.

This forecast assumes that some factors associated with efficiency have been captured and are already embedded within the electric, natural gas, and petroleum fuel forecasts. These factors include government intervention, improved manufacturing efficiencies, building energy codes, market demand and increased energy efficient implementation through early adopters, who will implement measures without explicit monetary incentives. Additionally, the impacts of new federal government-mandated energy efficiency standards have been reflected in the baseline data for equipment unit energy consumption. [24]

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23 NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State, Volume 1: Study Overview*. NYSERDA Report 14-19. Prepared by Optimal Energy, American Council for an Energy-Efficient Economy and Vermont Energy Investment Corporation.

24 Over this short-term (5 year) study period, the most current standards are reflected in the models and held constant through 2018 – this could overestimate savings potential should standards become more efficient during the last few years of this study period.

2.2 Energy Efficiency Potential Assumptions

The main objective of this energy efficiency potential study is to quantify the technical, economic, and achievable potential for electric and non-electric (natural gas and other fossil fuels) energy efficiency savings in the State. This report provides estimates of the potential gigawatt-hour electric savings and trillion Btu non-electric savings for each level (technical, economic, and achievable) of energy efficiency potential. This section describes the key assumptions used at each stage of the analytical process to produce the various estimates of energy efficiency potential.

Energy efficiency potential studies involve a number of analytical steps to produce estimates of each type of potential: technical, economic, and achievable. Two spreadsheet-based models were used to complete all necessary analyses. Excel was used as the modeling platform to provide transparency to the estimation process and allow for simple customization based on New York's unique characteristics and the availability of specific model input data and to enable NYSERDA to update the model as the NYS residential market continues to evolve and new data becomes available.

The first spreadsheet model, referred to as the Supply Curve Model, is a repository for all measure-specific inputs, market saturation and penetration rates, and is the model where calculations for technical, economic, and achievable potential estimates are performed. This study also uses a benefit-cost screening model to assess the cost-effectiveness of all electric and non-electric energy efficiency measures being assessed within the Supply Curve Model. As discussed in more detail further in this section, the cost-effectiveness screening tool integrates measure-specific impacts and costs, customer characteristics, avoided energy cost forecasts and more. For this study, both models have been run independently, multiple times, with results from one being used as inputs to the other as technical, economic, and achievable potential scenarios were completed.

Potential studies often distinguish between several types of energy efficiency potential including: technical, economic, and achievable. Because the definition of the several types of potential can be different between studies, it is important to understand the meaning and scope of each type of potential estimate as it applies to this New York study. The first two types of potential estimated for this study, technical and economic, provide a theoretical upper bound for energy savings from energy efficiency measures. Still, even the best-designed portfolio of energy efficiency programs is unlikely to capture 100 percent of the technical or economic potential. Therefore, the achievable potential attempts to estimate what may be realistically achieved, by when, and at what cost.

2.2.7 Technical Potential

This report has used the energy efficiency potential definitions included on pages 2–4 of the November 2007 National Action Plan for Energy Efficiency (NAPEE) Guide for Conducting Energy Efficiency Potential Studies. Technical potential is the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end-users to adopt the efficiency measures. It is often estimated as a "snapshot" in time assuming immediate implementation of all technologically feasible energy saving measures, with additional efficiency opportunities assumed as they arise from activities such as new construction.[25] The savings estimates per base unit are determined by comparing the high-efficiency equipment to current installed equipment for existing household retrofits, or to current equipment code standards for replace-on-burnout and new construction scenarios.

Technical energy efficiency potential in the residential sector is calculated in two steps. In the first step, all measures are treated *independently*, which means the savings of each measure are not reduced or otherwise adjusted for overlap between competing or interacting measures. By analyzing measures independently, no assumptions are made about the combinations or order in which they might be installed in customer buildings. However, the cumulative technical potential cannot be estimated by adding the savings from the individual savings estimates because some savings would be double-counted. For example, the savings from a measure that reduces heat loss from a building, such as insulation, are partially dependent on other measures that affect the efficiency of the system being used to heat the building, such as a high-efficiency furnace; the more efficient the furnace, the less energy saved from the installation of the insulation.

In the second step, adjustments are made to account for such interactive effects. The adjustments for interactive effects were made by upgrading the baseline conditions while holding the savings percentages constant. The upgraded baseline conditions vary by measure and assume some measures (such as weatherization measures) are installed to increase the building efficiency prior to the installation of the measure that is subject to the baseline adjustment (e.g., high efficiency furnaces).

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25 National Action Plan for Energy Efficiency. 2007. "Guide for Conducting Energy Efficiency Potential Studies", pages 2-4.

2.2.8 Economic Potential

Economic potential refers to the subset of the technical potential that is cost-effective (based on screening with the Total Resource Cost (TRC) test) as compared to conventional supply-side energy resources. The TRC benefit-cost ratios were calculated for this study according to criteria developed by NYSERDA and the DPS. All measures that were not found to be cost-effective based on the results of the measure-level cost-effectiveness screening were excluded from the economic and achievable potential. Then, allocation factors were re-adjusted and applied to the remaining measures that were cost-effective within each specific end-use category.

2.2.8.1 Determining Cost Effectiveness

A detailed, Excel-based benefit-cost screening model was used to assess cost-effectiveness for all residential electric and non-electric measures included in this study. The model is comprehensive and requires the following types of data as inputs:

- Measure costs.
- Measure useful life.
- Annual energy savings.
- Load shape impacts (where applicable).
- Avoided costs of electricity for generation, transmission, and distribution.
- Avoided costs of natural gas and other fuels (propane, fuel oil, etc.).
- Avoided water costs.
- Projected or actual measure penetrations assuming no program.
- Projected or actual measure penetrations with a program.
- Participant costs.
- Program administrator (or utility) costs including rebates or financial incentives.
- Nonenergy benefits (not quantified/used in this specific study).
- Electric line losses.
- Real or nominal discount rates and inflation rate.

All cost data used in this study are reported in constant (2014) dollars.

As noted previously, the cost-effectiveness test used for this study is the Total Resource Cost (TRC) Test. The TRC test measures the net benefits of a demand-side management or energy efficiency measure or program as a resource option based on the total costs of the measure/program, including both the participants' and the utility's costs.[26]

TRC Benefits. In general, the benefits calculated in the TRC test include the avoided electric supply costs for the periods when there is an electric load reduction, savings of other resources such as fossil fuels and water, any quantifiable nonenergy benefits (operational cost reductions, health, safety, or environmental improvements) and applicable Federal and State energy efficiency tax credits. For the estimates of economic and achievable potential, the benefits are calculated using gross program savings.

TRC Test Costs. In general, the costs in the TRC test (incremental or full cost depending on whether the measure is replace-on-burnout or an early replacement/retrofit) are the program costs paid by the program administrator and the participants. Thus all equipment costs, installation, operation and maintenance, cost of removal and administration costs, no matter who pays for them (e.g., NYSERDA, utilities, customers), are included in this test. Any tax credits are considered a reduction to costs in this test. For purposes of this study, administrative costs[27] were not included for the measure cost-effectiveness screening conducted to develop the estimates of economic potential. However, as discussed in more detail in the following Achievable Potential section, administrative costs were included when estimating the cost to achieve the achievable potential base case and sensitivity scenarios.

Avoided Costs. To ensure that the appropriate forecasts of avoided costs were used in all cost-effectiveness tests, input and values provided by NYSERDA and the DPS were incorporated. Consistent with the long-term potential study, the avoided electric and fossil fuel (natural gas and other petroleum-based fuels) energy cost forecasts used in this study were developed and provided by NYSERDA through coordination with the DPS. The avoided water costs were based on best available information from within New York and neighboring states.[28] Values for avoided electric, natural gas, petroleum fuels and water

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26 California Public Utilities Commission, California Standard Practice Manual, Economic Analysis of Demand-Side Management Programs and Projects, October 2001, page 18.

27 Administrative costs include costs to design, deliver, and evaluate energy efficiency programs.

28 Separate avoided water cost estimates were developed for Climate Zone 4 and Climate Zones 5 and 6. For Climate Zone 4, avoided water costs were based on the current New York City Environmental Protection published water and sewer rates. For Climate Zones 5 and 6, avoided water costs were estimated based on the Tighe & Bond 2012 Massachusetts Water and Sewer Rates Survey, including only towns that do not break out a separate charge for sewer (http://rates.tighebond.com/index.aspx).

costs are included in the cost-effectiveness spreadsheet model provided to NYSERDA as part of this project. The real discount rate used in the calculation of the New York TRC Test is the State's mandated 5.5 percent. Avoided energy costs were time and seasonally differentiated where possible. Values for avoided capacity (summer period only), transmission and distribution costs were also developed and proved by NYSERDA through coordination with the DPS.

2.2.9 Achievable Potential

Achievable potential is determined as the amount of energy use that efficiency can realistically be expected to displace, assuming different market penetration scenarios for cost-effective energy efficiency measures. Achievable potential takes into account real-world barriers to convincing end users to adopt cost-effective energy efficiency measures, the costs of delivering programs (for administration, marketing, tracking systems, monitoring and evaluation, etc.), and the capability of programs and administrators to ramp up program activity over time.[29] Achievable potential savings is a subset of economic potential.

This potential study evaluates four achievable potential scenarios (a base case and three sensitivity scenarios) as described in more detail in the following sections. Table 8 presents a high level summary of the key variables used within each of these four achievable potential scenarios.

Table 8. Summary of Key Variables Used in Achievable Potential Scenarios

Inputs	Scenario			
	Base Case	Scenario 1	Scenario 2	Scenario 3
Real Discount Rate	5.50%	0.55%	0.55%	0.55%
Inflation Rate	2.10%	2.22%	2.22%	2.22%
Measure Installation Costs	Full or Incremental	Full or Incremental	5% Cost Reduction	5% Cost Reduction
Percent Cost Reduction				
Market Penetration Rate	50%	50%	55%	60%

[29] These definitions are from the November 2007 National Action Plan for Energy Efficiency "Guide for Conducting Energy Efficiency Potential Studies".

2.2.9.1 Base Case Scenario

For the base case, achievable potential represents the amount of energy use that efficiency can realistically be expected to displace assuming support from public, utility, and other program channels that effectively reduces or covers 50 percent of the full or incremental measure cost (depending on retrofit or replace-on-burnout measure) and no spending cap. The 50 percent incentive is a proxy for incentive levels provided as part of current residential energy efficiency programs being delivered by multiple program administrators across the State. This 50 percent value is consistent with the incentive level assumption used in the long-term study, and has also been a typical base case achievable potential assumption used in a majority of the studies conducted nationwide over the past five or more years.

In addition to the 50 percent contribution toward total installed measure cost, this base case scenario assumes that only 50 percent market adoption of the total economic potential for individual measures can be achieved within the five year study period. The basis for this assumption is an engineering best estimate recognizing that some measures are already well along the market adoption curve, while others may struggle to achieve a 50 percent target within the next five years. Once the total number of measures eligible to be installed over the five-year analysis time frame is determined, a market adoption rate is assigned to each measure. The market adoption rates applied to each measure is modeled, starting at the measure's current field-documented market penetration rate, to approach the scenario specific market penetration (50% base-case and Scenario 1, 55% Scenario 2 and 60% Scenario 3) in Year 5 of the study. For robust markets that have measures already above the targeted adoption rate, the measures are considered to continue to maintain the level of market penetration for that measure. For example, the current penetration of efficient dishwashers is continued at its current efficiency market adoption rate of 64 percent.[30]

Although this methodology simplifies what an adoption curve would look like in practice, it succeeds in providing a concise and replicable method for estimating achievable savings potential over a specified period of time.

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30 During this five year study period, for any end-of-life replacements associated with measures already above the 50 percent efficient measure market penetration target, for dishwashers, the model assumes for each year of the study that the current market penetration (64% for dishwasher measures) of the replacement units being installed would be energy efficient units.

For new construction, by definition, energy efficiency measures are best implemented when each new home or building is constructed, thus the rate of availability is a direct function of the rate of new construction. For existing buildings, determining the annual rate of availability of savings is more complex. Energy efficiency potential in the existing stock of buildings has been captured in the supply curve model for this project over time through two principal processes:

- As equipment replacements are made normally in the market when a piece of equipment is at the end of its effective useful life (referred to as "replace-on-burnout").
- At any time in the life of the equipment or building (referred to as "retrofit").

For the replace-on-burnout measures, existing equipment is assumed in this study to be replaced with high-efficiency equipment at the time a consumer is shopping for a new appliance or other energy consuming equipment. Using this approach, only equipment that needs to be replaced in a given year is eligible to be upgraded to energy efficient equipment. For the retrofit measures, savings can theoretically be captured at any time; however, in practice, it takes many years to retrofit an entire stock of buildings, even with the most aggressive of energy efficiency programs.

In the residential base-case scenario, achievable potential represents the attainable savings if the market penetration of high-efficiency appliances and equipment reaches a certain percentage of the eligible market between 2014 and 2018. The timeframe in which the market penetration target is met, however, differs between replace-on-burnout and retrofit measures. For example, in a retrofit measure, more of a market can be replaced sooner because the installation does not depend on waiting for a specific measure to burn out. In this study, the following market adoptions assumptions were used when modeling residential replace-on-burnout, retrofit, and new construction measures:

- For replace-on-burnout measures, a fraction of the total eligible market can be achieved annually over the course of the technology's useful life. For example, if a measure has a 10-year useful life, only about half of the existing units would be expected to burnout during a 5-year timeframe.
- For all retrofit measures, the analysis assumes fewer adoption barriers and the target market penetration for retrofit opportunities can likely be achieved by 2018 regardless of measure lifetime.
- For measures installed in new construction, the savings occur as new buildings are constructed and completed, up to the 50 percent efficient market penetration target by 2018.

2.2.9.2 Sensitivity Scenario 1

For this scenario, the Real Discount Rate used in the Base-Case Achievable Potential scenario (5.5 percent, taken from the value used in NYSERDA's earlier long-term potential study) is reduced to 0.55 percent. This lower real discount rate is consistent with, but slightly higher than the 2014 real discount rates specified for use in the White House Office of Management and Budget's Memo for Heads of Departments and Agencies "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (http://www.whitehouse.gov/sites/default/files/omb/memoranda/2014/m-14-05.pdf).[31] It was chosen to be reflective of the current financial discount rates being used for cost-effectiveness assessment purposes in neighboring jurisdictions and is equivalent to a 2.78 percent nominal discount rate at 2.22 percent inflation.

2.2.9.3 Sensitivity Scenario 2

For this scenario, in addition to locking in the lower discount rate, it is assumed that NYSERDA and other efforts in the state to animate the market will effectively reduce efficient end-use installed measure costs and increase market penetrations by 5 percent across the board by 2018.

The 5 percent reduction in installed measure costs was selected to reflect a reasonable, but aggressive level of cost reduction potential achievable over a five year period. The reduction assumes successful implementation of programs that collectively reduce the soft costs associated with measure specification and installation as well as increase consumer demand for more efficient measures, thereby driving down manufacturing and distribution costs.

The 5 percent increase in market penetration of installed measures was selected to reflect a reasonable but aggressive level of penetration increase above the base case scenario due to successful implementation over the next five years of programs designed to bust barriers currently impacting measure interest and uptake among key market actors.

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31 The White House Memo specified a -0.7 percent real discount rate (based on the real interest rates on treasury notes and bonds of specified maturities) for three-year maturities, 0.0 percent for five years, 0.5 percent for seven years and 1.0 percent for 10 years. The Massachusetts regulators specify 0.55 percent as the current real discount rate for use in energy efficiency benefit-cost analyses.

2.2.9.4 Sensitivity Scenario 3

For this scenario, in addition to locking in the lower discount rate and 5 percent reduction in installed measure cost, it is assumed that NYSERDA and other program efforts in the state will increase market penetrations by 10 percent across the board by 2018. This additional 5 percent increase in market penetration (10 percent by 2018) would require an extremely aggressive barrier busting effort over the next five-year period and was selected to represent the high end of reasonableness. No additional decrease in installed measure cost beyond Sensitivity Scenario 2 was used for this scenario, because a 5 percent reduction in costs is already a significant target.

Finally, supply curves were developed to show the amount of energy efficiency savings available at different levelized cost per kilowatt-hour savings levels. A supply curve typically consists of two axes; one that captures the cost per unit of saving a resource (e.g., dollars per lifetime kWh or MMBtu saved) and another that shows the amount of savings that could be achieved at each level of cost. The curve is built up across individual measures that are applied to specific base case practices or technologies by market segment. Savings measures are sorted based on a metric of cost (in constant dollars). Costs are annualized (often referred to as levelized) in supply curves. For example, electric energy efficiency supply curves usually present levelized costs per lifetime kilowatt-hours saved by multiplying the initial investment in an efficient technology or program by the capital recovery rate (CRR), and then dividing that amount by annual kilowatt-hour savings. Total savings available at various levels of cost are calculated incrementally with respect to measures that precede them. Supply curves typically, but not always, end up reflecting diminishing returns, i.e., costs increase rapidly and savings decrease significantly at the end of the curve (Figure 9and Figure 10) in the following section of the report show supply curves for Sensitivity Scenario 1 results calculated for this project).

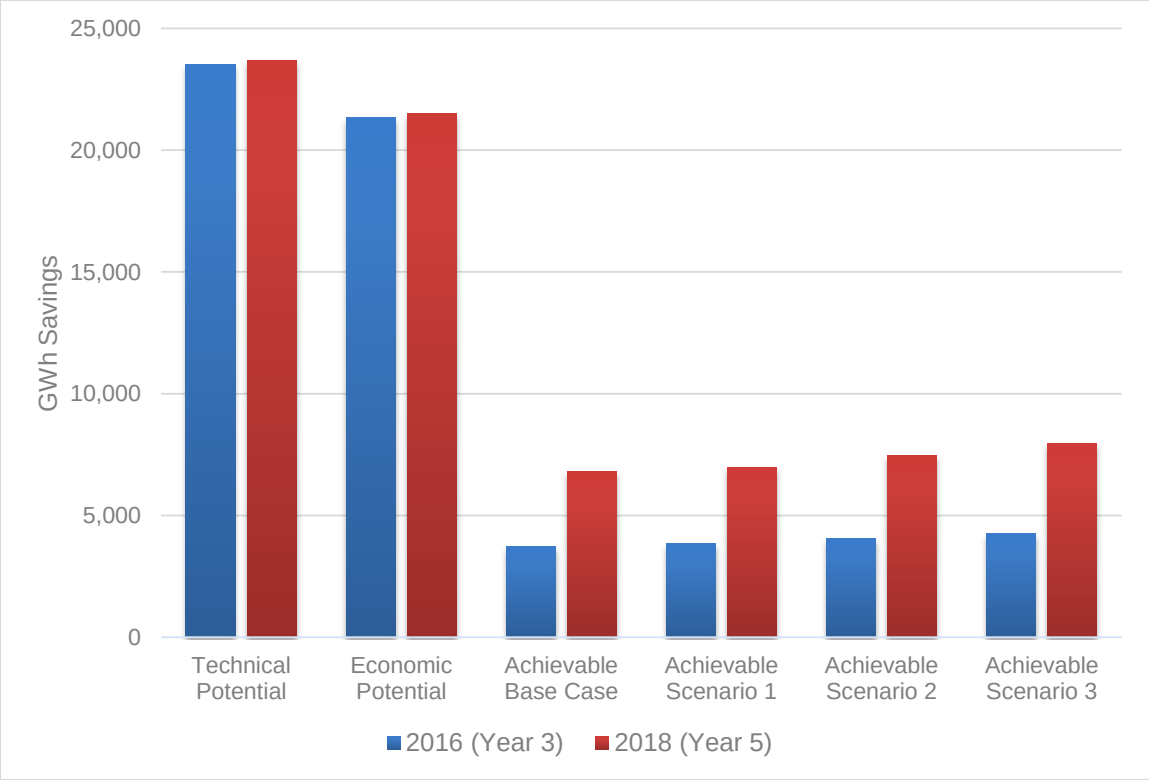
This section provides electric and fossil fuel (natural gas and petroleum fuel) energy efficiency potential estimates for the residential sector in New York, which includes all residential single-family and multifamily nonmaster-metered buildings.

2.3 Residential Potential Study Details

Figure 7 and Figure 8 show the 2016 and 2018 technical, economic, and achievable energy savings potential results, including the base-case achievable potential and the three achievable potential sensitivity scenarios, for both the electric and non-electric residential sectors in New York. Figure 7 shows the technical and economic potentials for electric energy savings for 2016 and 2018 exceed 40 percent of the State's projected residential single-family and multifamily (nonmaster-metered) electric energy sales.

Figure 7 also shows the achievable electric energy savings ranges from 13 to 15 percent of projected 2018 electric energy sales (between 7 and 9 percent of 2016 sales). Figure 8 shows more than 25 percent of the technical potential for energy savings in 2016 and 2018 is non-electric savings. The portion of this non-electric potential that is cost-effective (economic potential) is estimated to be approximately 11 percent. The achievable potential ranges from 5 to nearly 7 percent of non-electric energy sales in 2018 (approximately 3 to 3.5 percent in 2016).

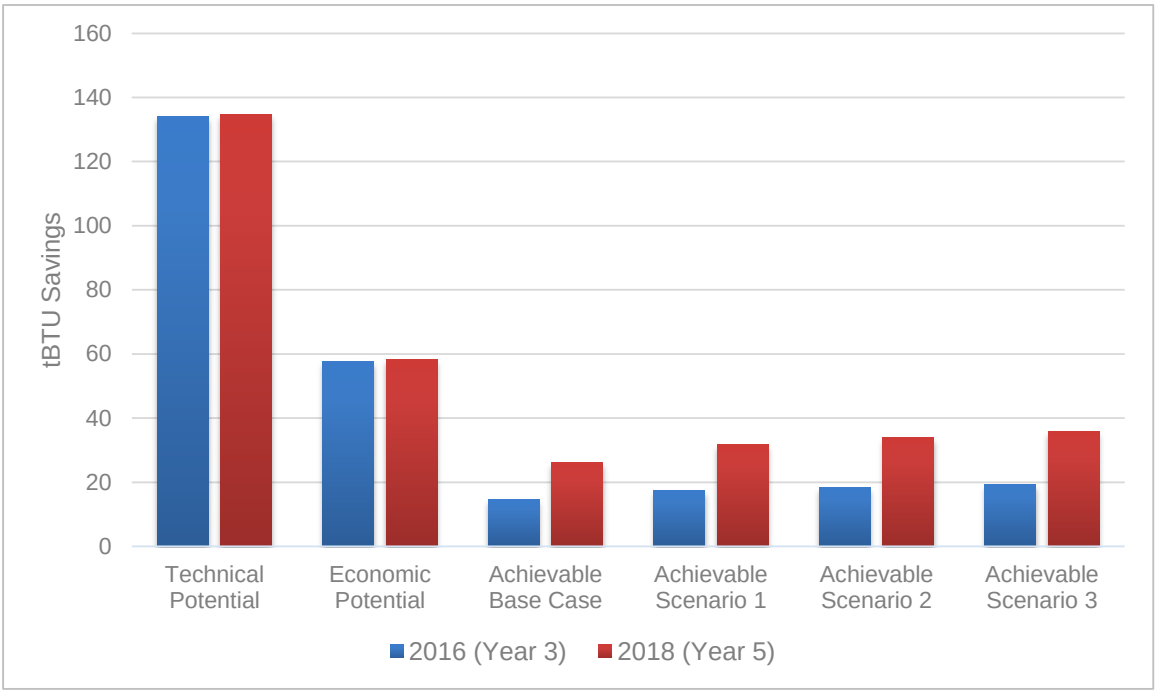
Figure 7. Residential Electric Savings Potential Results Comparison



Electric Sales - Residential Single Family & Multifamily	
2016 GWh (Annual Sales in Year 3)	51,188
2018 GWh (Annual Sales in Year 5)	51,718

Electric Energy Efficiency Potential (GWh)						
Statewide Potential	**Technical Potential**	**Economic Potential**	**Achievable Base Case**	**Achievable Scenario 1**	**Achievable Scenario 2**	**Achievable Scenario 3**
Cumulative Savings by 2016 (Year 3)	23,521	21,364	3,754	3,856	4,060	4,265
Cumulative Savings by 2018 (Year 5)	23,692	21,494	6,795	6,996	7,469	7,953
Electric Energy Efficiency Potential (Percent of Residential Sector Sales)						
Percent of 2016 Annual Sales	45.9	41.7	7.3	7.5	7.9	8.3
Percent of 2018 Annual Sales	45.8	41.6	13.1	13.5	14.4	15.4

Figure 8. Residential Non-Electric Savings Potential Results Comparison



Non-electric Sales - Residential Single Family & Multifamily	
2016 TBt (Annual Sales in Year 3)	529
2018 TBtu (Annual Sales in Year 5)	524

Non-electric Energy Efficiency Potential (TBtu)						
Statewide Potential	**Technical Potential**	**Economic Potential**	**Achievable Base Case**	**Achievable Scenario 1**	**Achievable Scenario 2**	**Achievable Scenario 3**
Cumulative Savings by 2016 (Year 3)	134	58	15	17	18	19
Cumulative Savings by 2018 (Year 5)	135	58	26	32	34	36
Non-electric Energy Efficiency Potential (Percent of Residential Sector Sales)						
Percent of 2016 Annual Sales	25.3	10.9	2.8	3.3	3.5	3.6
Percent of 2018 Annual Sales	25.7	11.1	5.0	6.1	6.5	6.9

These figures show a substantial difference between the economic and achievable base case potential, from over 41 percent to 13 percent in 2018 for electric energy savings, and from 11 percent to 5 percent for non-electric energy savings. The drop between economic and achievable potential recognizes that the economic potential assumes immediate implementation of energy efficiency measures, with no regard for the gradual "ramping up" process of real-life programs. In addition, the economic potential only considers the costs of efficiency measures themselves, ignoring any market barriers and programmatic costs (e.g., marketing, analysis, administration, program evaluation) that would be necessary to capture them.

2.3.10 Characteristics of Energy Efficient Measures

The key assumptions introduced in Table 4 are expanded in Table 9. Of note, 437 residential electric and 462 residential non-electric energy efficiency measures or programs (899 total residential measures) were included in the analysis for this New York residential sector, short-term energy efficiency potential study. When developing this list, a more comprehensive focus was given to electric and natural gas measures than for fuel oil and propane. The large number of building envelope and space conditioning measures shown in these tables is due to the need for multiple, individual measures to allow for appropriate modeling and analysis within each of New York's three separate climate zones (with different savings and cost implications by climate zone and for new construction versus retrofit applications). Ultimately one measure was selected for each specific prototype home based in each climate zone from the comprehensive list of measure types when calculating savings potentials.

Table 9. Summary of Residential Measures

Measure/End-Use Type	Number of Measures on List
Building Envelope	216 (72 electric, 144 non-electric)
Space Conditioning (heating/cooling)	261 (99 electric, 162 non-electric)
Water Heating	144 (40 electric, 104 non-electric)
Lighting	60 electric
Appliances	84 electric
Electronics	36 electric
Other (pools, feedback, etc.)	44 (28 electric, 16 non-electric)
New Construction	54 (18 electric, 36 non-electric)
Total	899 (437 electric, 462 non-electric)

Data were collected on the energy savings, incremental costs, useful lives, and other key "per unit" characteristics of each of these residential electric and non-electric energy efficiency measures. Estimates of the size of the eligible market were also developed for each efficiency measure. For example, electric water heater efficiency measures are only applicable to those homes in New York that have electric water heaters. A comprehensive list of all the electric and non-electric residential sector measures assessed as part of this technical, economic and achievable potential study is presented in Appendix B. More details on measure-specific assumptions (costs, savings, lives, saturations, etc.) and data sources can be found within the supply curve and cost-effectiveness screening models provided to NYSERDA as part of this project.

Appendix C shows the contribution that each residential electric and non-electric energy efficiency measure analyzed in this study provides toward the technical, economic, base case, and the three sensitivity scenario achievable energy savings potentials. For each electric end-use measure category, Table 10 shows the top three measures and their percentage contribution within their measure end-use category to the achievable potential (Scenario 1). For the lighting end use, which makes up over 36 percent of the total Sensitivity Scenario 1 Achievable Potential, the top three measures contributing to this savings are ENERGY STAR-specialty CFLs installed in single-family and multifamily applications and screw-in LED lighting installations in single-family homes.

A similar summary for the non-electric measures is presented in Table 11. By focusing on the measure end uses that contribute the most toward the total achievable savings potential (Scenario 1) and then identifying the measures within that end-use category showing greatest potential for savings, programs can be designed to maximize savings achieved at the lowest possible cost.

To summarize, a majority (66 percent) of the achievable electric energy savings comes from lighting, building envelope improvements and electric appliance end uses, at 36, 15, and 13 percent, respectively. For natural gas savings, a majority (82 percent) of the achievable potential comes from building envelope, water heating, and HVAC equipment end uses, at 38, 24 and 20 percent, respectively. For petroleum fuel savings, a majority (89 percent) of the achievable potential comes from building envelope, HVAC equipment, and water heating end-uses, at 64, 16, and 9 percent, respectively.

One reason for the substantial potential for energy savings through building envelope improvements is the aging residential building stock in New York. More than 75 percent of all single-family homes currently in existence across the State were built before 1980, making them 35 years and older. Increased focus on overcoming barriers in this market and promote installation of air sealing and insulation measures could yield valuable energy savings results.

Behavioral feedback measures also show a high percentage of savings potential for both electric and non-electric measures (9.2 and 16.3 percent respectively), especially within the multifamily building sector.

As would be expected, each of the sensitivity scenarios run against the achievable potential base case show slight increases in the 2016 and 2018 energy savings opportunities, peaking at over 15 percent by 2018 for electric energy savings potential and nearly 7 percent of projected non-electric energy sales.

Table 10. 2018 Residential Electric Energy Efficiency Savings Potential – Top Three Measures by End-Use

Lighting (36.3 Percent of total Scenario 1 Savings)	
ENERGY STAR Specialty CFL Single Family (SF)	19.2%
LED Lighting (screw-in) ; 2013-2019 SF	13.5%
ENERGY STAR Specialty CFL Multifamily (MF)	7.8%
Building Envelope (14.7 Percent of total Scenario 1 savings)	
Improved Air Sealing SF Climate Zone 4	10.5%
Improved Air Sealing SF Climate Zone 5	9.7%
Storm Windows SF Climate Zone 4	7.4%
Appliances (13.0 Percent of total 2018 Scenario 1 savings)	
Refrigerator Retirement (and Recycling) - No Replacement SF	46.4%
Freezer Retirement (and Recycling) - No Replacement SF	23.5%
Energy Star Refrigerator SF	7.5%
Electronics (11.7 Percent of total 2018 Scenario 1 savings)	
"Smart Strip" Plug Outlet, 7-plug SF	23.7%
ENERGY STAR Desk Top	13.5%
"Smart Strip" Plug Outlet, 7-plug MF	11.3%
Behavioral (9.2 Percent of total 2018 Scenario 1 savings)	
Indirect Energy Consumption Feedback MF (Natural Gas) NG	24.5%
Indirect Energy Consumption Feedback MF (Petroleum) PET	14.1%
Direct Feedback Devices (In Home Display) (Electric) MF	12.8%

Table 10 continued

HVAC Equipment (6.5 Percent of total 2018 Scenario 1 savings)	
Room AC Recycling SF Climate Zone 4	25.7%
Room AC SEHA Tier 1 (11.3 EER) SF Climate Zone 4	14.5%
Ductless Minisplit CEE Tier 2 EER 12.5, SEER 15 SF Climate Zone 4	10.8%
Water Heating (5 Percent of total 2018 Scenario 1 savings)	
High Efficiency Storage Tank Water Heater - HPWH EF 2.3 (Tier II) SF	15.5%
High Efficiency Storage Tank Water Heater - HPWH EF 2.0 (ES/Tier I) SF	13.9%
Pipe Wrap (Electric) SF	10.8%
New Construction (1.9 Percent of total 2018 Scenario 1 savings)	
New Construction Better than Code envelope SF Climate Zone 4 32	28.4%
New Construction Better than Code envelope SF Climate Zone 5	22.0%
New Construction Better than Code HVAC MF Climate Zone 4 NG	7.4%

Table 11. 2018 Residential Non-electric Energy Efficiency Savings Potential – Top Three Measures by End Use

Building Envelope (37.7 Percent natural gas, 63.8 Percent petroleum savings from 2018 Scenario 1)	
Improved Air Sealing SF NG Climate Zone 5	9.7%
Improved Air Sealing SF PET Climate Zone 4	8.9%
Improved Attic/Roof Insulation (R19 to R49) SF PET Climate Zone 4	5.6%
Water Heating (24.4 Percent natural gas, 15.6 Percent petroleum savings from 2018 Scenario 1)	
Pipe Wrap (Natural Gas) SF NG	11.7%
Combination Heat/Hot Water (Natural Gas Boiler) SF NG	9.1%
Tank Wrap (Natural Gas) SF NG	8.7%
HVAC (19.7 Percent natural gas, 9.2 Percent petroleum savings from 2018 Scenario 1)	
Boiler Reset Controls (Gas) SF NG CZ4	21.4%
Boiler Reset Controls (Petroleum) SF PET CZ4	21.4%
High Efficiency Gas Furnace 96 AFUE SF NG CZ5	6.9%

32 Building envelope and HVAC improvements "better than code" could include increasing attic/roof insulation from R19 to R38+, improving wall/foundation and rim insulation above code requirements, performing air and duct sealing, and installing high efficiency furnaces or boilers with AFUE's of 90 to 95 or more.

Table 11 continued

Behavioral (16.3 Percent natural gas, 9.1 Percent petroleum savings from 2018 Scenario 1)	
Indirect Energy Consumption Feedback (Natural Gas) MF NG	36.5%
Indirect Energy Consumption Feedback (Natural Gas) SF NG	26.6%
Indirect Energy Consumption Feedback (Petroleum) MF PET	21.6%
Appliances (1.2 Percent natural gas, 1.4 Percent petroleum savings from 2018 Scenario 1)	
CEE Tier 3 Clothes Washer (with natural gas WH) SF NG	15.5%
CEE Tier 2 Clothes Washer (with natural gas WH) SF NG	15.2%
Energy Star Electric Clothes Washer (with natural gas WH) SF NG	14.9%
New Construction (0.6 Percent natural gas, 0.9 Percent petroleum savings from 2018 Scenario 1)	
New Construction Better than Code envelope SF CZ4 PET [33]	30.0%
New Construction Better than Code envelope and HVAC SF CZ4 PET	16.3%
New Construction Better than Code envelope SF CZ5 PET	11.3%

2.3.11 Residential Energy Efficiency Measure Supply Curves

This report also presents results in the form of electric and non-electric energy efficiency supply curves. As noted previously, the advantage of using an energy efficiency supply curve is that it provides a clear, easy-to-understand framework for summarizing a variety of complex information about energy efficiency technologies, their costs, and the potential for energy savings. Properly constructed, an energy-efficiency supply curve avoids the double counting of energy savings across measures by accounting for interactions between measures. The supply curve also provides a simplified framework to compare the costs of energy efficiency measures with the costs of energy supply resources.

The supply curves for residential electric and non-electric energy efficiency savings are shown in Figure 9 and Figure 10, respectively. These supply curves were built up across individual measures and were sorted on a lowest to highest cost basis per unit of energy saved. As shown in these figures, nearly 12 percent of the projected 2018 residential sector gigawatt-hour sales could be offset by installing electric efficiency measures at a levelized cost of less than 10 cents per kWh (nearly 10 percent for under

[33] Building envelope and HVAC improvements "better than code" could include increasing attic/roof insulation from R19 to R38+, improving wall/foundation and rim insulation above code requirements, performing air and duct sealing, and installing high efficiency furnaces or boilers with AFUE's of 90 to 95 or more.

five cents per kWh). Nearly 6 percent of the projected maximum achievable cost-effective savings potential from non-electric efficiency measures could be obtained at a levelized cost of less than $25 per MMBtu (nearly 4 percent under $10).

Figure 9. New York Residential Electric Efficiency Supply Curve – Achievable Potential

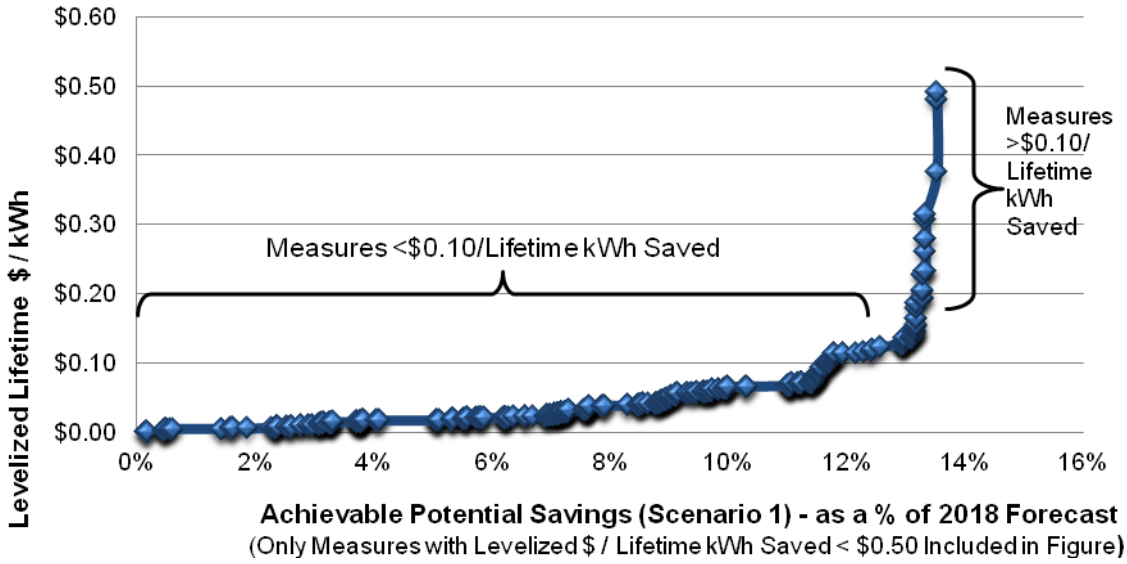
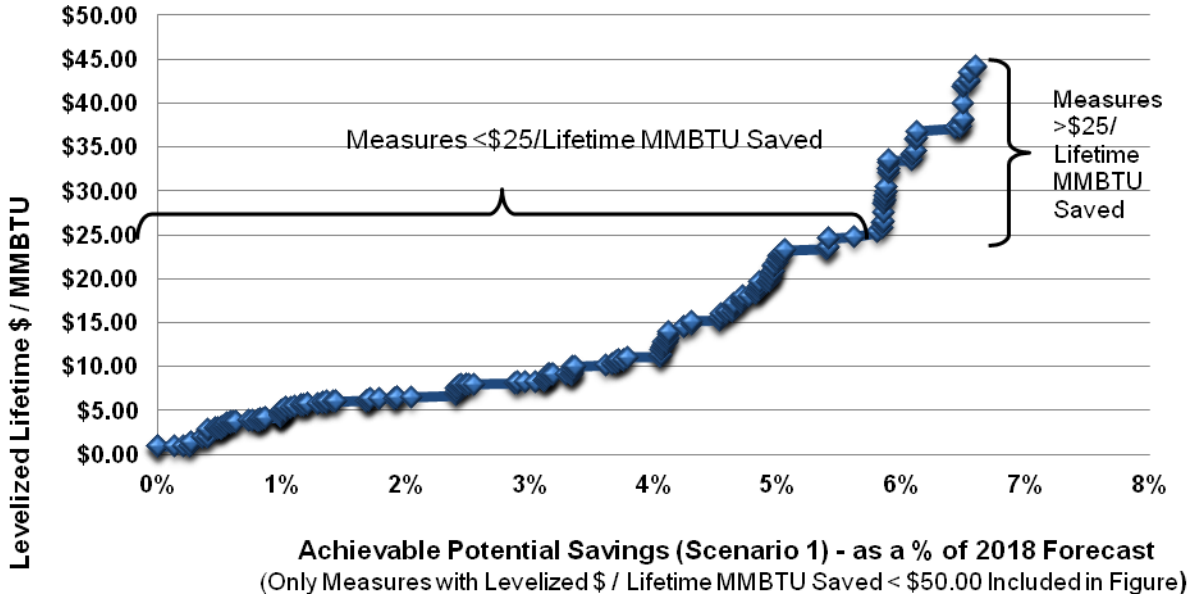


Figure 10. New York Residential Non-electric Supply Curve – Achievable Potential



2.4 Conclusions

- Substantial achievable potential remains for energy efficiency improvements in New York's residential single-family and multifamily (nonmaster-metered) buildings sectors.
    - By 2016 (3 year): 7.5 percent electric and 3.3 percent non-electric savings, based on Achievable Potential Sensitivity Scenario #1 (lower discount rate) (4.3 percent total)
    - By 2018 (5 year): 13.5 percent electric and 6.1 percent non-electric savings, based on Achievable Potential Sensitivity Scenario #1 (lower discount rate)(8 percent total) [34]
- The best region within the State from which to tap this potential exists in Climate Zone 4, although the unique challenges of delivering energy efficiency within the New York City, Westchester County, and Long Island regions would need to be effectively identified, addressed and overcome.
- Nearly 10 percent of total 2018 residential electric sector sales can be achieved at a lifetime levelized cost of less than $0.05/kWh for electric measures.
    - Electric measure areas with the greatest opportunities for cost-effective, achievable savings include: lighting, building envelope and appliances (with focus on removal of second refrigerators, freezers and room air conditioners).
- Over four percent of total 2018 residential non-electric sector sales can be achieved for less than $10/MMBtu for non-electric measures.
    - Non-electric measure areas with the greatest opportunities for cost-effective, achievable savings include: building envelope, water heating, and HVAC.
- Behavioral measures, especially within the multifamily building sector also show promise for cost-effective achievable energy savings over this short-term (2014 to 2018) study period.
- If the soft costs and other installed costs of measures across the marketplace decrease by 5 percent and continued support for energy efficiency successfully increases the market penetration of efficient residential energy using equipment by 10 percent, the State has the potential to see even greater savings – over 15 percent of 2018 electricity sales and approximately 7 percent of 2018 non-electric sales.
- Incorporating strategies for lowering the installed cost and increasing market penetration of the high potential electric and non-electric measures identified in this study could be a very effective avenue to consider as new programs are developed in New York under the proposed Clean Energy Fund and Reforming Energy Vision.

[34] To convert electric savings into common unit Btu's a conversion factor of 3,412.142 Btu/kWh was used.

Appendix A: Methodology

This appendix provides more detail on approach and methodologies used to complete the following tasks:

- Reviewing existing data sources.
- Identifying primary research needs.
- Energy Efficiency Measure Database Development.
- Load forecast development.
- Assessment of residential energy efficiency potential.

A.1 Review of Data Sources

The data sources listed in this section were reviewed to identify relevant resources to aid in development of the short-term (three and five year) energy efficiency potential assessment. These secondary data sources provided valuable insights and characterization of the residential single-family and multifamily markets. The sources, in combination with primary data collected from telephone and Web surveys and on-site inspections, provided New York-relevant baseline information that helped to inform development and refinement of a comprehensive list of efficiency measures used in the potential assessment; including cost, savings, and measure life. Additional information from NYSERDA and other New York State program administrators relating to other relevant residential market research, equipment saturations, energy end-use surveys and baseline studies were also solicited to assist in the establishment of the baseline, saturation, and penetration of measures important to quantify as part of this effort.

Summary information is provided on data sources reviewed in each of the following categories:

- Technical reference manuals (TRMs).
- Energy consumption and census resources.
- Cost and savings resources.
- Technical potential and baseline studies.
- Saturation and penetration resources.
- Other NYSERDA and utility studies.

A.1.1 Technical Reference Manuals

The New York Technical Reference Manual (TRM) was a primary source for the compilation of measures, savings algorithms, modeling, and measure lives. A number of other technical reference manuals were reviewed and provided supplemental information as noted here.

New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs, October 2010, TecMarket Works (New York TRM). This resource provides detailed savings algorithms for single-family and multifamily measures, prototypical building descriptions and detailed assumptions for homes by vintage and area. For this study, New York TRM data supplemented data collected through primary sources. It also served as the main source of algorithms used to calculate savings from the prototypical baseline single-family and multifamily homes.

Technical Reference Manual: State of Pennsylvania, 2013, Pennsylvania Public Utility Commission. This TRM provided additional algorithms for electric energy savings measures in the rare occasion when New York specific data was unavailable.

Massachusetts Technical Reference Manual for Estimating Savings from Energy Efficiency Measures, October 2012, Massachusetts Electric and Gas energy Efficiency Program Administrators. This TRM was also used as an occasional source for algorithms and measure lives.

Vermont Reference User Manual (TRM): Measure Savings Algorithms and Cost Assumptions, December 2011, Efficiency Vermont. This reference was used to supplement measure lives and incremental cost data where needed.

A.1.2 Energy Consumption and Census Resources

A majority of the New York measure-specific information needed as inputs to the potential models used in this study was provided through data collected during the residential baseline project telephone and Web surveys and on-site data collection activities. The following sources were used to supplement statewide and county level housing characteristics such as heating fuel, population, occupied households and housing type to weight the measures overall and by climate zone.

US Census Bureau: 2011 American Community Survey: Physical Housing Characteristics for Occupied Housing Units provides estimates on total occupied housing units by county and by housing type (i.e., detached, attached, two apartments, three or four apartments, five to nine apartments and 10 or more apartments). This data also offers vintages of occupied homes by county.

US Census Bureau: Profile of General Demographic Characteristics 2010—New York State and Counties. This county level of data was used to help apportion the data by various subsets including the three climate zones in New York State. The data includes average household size, owner-occupied units, renter-occupied units, total housing units—occupied, vacant, and seasonal for each county of the State.

US Energy Information Administration's Residential Energy Consumption Survey (RECS) provides data on energy-related characteristics of buildings, including appliances, televisions, computers and other electronics, space heating, air conditioning, water heating, square footage, age of buildings and energy consumption.

A.1.3 Cost and Savings Resources

A majority of the measure-specific cost and savings information compiled for this study originated from NYSERDA's Deemed Savings Database. More information on this and other cost and savings resources is provided below:

NYSERDA Deemed Savings Database provided measure assumptions, such as measure life and annual operating hours, as well as energy savings and incremental costs for multiple measure types analyzed as part of the potential study.

US Environmental Protection Agency and Department of Energy Savings Calculators: ENERGY STAR® qualified appliances (air purifier, clothes washer, dehumidifier, dishwasher, refrigerator, compact refrigerator, and freezer), central air conditioner, room air conditioner, air source heat pump, furnace, programmable thermostat, ceiling fans, office equipment, and compact fluorescent light bulb calculators have assumptions for incremental cost, measure life and baseline, and efficient energy usage.

Reed Construction Data's RS Means Cost Data volumes were used to estimate measure cost. RS Means location factors for New York State were used to allow for the adjustments of cost differences by region within the State by material, installation, or overall.

Incremental Cost Study Report: A Report of 12 Energy Efficiency Measure Incremental Costs in Six Northeast and Mid-Atlantic Markets, September 2011, and Phase Two Report, January 2013, both by Navigant Consulting, Inc. These studies chaired by NEEP provided incremental costs data on specific efficiency measures in the Upstate and the New York Metro area including several workbooks with detailed cost information by geographic region.

Database for Energy Efficiency Resources (DEER). This database developed by the California Public Utilities Commission provided additional energy efficiency measures along with savings for consideration in the potential study.

Advanced Power Strips Deemed Savings Methodology, January 2012, NEEP Data Working Group. This report provides information on the use and associated savings of advanced power strips and the algorithms used in the calculations. The study specifically mentions the savings are consistent with NYSERDA's Power Management Study. The study includes information on typical household and national market average consumption and potential savings.

National Renewable Energy Laboratory (NREL) maintains a database of residential retrofit measures that include cost data. The cost data is provided as both a range and a national average. This data was used where other New York specific data was unavailable.

Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities, ACEEE, June 2010 this report was used to identify inputs associated with relevant direct feedback devices and indirect energy consumption feedback measures.

Northeast Residential Lighting Strategy: 2012-2013 Update, December 2012, Northeast Energy Efficiency Partnerships. This resource was used to inform baselines and cost for lighting measures.

A.1.4 Technical Potential and Baseline Studies

To ensure consistency of assumptions, care was taken to review and compare key model inputs and outcomes against other technical potential and baseline studies recently completed in New York and surrounding states. In addition to NYSERDA's recently completed long-term potential study, a number of other potential and baseline studies were reviewed as listed below:

Energy Efficiency and Renewable Energy Potential Study of New York State, NYSERDA Report 14–19, April 2014, prepared for NYSERDA by Optimal Energy, Inc., American Council for an Energy-Efficient Economy and Vermont Energy Investment Corporation. This recently completed, long-term New York State potential study offers data, energy forecasts, avoided cost projections and results that have helped inform the current residential potential study. In general, results from this potential study appear consistent with the long-term study results.

Achievable Electric Energy Efficiency Potential in New York State, 2008, Optimal Energy, Inc., Vermont Energy Investment Corporation, American Council for an Energy Efficient Economy. This previously completed New York State potential study (update to the 2003 Optimal Energy, Inc. study) offers data and detailed measures lists that have helped develop the final measure list for the current residential potential study.

2010 LIPA Residential Baseline Study, June 2011, Prepared for Long Island Power Authority by Opinion Dynamics Corporation. This study included on-site inspections and telephone baseline data collection to assess energy efficiency attitudes and awareness and equipment presence and characteristics. This residential electric baseline included New York regional baseline and saturation information for lighting, HVAC, consumer electronics, appliances, and pool pumps.

HEHE Process and Impact Evaluation, Volume 1: Integrated Report of Findings, October 2010, NMR Group, Inc. This study provided summaries of findings from an impact and process evaluation of residential natural gas high efficiency heating and water heating equipment technologies in Massachusetts, Rhode Island, New Hampshire and Maine. The study included replacement efficiencies and average age of baseline equipment. This study of an adjacent region was used to aid in the determination of the baseline equipment in support of the primary survey data.

Other relevant potential and baseline studies reviewed to help inform this study effort included:

- *Massachusetts Multifamily Market Characterization and Potential Study: Volume 1,* May 2012, The Cadmus Group, Inc.
- *Pennsylvania Statewide Residential End-Use and Saturation Study,* 2012, GDS Associates, Inc., Nexant, Inc., Mondre Energy
- *Energy Efficiency Potential Study for Consolidated Edison Company of New York, Inc. Volumes 1–5,* June 2010, Global Energy Partners, LLC
- *Connecticut 2011 Baseline Study of Single-Family Residential New Construction,* October 2012, NMR Group, Inc.

A.1.5 Saturation and Penetration Resources

Results from the residential baseline project telephone and Web surveys and data collection activities conducted during the on-site inspection provided nearly all (over 90%) of the measure-specific saturation and penetration inputs required for this potential study. In cases where insufficient information was available, most notably with lighting measures (by design, given the magnitude of available existing information and to manage time with project telephone and Web surveys, and on-site inspections), the following additional resources were utilized. Data from these sources were also used to help identify saturation and penetration rates for emerging technologies, not yet regularly encountered within New York's current residential customer base.

Market Effects, Market Assessment, Process and Impact Evaluation of the NYSERDA Statewide Residential Point-Of-Sale lighting Program: 2010-2012, May 2014, Prepared for NYSERDA by NMR Group, Inc. and Apex Analytics, LLC. This resource was used for the hours-of-use estimate and socket counts for various bulbs in Upstate and Downstate regions.

Northeast Residential Lighting Strategy 2012–2013 Update, December 2012, Energy Future Group. This study chaired by the Northeast Energy Efficiency Partnerships (NEEP) provides an update on the residential lighting landscape in New York State. This study also discussed the Energy Independence Security Act (EISA) standards and how they will impact the residential baseline for lighting in the future. Information from this report was used as a supplement where more applicable New York studies or primary data was not available.

Frontiers of Energy Efficiency: Next Generation Programs Reach for High Energy Savings, ACEEE Report U131, January 2013, Dan York, et al. This report includes an evaluation of the current penetration of utility and non-utility program measures for residential, commercial, industrial, CHP, agricultural, and distribution program customers. This report was used as a resource for further information for residential measures to be evaluated and national saturations.

Emerging Hot Water Technologies and Practices for Energy Efficiency as of 2011, ACEEE Report A112, February 2012, Harvey Sachs, et al. This report evaluates 16 technologies and practices with savings estimated with some information specific to NYSERDA findings. This information was used to inform savings estimations, baseline comparisons, market penetration and efficiency measures for the current residential potential study.

A.1.6 Other NYSERDA and Utility Studies

As previously noted, nearly all the saturation and penetration rates came from primary data collected as part of this residential baseline study and New York specific census household data. Approximately 70 percent of the measure-specific assumptions (savings, costs, measure lives, etc.) also came directly from New York-specific sources (including the TRM). The rest came from direct modeling or other relevant sources noted earlier in this section and below:

NYSERDA 2007–2008 NEW YORK ENERGY STAR® Homes Program Impact Evaluation Report, September 2012, Megdal & Associates, LLC. This impact evaluation included an evaluation of electric and MMBtu savings per home for ENERGY STAR homes built in 2007–2008. This information is segmented into a combined climate zones 4 and 5 and climate zone 6. The results of this NYSERDA 2007-2008 ENERGY STAR Homes evaluation reflect construction before the impact of IECC 2009 and ENERGY STAR Version 3.

Collectively, this list of resources was reviewed and used to help inform development of the baseline case, efficient case, saturation rates, and costs and savings values needed for this short-term energy efficiency potential assessment. The Technical Reference Manuals algorithms were used along with energy modeling to quantify measure savings from the baseline information acquired from the primary data collection. The Energy Consumption and Census Resources were used to determine energy consumption by fuel, occupied housing by region and energy forecasts. The Cost and Savings Resources have assumptions for incremental cost, measure life, baseline

and efficient energy usage from calculators, construction cost data and targeted studies. Technical Potential and Baseline Studies along with the Saturation and Penetration Resources have recent penetration, saturation, market characterizations and housing characteristics that were used as supplements to the primary data from this baseline study. The other NYSERDA and utility studies were used to help determine characteristics and program participation from recent New York program evaluations.

A.2 Identification of Primary Research Needs

Results from reviewing various data sources identified in the appendix were used to inform development of the residential customer and HVAC contractor/supplier telephone and Web surveys and the single-family and multifamily on-site data collection instruments fielded as part of the broader residential baseline and HVAC market assessment components of this NYSERDA residential baseline study and potential effort. Specifically, to obtain data on the percent of existing equipment that is already efficient, as well as the potential for additional efficient equipment penetration, data collected through these telephone and Web surveys and on-site inspections was leveraged along with D&R International Heating, Air-conditioning and Refrigeration Distributors International (HARDI) sales data for 2013.

A.2.1 Energy Efficiency Measure Database Development

Based on review of the resources described above, an up-to-date list of energy efficiency measures (including currently available and soon to be commercially available technologies) was compiled. In February 2013, a draft of this energy efficiency measures list was provided for review and comment, with results being incorporated into a final list of nearly 900 measures potentially applicable for use within single-family and multifamily residential existing or new construction homes. A detailed itemization of these measures is presented in Appendix B. The final list included all necessary data for the potential assessment such as incremental/full measure costs, measure energy savings, useful lives, current baseline saturation and penetrations of energy efficiency equipment, percentage of the market that is currently efficient, as well as all relevant sources. Table 5, presented in the main report, identifies the number of measures included within the final measure list by measure/end-use category.

A.2.2 Measure Baseline Values Determination

Through careful review and assessment of the multiple sources, baselines, from which energy savings estimates could be derived, were identified for each of the nearly 900 individual measures. Table 6 in the main report provides a high-level summary of the data sources used to develop baselines for each measure end-use category. More details on measure-specific baselines and data sources is provided in Table A-1 through Table A-8 and within the actual Excel files provided to NYSERDA as part of this report.

Table A-1. Baseline Assumptions – Appliance End-Uses

Appliance	Baseline
Refrigerator Retirement (and Recycling) – No Replacement	Deemed Value, NY TRM.
ENERGY STAR Refrigerator, Consortium for Energy Efficiency (CEE) Tier 2, CEE Tier 3	Standard efficiency refrigerator, weighted average of chest and upright freezer types from single family telephone and Web surveys or multi-family on-site inspections.
Freezer Retirement (and Recycling) – No Replacement	Deemed Value, NY TRM.
ENERGY STAR Freezer	Standard efficiency freezer, weighted average of chest and upright freezer types from single family telephone and Web surveys or multi-family on-site inspections.
ENERGY STAR Clothes Washer, CEE Tier 2, CEE Tier 3	Standard efficiency clothes washer, used survey results for water heater efficiencies in ENERGY STAR calculator for existing and federal standard for new construction.
Clothes Dryer with Moisture Sensor	Standard efficiency clothes dryer from ENERGY STAR appliance calculator.
ENERGY STAR Dishwasher	Standard efficiency clothes washer, used survey results for water heater efficiencies in ENERGY STAR calculator for existing and federal standard for new construction.
ENERGY STAR Dehumidifier	Standard efficiency dehumidifier, average of six sizes, weighted by market share from Vermont TRM.

Table A-2. Baseline Assumptions – Electronics End-Uses

Electronics	Baseline
“Smart Strip” Plug Outlet, 5-plug	NYSERDA Advanced Power Strip Research Report, desktop computer, LCD monitor and printer.
“Smart Strip” Plug Outlet, 7-plug	NYSERDA Advanced Power Strip Research Report, CRT television, LCD television, Cable set top box, DVD player, VCR and Video game console.
ES Desktop	ENERGY STAR Office Equipment calculator, baseline desktop, power management not enabled.
ES Laptop	ENERGY STAR Office Equipment calculator, baseline laptop, power management not enabled.
LCD Computer Monitors	ENERGY STAR Office Equipment calculator, baseline monitor, power management not enabled.
HE Television replacing Standard	NYSERDA Advanced Power Strip Research Report, standard television.
HE Television replacing Plasma	NYSERDA Advanced Power Strip Research Report, plasma television.
HE Television replacing Projection	NYSERDA Advanced Power Strip Research Report, protection television.
Room Air Cleaner	ENERGY STAR Appliance calculator, standard room air purifier, 100 CADR (capacity – clean air delivery rate), 1 W standby, 1 CADR/Watt operating efficiency.

Table A-3. Baseline Assumptions – Lighting End-Uses

Lighting	Baseline
ENERGY STAR Specialty CFL	70 Watt bulb, 2.8 hours/day NRM HOU Study SF, 3.3 MF
ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent)	29 Watt halogen bulb, 2.8 hours/day NRM HOU Study SF, 3.3 MF
ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent)	43 Watt halogen bulb, 2.8 hours/day NRM HOU Study SF, 3.3 MF
ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent)	53 Watt halogen bulb, 2.8 hours/day NRM HOU Study SF, 3.3 MF
ENERGY STAR Standard CFL (23 W CFL replacing 100 W incandescent)	72 Watt halogen bulb, 2.8 hours/day NRM HOU Study SF, 3.3 MF
Energy Star Dedicated CFL Fixture	48.7 Watt 2 bulb fixture, 2.8 hours/day NRM HOU Study SF, 3.3 MF
Energy Star Dedicated Exterior Fixture	86 Watt, 4.4 hours/day NRM HOU Study
LED Lighting (screw-in) ; 2013-2019	48.7 Watt, 2.8 hours/day NRM HOU Study SF, 3.3 MF
LED Lighting (screw-in) ; 2020 and later	16.7 Watt, 2.8 hours/day NRM HOU Study SF, 3.3 MF
LED Specialty Lighting	70 Watt bulb, 2.8 hours/day NRM HOU Study SF, 3.3 MF
LED Fixture (Exterior)	86 Watt 2 bulb fixture, 4.4 hours/day NRM HOU Study
Torchieres	171 Watt, 2.8 hours/day NRM HOU Study SF, 3.3 hours/day MF
Interior Lighting Controls (Common Areas)	60.2 Watt (1.4 sockets per floor from MF on-site inspection), 2.4 hours/day NRM HOU Study
Exterior Lighting Controls	86 Watt, 2 bulb fixture, 4.7 hours/day NRM HOU Study SF, 7.5 MF
Electroluminescent nightlights	7 Watt, 24 hours/day

Table A-4. Baseline Assumptions – Water Heating End-Uses

Water Heating	Baseline
High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I), (Tier II)	Electric storage water heater .95 EF
Solar WH w/ Electric Backup	Electric storage water heater .95 EF
Desuperheater (off GSHP)	Electric storage water heater .95 EF
High-Efficiency Gas Storage Tier I, Tier II (Condensing)	Natural gas storage water heater .61 EF
Whole-Home Gas Tankless 82%, 95%	Natural gas storage water heater .61 EF
Solar WH w/ Gas Backup	Natural gas storage water heater .61 EF
Indirect Water Heater (Gas Boiler)	Natural gas storage water heater .61 EF
Combination Heat/Hot Water (Natural Gas Boiler)	Deemed Value, MA TRM
High-Efficiency petroleum Storage Tier I, Tier II (Condensing)	Petroleum storage water heater .61 EF
Whole-Home petroleum Tankless 82%, 95%	Petroleum storage water heater .61 EF
Solar WH w/ petroleum Backup	Petroleum storage water heater .61 EF
Indirect Water Heater (petroleum Boiler)	Petroleum storage water heater .61 EF
Combination Heat/Hot Water (petroleum Boiler)	Deemed Value, MA TRM
Pipe Wrap (Electric)	NY TRM algorithm with .95 EF water heater, 4' length
Pipe Wrap (Natural Gas)	NY TRM algorithm with .61 EF water heater, 4' length
Pipe Wrap (Petroleum)	NY TRM algorithm with .61 EF water heater, 4' length
Tank Wrap (Electric)	NY TRM algorithm with .95 EF water heater, 50 gallon tank SF, 120 gallon tank MF
Tank Wrap (Natural Gas)	NY TRM algorithm with .61 EF water heater, 50 gallon tank SF, 120 gallon tank MF
Tank Wrap (Petroleum)	NY TRM algorithm with .61 EF water heater, 50 gallon tank SF, 120 gallon tank MF
Low Flow Showerhead (Electric)	NY TRM algorithm, .97 EF water heater recovery, 2 gpm, 8 min shower, 1.6 shower per day
Low Flow Showerhead (Natural Gas)	NY TRM algorithm, .75 EF water heater recovery, 2 gpm, 8 min shower, 1.6 shower per day
Low Flow Showerhead (Petroleum)	NY TRM algorithm, .77 EF water heater recovery, 2 gpm, 8 min shower, 1.6 shower per day
Low Flow Faucets- Kitchen (Electric)	NY TRM algorithm, .97 EF water heater recovery, 2.2 gpm, 11.25 min per day

Table A-4 continued

Water Heating	Baseline
Low Flow Faucets- Kitchen (Natural Gas)	NY TRM algorithm, .75 EF water heater recovery, 2.2 gpm, 11.25 min per day
Low Flow Faucets- Kitchen (Petroleum)	NY TRM algorithm, .77 EF water heater recovery, 2.2 gpm, 11.25 min per day
Low Flow Faucets- Bath (Electric)	NY TRM algorithm, .97 EF water heater recovery, 2.2 gpm, 3.75 min per day
Low Flow Faucets- Bath (Natural Gas)	NY TRM algorithm, .75 EF water heater recovery, 2.2 gpm, 3.75 min per day
Low Flow Faucets- Bath (Petroleum)	NY TRM algorithm, .77 EF water heater recovery, 2.2 gpm, 3.75 min per day
Shower Start (Electric)	Adapted NY TRM algorithm, .97 EF water heater recovery, 2700 gal per year
Shower Start (Natural Gas)	Adapted NY TRM algorithm, .75 EF water heater recovery, 2700 gal per year
Shower Start (Petroleum)	Adapted NY TRM algorithm, .77 EF water heater recovery, 2700 gal per year
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Electric)	Base shower usage
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Natural Gas)	Base shower usage
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Petroleum)	Base shower usage

Table A-5. Baseline Assumptions – Modeling and Envelope/HVAC Impacts

Modeling & Envelope/HVAC Impacts	Baseline
Modeling attributes	Models were weighted by climate zone, model type (1 story or 2 story) and equipment. Each climate zone, was calibrated for base usage for boiler and furnace equipment types and average fuel usage for smaller and larger homes. The base models used the insulation efficiencies and heating equipment from the on-site inspections. The models used the American Fact Finder to allocate housing heating fuel per climate zone, Bedrooms by climate zone with 1 or 2 bedroom for 1 story and 3+ bedroom for 2 story for model allocation and phone survey equipment allocation for boiler, furnace, electric resistance or electric heat pump. The multifamily used a high rise and low rise model allocation for calibration of base usage.
Foundation Type	Unconditioned basement; concrete FW average 1' above grade with 20% stud wall
Foundation Wall	CZ4: R2.2 interior insulation, 10" thick concrete; CZ5: R3.8, 10"; CZ6: R3.2, 10"
Frame Floor over unconditioned basement	CZ4: R4.1 cavity insulation G3; CZ5: R4.1, G2; CZ6: R5.6 G3
Rim and Band Joist	CZ4: R3.4 cavity insulation G2; CZ5: R10.5, G2; CZ6: R9.9 G2
Above Grade Wall	CZ4: R9.5 cavity insulation G3, CZ5: R13 G2, CZ6: R13.3 G2
Window	CZ4: U value = 0.53, CZ5: U = 0.49, CZ6: U = 0.47
Ceiling	CZ4: R15.1 cavity insulation G3; CZ5: R22.6 G2; CZ6: R24.6 G2
Thermostat	Non-programmable
Heating Equipment	CZ4: Gas Furnace, 82.4 AFUE, Oil Boiler 74 AFUE; CZ5: Gas Furnace 86.9 AFUE, Oil Boiler 85.1 AFUE; CZ6: Gas Furnace 86.6 AFUE, Oil Boiler 83 AFUE
Cooling Equipment	CZ4: Central AC for homes with air distribution 11.1 EER, Room AC for homes with hydronic distribution 9.5 EER; CZ5: CAC 11.1 EER, RAC 10 EER; CZ6: CAC 10.7 EER, RAC 9.9 EER
Water Heating Equipment	Storage, 45 gallon, 0.60 EF gas; storage 46 gallon, 0.90 EF electric, storage, 40 gallon, 0.62 EF petroleum
Duct Insulation	Uninsulated
Total Supply & Return Leakage	15% of conditioned floor area
Infiltration	CZ4: 0.45 air changes per hour natural; CZ5: 0.45 ACH nat; CZ6: 0.40 ACH nat

Table A-6. Baseline Assumptions – HVAC Envelope and Equipment End-Uses

HVAC (Envelope)	Baseline
Improved Floor Insulation (R-0 to R-19), (R-0 to R-30)	Calibrated model with R0 cavity floor insulation
Improved Wall Insulation (R-0 to R-13), (R0 to R20)	Calibrated model with R0 cavity wall insulation
Improved Wall Insulation (R-7 to R-13)	Calibrated model with R7 G3 cavity wall insulation
Improved Wall Insulation (R10 to R20)	Calibrated model with R10 cavity wall insulation
Improved Attic/Roof Insulation (R-19 to R-38), (R-19 to R-49), (R-19 to R-60)	Calibrated model with R19 G3 cavity wall insulation
Basement Wall/Foundation/Rim Insulation (R-0 to R-10), (R-0 to R-15)	Calibrated model with foundation wall uninsulation, Rim/Band R0 cavity insulation
Improved Air Sealing	Calibrated model with 9 ACH 50
Improved Duct Sealing	Calibrated model with duct leakage 15% conditioned floor area
ES Windows, Storm Windows	Calibrated model with windows and slider U value = 0.50
Exterior Door	Calibrated model with two doors R3
Programmable Thermostats	Calibrated model with non-programmable thermostat
HVAC (Equipment)	**Baseline**
Room AC Recycling	Calibrated model with additional RAC EER 8
AC Tune-Up, Refrigerant Charge	Calibrated model with performance adjustment 95%
Room AC SEHA Tier 1 (11.3 EER)	Minimum federal standard, RAC 9.5 EER 11k to 14k, RAC 9.3 EER 14k to 20k
Central Air Conditioner Tier 1 (12 EER), Tier 2 (12.5 EER), Tier 3 (13 EER)	Minimum federal standard, 13 SEER
Central Air Source Heat Pump Tier 1 (12 EER), Tier 2 (12.5 EER)	Minimum federal standard, 13 SEER
Ductless Minisplit CEE Tier I EER 12, Tier 2 EER 12.5	Minimum federal standard, RAC 9.5 EER 11k to 14k, RAC 9.3 EER 14k to 20k
Ground Source Heat Pumps COP 4.2, EER 17	Baseline air source heat pump 7.7 HSPF, 13 SEER
Right Sizing - Air Conditioning	Baseline CAC with tonnage 2 sizes larger
High Efficiency Gas Furnace 90 AFUE, 94 AFUE, 96 AFUE	Minimum federal standard, 80 AFUE
Tier I High Efficiency Petroleum Furnace, Tier II, Tier III	Minimum federal standard, 80 AFUE LP, 83 AFUE Oil
ECM Furnace Fan Motor	Minimum federal standard, 80 AFUE

Table A-6 continued

HVAC (Equipment)	Baseline
Furnace Tune-Up	Calibrated model with performance adjustment 95%, fuel savings
Furnace Whistle	Calibrated model with performance adjustment 95%, electric fan savings only
High Efficiency Gas Boiler 90 AFUE (Water), 95 AFUE	Minimum federal standard, 82 AFUE
Tier I High Efficiency Petroleum Boiler, Tier II	Minimum federal standard, 82 AFUE LP, 84 AFUE Oil
High Efficiency Gas steam boiler	Minimum federal standard, 80 AFUE
High Efficiency Petroleum steam boiler	Minimum federal standard, 80 AFUE LP, 82 AFUE Oil
Boiler Tune-Up, boiler reset controls	Calibrated model with performance adjustment 95%, fuel savings
Programmable Thermostats	Calibrated model with non-programmable thermostat
Heat Recovery Ventilator	Exhaust fan

Table A-7. Baseline Assumptions – Other (Pools, Wells, Behavioral) End-Uses

Other (Pools, Wells and Behavioral)	Baseline
Variable Speed Pool Pump and Motor	2.0 EF, 107 days, 62 gpm, 12 hrs/day
High Efficiency Two-Speed Pool Pump	2.0 EF, 107 days, 62 gpm, 12 hrs/day
Pool Pump Timer	2.0 EF, 107 days, 62 gpm, 17 hours/day
Solar Pool Cover	80 deg pool, Heat pump water heater, energy.gov heat-pump-swimming-pool heaters costs by location - New York
Efficient Well Pump	2.0 EF, 365 days, 5 gpm, 2 hrs/day
Indirect Energy Consumption Feedback (Electric)	Average of two study years electric in ODC Mass indirect feedback evaluation
Indirect Energy Consumption Feedback (Natural Gas)	Average of two study years electric and natural gas in ODC Mass indirect feedback evaluation
Indirect Energy Consumption Feedback (Petroleum)	Average of two study years in ODC Mass electric and proxy natural gas indirect feedback evaluation
Direct Feedback Devices (In Home Display) (Electric)	Average of two study years electric in ODC Mass indirect feedback evaluation
Direct Feedback Devices (In Home Display) (Natural Gas)	Average of two study years electric and natural gas in ODC Mass indirect feedback evaluation
Direct Feedback Devices (In Home Display) (Petroleum)	Average of two study years in ODC Mass electric and proxy natural gas indirect feedback evaluation

Table A-8. Baseline Assumptions – New Construction End-Uses

New Construction	Baseline
All New Construction	Baseline for all is IECC 2009 and NYS TRM Appendix A
Foundation Wall	R0 cavity insulation 10"
Frame Floor over unconditioned basement	CZ4: R19 cavity insulation G2; CZ5: R30 G2; CZ6: R30 G2
Rim and Band Joist	CZ4: R13 cavity insulation G2; CZ5: R20 G2; CZ6: R20 G2
Above Grade Wall	CZ4: R13 cavity insulation G2; CZ5: R20 G2; CZ6: R20 G2
Window	U = 0.35
Ceiling	CZ4: R38 cavity insulation G2; CZ5: R38 G2; CZ6: R49 G2
Thermostat	Programmable
Heating Equipment	Gas/LP Furnace 80 AFUE, Oil Furnace 83 AFUE; Gas/LP Boiler (Water) 82 AFUE, Oil 84 AFUE
Cooling Equipment	For homes with hydronic distribution minimum federal standard, RAC 9.5 EER 11k to 14k, RAC 9.3 EER 14k to 20k. For homes with air distribution minimum federal standard CAC 13 SEER
Water Heating Equipment	Storage, 45 gallon, 0.61 EF gas; storage 46 gallon, 0.95 EF electric, storage, 40 gallon, 0.62 EF petroleum
Duct Insulation	R6
Total Supply & Return Leakage	8% of conditioned floor area
Infiltration	0.35 ACH natural

A.2.4 Load Forecast Development

To ensure consistency and comparability with the recently completed long-term energy efficiency potential study, load forecasts specified within that study were utilized.[35] The long-term potential study provided separate sales forecasts for electricity, natural gas and other fossil (petroleum) fuels. The electricity residential forecast was a single statewide forecast that covered the period from 1990 to 2035. The natural gas and petroleum fuels forecasts ran for the period 2013 through 2035, with separate forecasts for four regions of New York State.

[35] NYSERDA. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State,* Report Number 14-19, Prepared by Optimal Energy, Inc., American Council for an Energy-Efficient Economy, and Vermont Energy Investment Corporation. Volume 1, Section 2.4.

To prepare the sales forecasts from the long-term potential study for use in this short-term (three and five year) residential potential study effort, the statewide electric sales forecast was allocated across New York's three climate zones (4, 5, and 6) using US Census data percent population of households within each climate zone. Similarly, the regional natural gas and petroleum fuels forecasts from the long-term study were allocated to climate zones.

A.3 Assessment of Residential Energy Efficiency Potential

The main objective of this energy efficiency potential study is to quantify the technical, economic and achievable potential for electric and non-electric (natural gas and other fossil fuels) energy efficiency savings in the state. This report provides estimates of the potential gigawatt-hour electric savings and TBtu non-electric savings for each level (technical, economic, and achievable) of energy efficiency potential. This section describes the general steps and methods that were used at each stage of the analytical process to produce the various estimates of energy efficiency potential.

Energy efficiency potential studies involve a number of analytical steps to produce estimates of each type of potential: technical, economic, and achievable. Two spreadsheet-based models were used to complete all necessary analyses. Microsoft Excel has been used as the modeling platform to provide transparency to the estimation process and allow for simple customization based on New York's unique characteristics and the availability of specific model input data and to enable NYSERDA to update the model as NYS residential market evolves in the future.

The first spreadsheet model, referred to as the Supply Curve Model, is a repository for all measure-specific inputs, market saturation and penetration rates, and is the model where calculations for technical, economic and achievable potential estimates are performed. This study also uses a benefit-cost screening model to assess the cost-effectiveness of all electric and non-electric energy efficiency measures being assessed within the Supply Curve Model. The cost-effectiveness screening tool integrates measure-specific impacts and costs, customer characteristics, avoided energy cost forecasts and more. For this study, both models have been run independently, multiple times, with results from one being used as inputs to the other as technical, economic, and achievable potential scenarios were completed.

In addition to the measure list and load forecast development activities described earlier in this section, an overview of the savings potential estimation methodologies is presented in the next section.

A.3.1 Technical Energy Efficiency Potential

Potential studies often distinguish between several types of energy efficiency potential including: technical, economic, and achievable. Because the definition of the several types of potential can be different between studies, it is important to understand the meaning and scope of each type of potential estimate as it applies to this study of New York. The first two types of potential estimated for this study, technical, and economic, provide a theoretical upper bound for energy savings from energy efficiency measures. Still, even the best-designed portfolio of energy efficiency programs is unlikely to capture 100 percent of the technical or economic potential. Therefore, the achievable potential attempts to estimate what may be realistically achieved, by when, and at what cost.

In general, this study uses a "bottom-up" approach in the residential sector to calculate the potential of an energy efficiency measure or set of measures, as illustrated in Figure A-10. Figure A-10 represents a bottom-up approach that first starts with the savings and costs associated with replacing one piece of energy using equipment with its high efficiency counterpart, and then multiplies these values by the number of measures available to be installed throughout the life of the program. The bottom-up approach is applicable in the residential sector because of the substantial availability of primary data collected through the concurrent baseline study (telephone and Web surveys and on-site inspections) component of this project, ample New York-specific and surrounding state secondary data sources and the general homogeneity of residential building and equipment stock to which measures are applied.

Figure A-10. Residential Sector Savings Methodology

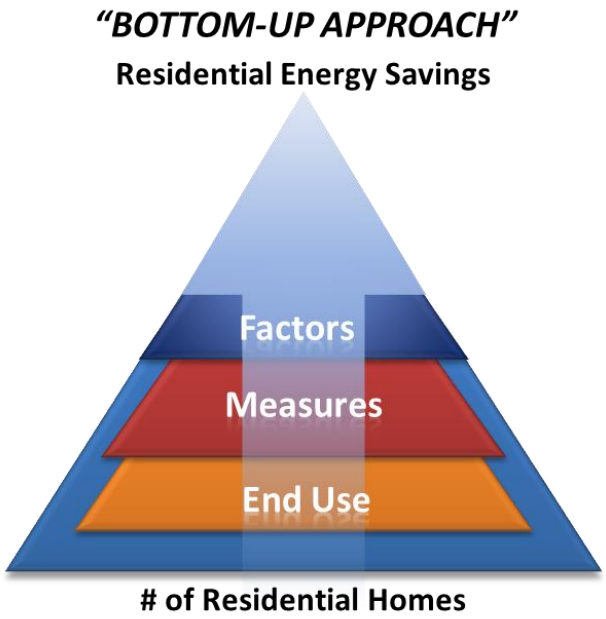


Figure 10 shows the methodology starts at the bottom based on the number of residential customers (splitting them into single-family and multifamily housing types as well as existing homes versus new construction). From this point, estimates of the size of the eligible market in New York are developed for each energy efficiency measure included in the study. For example, energy efficiency measures that affect natural gas space heating are only applicable to those homes in New York that have natural gas space heating.

The goal of this bottom up approach is to determine how many residential homes a specific measure applies to (base-case factor), then of that group, the fraction of households without the energy efficient version of the measure being installed (remaining factor). In instances where technical reasons do not permit the installation of the efficient equipment in all eligible households, an applicability factor is used to limit the potential. For example, the technical potential for solar water heating in residential applications is limited to 40 percent of the eligible market due to both technical and non-technical factors, including roof orientation, shading, minimum roof size and load bearing capability, aesthetics, as well as local building codes and

ordinances.[36] Alternative water heating technologies (efficient water heater tanks and/or heat pump water heaters) are then utilized to meet the remaining market potential. The last factor to be applied is the savings factor, which is the percentage savings achieved from installing the efficient measure over a standard measure.

In developing potential electric and other fuels savings, the analysis accounts for the interactive effects of measures designed to impact the same end-use. For instance, if a home were to properly seal all ductwork, the overall space heating and cooling consumption in that home would decrease. As a result, the remaining potential for energy savings derived from a heating/cooling equipment upgrade would be reduced. In this analysis, it was assumed that for measures designed to impact the same end-use, the measure or program with the highest Total Resource Cost (TRC) ratio would typically be installed first, followed by the measure(s) with the next highest benefit-cost ratio.

In instances where there are two (or more) competing technologies for the same electrical (or fossil fuel) end-use, such as: heat pump water heaters, water heater efficiency measures and high-efficiency electric storage water heaters, in most cases an equal percent of the available population is assigned to each measure using the applicability factor.[37] In the event that one of the competing measures is not found to be cost-effective, the households assigned to that measure are transitioned over to any of the remaining cost-effective alternatives.

The savings estimates per base unit are determined by comparing the high-efficiency equipment to current installed equipment for existing household retrofits, or to current equipment code standards for replace-on-burnout and new construction scenarios.

The core equation used in the residential sector energy efficiency technical potential analysis for each individual efficiency measure (by fuel type) is shown Equation A-1.

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36 National Renewable Energy Laboratory (NREL). 2007. "The Technical Potential of Solar Water Heating to Reduce Fossil Fuel Use and Greenhouse Gas Emissions in the United States." pg. 8.

37 GDS used its professional judgment in some cases to assign unequal applicability factors to attempt to avoid overstating or understating the potential of the set of competing technologies.

Equation A-1. Core Equation for Residential Sector Technical Potential

Where:

- **Total Number of Households** = the number of households in the market segment (e.g., the number of detached single-family buildings, or the number of household/tenant units within multifamily buildings)
- **Base Case Equipment End-Use Intensity** = annual energy consumption (kWh or MMBtu) used per customer, per year, by each base-case technology in each market segment. This is the consumption of energy using equipment that efficient technology replaces or affects. This variable fully accounts for any known building characteristics in the service area, such as average square footage of homes in New York.
- **Saturation Share** – this variable has two parts: the first is the fraction of the end-use energy that is applicable for the efficient technology in a given market segment. For example, for natural gas residential water heating, this would be the fraction of all residential gas customers that have gas water heating in their household; the second is the share of the end-use energy that is applicable for the efficient technology that has not yet been converted to an efficient technology.
- **Applicability Factor** – this factor ensures that a household cannot receive two of the same type of measure. For example, if there are two tiers of efficient natural gas furnaces, one which yields 10 percent savings and another which yields 20 percent savings, a household that needs to replace its inefficient natural gas furnace could either receive the unit which yields 10 percent savings or the unit which yields 20 percent savings. A single household could not receive both units. In general, an even distribution was applied to the same type of measure across eligible households when applying this factor. In some cases, unbalanced applicability factors were assigned, if believed an even distribution is inappropriate. [38] The applicability factor also captures the fraction of applicable units technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to add wall insulation in all homes because the original construction of some homes does not allow for wall insulation to be installed without requiring major reconstruction of the house, which would be an additional cost that does not yield any energy benefits).

[38] For example, if historical data indicates a technology has been able to garner a large share of the market GDS may assign a higher applicability factor to this technology in order to properly reflect this knowledge.

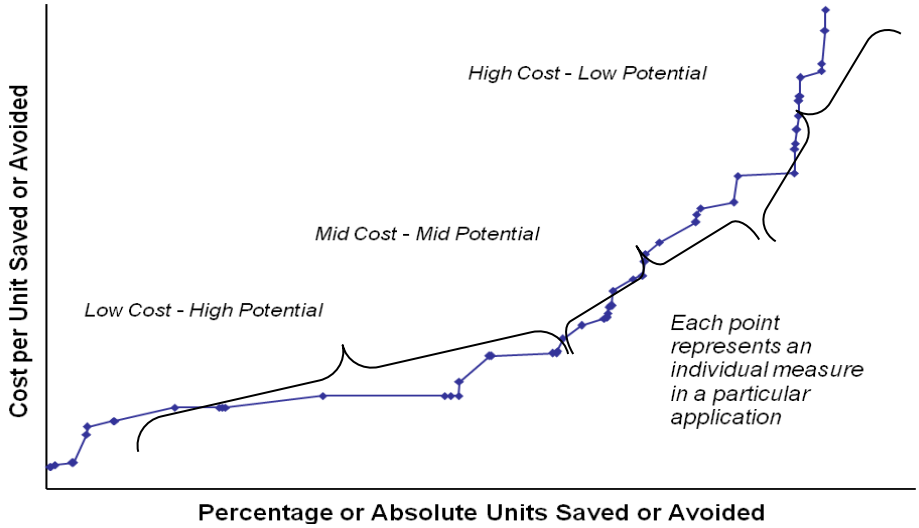
- **Savings Factor** = the percentage of energy consumption reduction resulting from application of the efficient technology. The savings factor is a general term used to illustrate the calculation of a measure's technical potential. The Excel-based model fully integrates the necessary assumptions to determine the measure-level savings, given the Base Case Equipment End-Use Intensity, and the expected savings of each technology.

Technical energy efficiency potential in the residential sector is calculated in two steps. In the first step, all measures are treated *independently*; which means the savings of each measure are not reduced or otherwise adjusted for overlap between competing or interacting measures. By analyzing measures independently, no assumptions are made about the combinations or order in which they might be installed in customer buildings. However, the cumulative technical potential cannot be estimated by adding the savings from the individual savings estimates because some savings would be double-counted. For example, the savings from a measure that reduces heat loss from a building, such as insulation, are partially dependent on other measures that affect the efficiency of the system being used to heat the building, such as a high-efficiency furnace; the more efficient the furnace, the less energy saved from the installation of the insulation.

In the second step, adjustments are made to account for such interactive effects. The adjustments for interactive effects were made by upgrading the baseline conditions while holding the savings percentages constant. The upgraded baseline conditions vary by measure and assume some measures (such as weatherization measures) are installed to increase the building efficiency prior to the installation of the measure that is subject to the baseline adjustment (e.g., high efficiency furnaces).

Finally, supply curves were developed to show the amount of energy efficiency savings available at different cost levels. A generic example of a supply curve is shown in Figure A-11. As shown in the figure, a supply curve typically consists of two axes; one that captures the cost per unit of saving a resource (e.g., dollars per lifetime kWh or MMBtu saved) and another that shows the amount of savings that could be achieved at each level of cost. The curve is typically built up across individual measures that are applied to specific base-case practices or technologies by market segment. Savings measures are sorted based on a metric of cost (in constant dollars). Total savings available at various levels of cost are calculated incrementally with respect to measures that precede them. Supply curves typically, but not always, end up reflecting diminishing returns, i.e., costs increase rapidly and savings decrease significantly at the end of the curve.

Figure A-11. Generic Example of a Supply Curve



As noted above, the cost portion of this energy efficiency supply curve is represented in dollars per unit of lifetime energy savings. Costs are annualized (often referred to as levelized) in supply curves. For example, electric energy efficiency supply curves usually present levelized costs per lifetime kWh saved by multiplying the initial investment in an efficient technology or program by the capital recovery rate (CRR), and then dividing that amount by annual kWh savings:

According to Equation A-2:

Equation A-2: Levelized Cost Per Lifetime Kilowatt-hours Saved

Levelized Cost per lifetime kWh Saved = Initial Cost x CRR/Annual kWh Savings

A.3.2 Economic Potential

Economic potential refers to the subset of the technical potential that is cost-effective (based on, for this report, screening with the TRC test) as compared to conventional supply-side energy resources. The TRC benefit-cost ratios were calculated for this study according to criteria developed by NYSERDA and the DPS. All measures that were not found to be cost-effective based on the results of the measure-level cost-effectiveness screening were excluded from the economic and achievable potential. Then allocation factors were re-adjusted and applied to the remaining measures that were cost-effective. Information on determining cost-effectiveness is provided in the Key Assumptions section of this report.

A.3.3 Achievable Potential

Achievable potential is determined as the amount of energy use that efficiency can realistically be expected to displace, assuming different market penetration scenarios for cost-effective energy efficiency measures. Achievable potential takes into account real-world barriers to convincing end-users to adopt cost-effective energy efficiency measures, costs of delivering programs (for administration, marketing, tracking systems, monitoring and evaluation, etc.) and the capability of programs and administrators to ramp up program activity over time.[39] Achievable potential savings is a subset of economic potential.

This potential study evaluates four achievable potential scenarios. More details on inputs and methodologies used to calculate the base case achievable potential and three associated sensitivity scenarios are presented in the Key Assumptions section of this report. Once the total number of measures eligible to be installed over the five-year analysis time frame is determined, a market adoption rate is assigned to each measure.

The methodology for estimating the total energy efficiency measure adoption from 2014-2018 in the residential sector is based on Equation A-3:

[39] These definitions are from the November 2007 National Action Plan for Energy Efficiency "Guide for Conducting Energy Efficiency Potential Studies."

Equation A-3. Core Equation for Residential Sector Program Adoption

Where:

- **Population** = Total number of single-family or multi-family (non-master-metered) occupied homes in New York
- **Saturation Share** = Percent of population with measure (standard or high-efficiency)
- **Applicability Factor** = Percent of population currently not equipped with energy efficient technology
- **Market Penetration Factor** = Desired market penetration over time. In the base-case scenario, this factor ramped up to a maximum asymptote within a given time period based on a market penetration algorithm
- **Measure Useful Life** = Useful life of Measure
- **Program Time Frame** = # of years included in the program analysis

This equation was used to calculate the total adoption of energy efficient measures based on the replace-on-burnout approach. Once the total number of measures eligible to be installed over the five-year analysis time frame is determined, a market adoption rate is assigned to each measure. Although this methodology simplifies what an adoption curve would look like in practice, it succeeds in providing a concise method for estimating achievable savings potential over a specified period of time.

In the residential base case scenario, achievable potential represents the attainable savings if the market penetration of high-efficiency appliances and equipment reaches a certain percentage of the eligible market between 2014 and 2018. The timeframe in which the market penetration target is met, however, differs between replace-on-burnout and retrofit measures. For example, in a retrofit measure, more of a market can be replaced sooner because the installation does not depend on waiting for a specific measure to burn out. A combination of actual program experience and market penetration models was used to forecast likely levels of achievable market penetration for energy efficiency measures in New York.

Appendix B: Comprehensive Measure List

This comprehensive list covers the electric and non-electric residential sector measures assessed as part of this technical, economic, and achievable potential study. More details on measure-specific assumptions (costs, savings, measure lives, saturations, etc.) and data sources can be found within the supply curve and cost-effectiveness screening models provided to NYSERDA as part of this project.

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
1000	**Appliances**				
1001	Refrigerator Retirement (and Recycling) - No Replacement	SF	-	All	Existing
1002	Energy Star Refrigerator	SF	-	All	Existing
1003	CEE Tier 2 Refrigerator	SF	-	All	Existing
1004	CEE Tier 3 Refrigerator	SF	-	All	Existing
1005	Freezer Retirement (and Recycling) - No Replacement	SF	-	All	Existing
1006	Energy Star Freezer	SF	-	All	Existing
1007	Energy Star Electric Clothes Washer (with electric WH)	SF	-	All	Existing
1008	CEE Tier 2 Clothes Washer (with electric WH)	SF	-	All	Existing
1009	CEE Tier 3 Clothes Washer (with electric WH)	SF	-	All	Existing
1010	Energy Star Electric Clothes Washer (with natural gas WH)	SF	NG	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
1000	**Appliances**				
1011	CEE Tier 2 Clothes Washer (with natural gas WH)	SF	NG	All	Existing
1012	CEE Tier 3 Clothes Washer (with natural gas WH)	SF	NG	All	Existing
1013	Energy Star Electric Clothes Washer (with Petroleum WH)	SF	PET	All	Existing
1014	CEE Tier 2 Clothes Washer (with Petroleum WH)	SF	PET	All	Existing
1015	CEE Tier 3 Clothes Washer (with Petroleum WH)	SF	PET	All	Existing
1016	Clothes Dryer with Moisture Sensor (electric dryer)	SF	-	All	Existing
1017	Clothes Dryer with Moisture Sensor (natural gas dryer)	SF	NG	All	Existing
1018	Clothes Dryer with Moisture Sensor (petroleum dryer)	SF	PET	All	Existing
1019	Energy Star Dishwasher (electric water heating)	SF	-	All	Existing
1020	Energy Star Dishwasher (natural gas water heating)	SF	NG	All	Existing
1021	Energy Star Dishwasher (petroleum water heating)	SF	PET	All	Existing
1022	Energy Star Dehumidifier	SF	-	All	Existing
1023	Energy Star Refrigerator	SF	-	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
1000	**Appliances**				
1024	CEE Tier 2 Refrigerator	SF	-	All	NC
1025	CEE Tier 3 Refrigerator	SF	-	All	NC
1026	Energy Star Freezer	SF	-	All	NC
1027	Energy Star Electric Clothes Washer (with electric WH)	SF	-	All	NC
1028	CEE Tier 2 Clothes Washer (with electric WH)	SF	-	All	NC
1029	CEE Tier 3 Clothes Washer (with electric WH)	SF	-	All	NC
1030	Energy Star Electric Clothes Washer (with natural gas WH)	SF	NG	All	NC
1031	CEE Tier 2 Clothes Washer (with natural gas WH)	SF	NG	All	NC
1032	CEE Tier 3 Clothes Washer (with natural gas WH)	SF	NG	All	NC
1033	Energy Star Electric Clothes Washer (with Petroleum WH)	SF	PET	All	NC
1034	CEE Tier 2 Clothes Washer (with Petroleum WH)	SF	PET	All	NC
1035	CEE Tier 3 Clothes Washer (with Petroleum WH)	SF	PET	All	NC
1036	Clothes Dryer with Moisture Sensor (electric dryer)	SF	-	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
1000	**Appliances**				
1037	Clothes Dryer with Moisture Sensor (natural gas dryer)	SF	NG	All	NC
1038	Clothes Dryer with Moisture Sensor (propane dryer)	SF	PET	All	NC
1039	Energy Star Dishwasher (electric water heating)	SF	-	All	NC
1040	Energy Star Dishwasher (natural gas water heating)	SF	NG	All	NC
1041	Energy Star Dishwasher (petroleum water heating)	SF	PET	All	NC
1042	Energy Star Dehumidifier	SF	-	All	NC
1043	Refrigerator Retirement (and Recycling) - No Replacement	MF	-	All	Existing
1044	Energy Star Refrigerator	MF	-	All	Existing
1045	CEE Tier 2 Refrigerator	MF	-	All	Existing
1046	CEE Tier 3 Refrigerator	MF	-	All	Existing
1047	Freezer Retirement (and Recycling) - No Replacement	MF	-	All	Existing
1048	Energy Star Freezer	MF	-	All	Existing
1049	Energy Star Electric Clothes Washer (with electric WH)	MF	-	All	Existing
1050	CEE Tier 2 Clothes Washer (with electric WH)	MF	-	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
1000	**Appliances**				
1051	CEE Tier 3 Clothes Washer (with electric WH)	MF	-	All	Existing
1052	Energy Star Electric Clothes Washer (with natural gas WH)	MF	NG	All	Existing
1053	CEE Tier 2 Clothes Washer (with natural gas WH)	MF	NG	All	Existing
1054	CEE Tier 3 Clothes Washer (with natural gas WH)	MF	NG	All	Existing
1055	Energy Star Electric Clothes Washer (with Petroleum WH)	MF	PET	All	Existing
1056	CEE Tier 2 Clothes Washer (with petroleum WH)	MF	PET	All	Existing
1057	CEE Tier 3 Clothes Washer (with Petroleum WH)	MF	PET	All	Existing
1058	Clothes Dryer with Moisture Sensor (electric dryer)	MF	-	All	Existing
1059	Clothes Dryer with Moisture Sensor (natural gas dryer)	MF	NG	All	Existing
1060	Clothes Dryer with Moisture Sensor (propane dryer)	MF	PET	All	Existing
1061	Energy Star Dishwasher (electric water heating)	MF	-	All	Existing
1062	Energy Star Dishwasher (natural gas water heating)	MF	NG	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
1000	**Appliances**				
1063	Energy Star Dishwasher (petroleum water heating)	MF	PET	All	Existing
1064	Energy Star Dehumidifier	MF	-	All	Existing
1065	Energy Star Refrigerator	MF	-	All	NC
1066	CEE Tier 2 Refrigerator	MF	-	All	NC
1067	CEE Tier 3 Refrigerator	MF	-	All	NC
1068	Energy Star Freezer	MF	-	All	NC
1069	Energy Star Electric Clothes Washer (with electric WH)	MF	-	All	NC
1070	CEE Tier 2 Clothes Washer (with electric WH)	MF	-	All	NC
1071	CEE Tier 3 Clothes Washer (with electric WH)	MF	-	All	NC
1072	Energy Star Electric Clothes Washer (with natural gas WH)	MF	NG	All	NC
1073	CEE Tier 2 Clothes Washer (with natural gas WH)	MF	NG	All	NC
1074	CEE Tier 3 Clothes Washer (with natural gas WH)	MF	NG	All	NC
1075	Energy Star Electric Clothes Washer (with Petroleum WH)	MF	PET	All	NC
1076	CEE Tier 2 Clothes Washer (with Petroleum WH)	MF	PET	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
1000	**Appliances**				
1077	CEE Tier 3 Clothes Washer (with Petroleum WH)	MF	PET	All	NC
1078	Clothes Dryer with Moisture Sensor (electric dryer)	MF	-	All	NC
1079	Clothes Dryer with Moisture Sensor (natural gas dryer)	MF	NG	All	NC
1080	Clothes Dryer with Moisture Sensor (petroleum dryer)	MF	PET	All	NC
1081	Energy Star Dishwasher (electric water heating)	MF	-	All	NC
1082	Energy Star Dishwasher (natural gas water heating)	MF	NG	All	NC
1083	Energy Star Dishwasher (petroleum water heating)	MF	PET	All	NC
1084	Energy Star Dehumidifier	MF	-	All	NC
2000	**Electronics**				
2001	"Smart Strip" Plug Outlet, 5-plug	SF	-	All	Existing
2002	"Smart Strip" Plug Outlet, 7-plug	SF	-	All	Existing
2003	ES Desktop	SF	-	All	Existing
2004	ES Laptop	SF	-	All	Existing
2005	LCD Computer Monitors	SF	-	All	Existing
2006	HE Television replacing Standard	SF	-	All	Existing
2007	HE Television replacing Plasma	SF	-	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
2000	**Electronics**				
2008	HE Television replacing Projection	SF	-	All	Existing
2009	Room Air Cleaner	SF	-	All	Existing
2010	"Smart Strip" Plug Outlet, 5-plug	SF	-	All	NC
2011	"Smart Strip" Plug Outlet, 7-plug	SF	-	All	NC
2012	ES Desktop	SF	-	All	NC
2013	ES Laptop	SF	-	All	NC
2014	LCD Computer Monitors	SF	-	All	NC
2015	HE Television replacing Standard	SF	-	All	NC
2016	HE Television replacing Plasma	SF	-	All	NC
2017	HE Television replacing Projection	SF	-	All	NC
2018	Room Air Cleaner	SF	-	All	NC
2019	"Smart Strip" Plug Outlet, 5-plug	MF	-	All	Existing
2020	"Smart Strip" Plug Outlet, 7-plug	MF	-	All	Existing
2021	ES Desktop	MF	-	All	Existing
2022	ES Laptop	MF	-	All	Existing
2023	LCD Computer Monitors	MF	-	All	Existing
2024	HE Television replacing Standard	MF	-	All	Existing
2025	HE Television replacing Plasma	MF	-	All	Existing
2026	HE Television replacing Projection	MF	-	All	Existing
2027	Room Air Cleaner	MF	-	All	Existing
2028	"Smart Strip" Plug Outlet, 5-plug	MF	-	All	NC
2029	"Smart Strip" Plug Outlet, 7-plug	MF	-	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
2000	**Electronics**				
2030	ES Desktop	MF	-	All	NC
2031	ES Laptop	MF	-	All	NC
2032	LCD Computer Monitors	MF	-	All	NC
2033	HE Television replacing Standard	MF	-	All	NC
2034	HE Television replacing Plasma	MF	-	All	NC
2035	HE Television replacing Projection	MF	-	All	NC
2036	Room Air Cleaner	MF	-	All	NC
3000	**Lighting**				
3001	ENERGY STAR Specialty CFL	SF	-	All	Existing
3002	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent)	SF	-	All	Existing
3003	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent)	SF	-	All	Existing
3004	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent)	SF	-	All	Existing
3005	ENERGY STAR Standard CFL (23 W CFL replacing 100 W incandescent)	SF	-	All	Existing
3006	Energy Star Dedicated CFL Fixture	SF	-	All	Existing
3007	Energy Star Dedicated Exterior Fixture	SF	-	All	Existing
3008	LED Lighting (screw-in) ; 2013-2019	SF	-	All	Existing
3009	LED Lighting (screw-in) ; 2020 and later	SF	-	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
3000	**Lighting**				
3010	LED Specialty Lighting	SF	-	All	Existing
3011	LED Fixture (Exterior)	SF	-	All	Existing
3012	Torchieres	SF	-	All	Existing
3013	Exterior Lighting Controls	SF	-	All	Existing
3014	Electroluminescent nightlights	SF	-	All	Existing
3015	ENERGY STAR Specialty CFL	SF	-	All	NC
3016	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent)	SF	-	All	NC
3017	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent)	SF	-	All	NC
3018	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent)	SF	-	All	NC
3019	Energy Star Dedicated CFL Fixture	SF	-	All	NC
3020	Energy Star Dedicated Exterior Fixture	SF	-	All	NC
3021	LED Lighting (screw-in) ; 2013-2019	SF	-	All	NC
3022	LED Lighting (screw-in) ; 2020 and later	SF	-	All	NC
3023	LED Specialty Lighting	SF	-	All	NC
3024	LED Fixture (Exterior)	SF	-	All	NC
3025	Torchieres	SF	-	All	NC
3026	Exterior Lighting Controls	SF	-	All	NC
3027	Electroluminescent nightlights	SF	-	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
3000	**Lighting**				
3028	ENERGY STAR Specialty CFL	MF	-	All	Existing
3029	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent)	MF	-	All	Existing
3030	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent)	MF	-	All	Existing
3031	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent)	MF	-	All	Existing
3032	ENERGY STAR Standard CFL (23 W CFL replacing 100 W incandescent)	MF	-	All	Existing
3033	Energy Star Dedicated CFL Fixture	MF	-	All	Existing
3034	Energy Star Dedicated Exterior Fixture	MF	-	All	Existing
3035	LED Lighting (screw-in) ; 2013-2019	MF	-	All	Existing
3036	LED Lighting (screw-in) ; 2020 and later	MF	-	All	Existing
3037	LED Specialty Lighting	MF	-	All	Existing
3038	LED Fixture (Exterior)	MF	-	All	Existing
3039	Torchieres	MF	-	All	Existing
3040	Interior Lighting Controls (Common Areas)	MF	-	All	Existing
3041	Exterior Lighting Controls	MF	-	All	Existing
3042	Electroluminescent nightlights	MF	-	All	Existing
3043	Common Area CFL lamps	MF	-	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
3000	**Lighting**				
3044	Common Area Efficient Linear Fluorescent Lamps	MF	-	All	Existing
3045	ENERGY STAR Specialty CFL	MF	-	All	NC
3046	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent)	MF	-	All	NC
3047	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent)	MF	-	All	NC
3048	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent)	MF	-	All	NC
3049	Energy Star Dedicated CFL Fixture	MF	-	All	NC
3050	Energy Star Dedicated Exterior Fixture	MF	-	All	NC
3051	LED Lighting (screw-in) ; 2013-2019	MF	-	All	NC
3052	LED Lighting (screw-in) ; 2020 and later	MF	-	All	NC
3053	LED Specialty Lighting	MF	-	All	NC
3054	LED Fixture (Exterior)	MF	-	All	NC
3055	Torchieres	MF	-	All	NC
3056	Interior Lighting Controls (Common Areas)	MF	-	All	NC
3057	Exterior Lighting Controls	MF	-	All	NC
3058	Electroluminescent nightlights	MF	-	All	NC
3059	Common Area CFL lamps	MF	-	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
3000	**Lighting**				
3060	Common Area Efficient Linear Fluorescent Lamps	MF	-	All	NC
4000	**Water Heating**				
4001	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I)	SF	-	All	Existing
4002	High Efficiency Storage Tank Water Heater - HPWH (Tier II)	SF	-	All	Existing
4003	Solar WH w/ Electric Backup	SF	-	All	Existing
4004	Desuperheater (off GSHP)	SF	-	All	Existing
4005	High-Efficiency Gas Storage Tier I	SF	NG	All	Existing
4006	High-Efficiency Gas Storage Tier II (Condensing)	SF	NG	All	Existing
4007	Whole-Home Gas Tankless 82%	SF	NG	All	Existing
4008	Whole-Home Gas Tankless 95%	SF	NG	All	Existing
4009	Solar WH w/ Gas Backup	SF	NG	All	Existing
4010	Indirect Water Heater (Gas Boiler)	SF	NG	All	Existing
4011	Combination Heat/Hot Water (Natural Gas Boiler)	SF	NG	All	Existing
4012	High-Efficiency petroleum Storage Tier I	SF	PET	All	Existing
4013	High-Efficiency petroleum Storage Tier II (Condensing)	SF	PET	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4014	Whole-Home petroleum Tankless 82%	SF	PET	All	Existing
4015	Whole-Home petroleum Tankless 95%	SF	PET	All	Existing
4016	Solar WH w/ petroleum Backup	SF	PET	All	Existing
4017	Indirect Water Heater (petroleum Boiler)	SF	PET	All	Existing
4018	Combination Heat/Hot Water (petroleum Boiler)	SF	PET	All	Existing
4019	Pipe Wrap (Electric)	SF	-	All	Existing
4020	Pipe Wrap (Natural Gas)	SF	NG	All	Existing
4021	Pipe Wrap (Petroleum)	SF	PET	All	Existing
4022	Tank Wrap (Electric)	SF	-	All	Existing
4023	Tank Wrap (Natural Gas)	SF	NG	All	Existing
4024	Tank Wrap (Petroleum)	SF	PET	All	Existing
4025	Low Flow Showerhead (Electric)	SF	-	All	Existing
4026	Low Flow Showerhead (Natural Gas)	SF	NG	All	Existing
4027	Low Flow Showerhead (Petroleum)	SF	PET	All	Existing
4028	Low Flow Faucets-Kitchen (Electric)	SF	-	All	Existing
4029	Low Flow Faucets-Kitchen (Natural Gas)	SF	NG	All	Existing
4030	Low Flow Faucets-Kitchen (Petroleum)	SF	PET	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4031	Low Flow Faucets-Bath (Electric)	SF	-	All	Existing
4032	Low Flow Faucets-Bath (Natural Gas)	SF	NG	All	Existing
4033	Low Flow Faucets-Bath (Petroleum)	SF	PET	All	Existing
4034	Shower Start (Electric)	SF	-	All	Existing
4035	Shower Start (Natural Gas)	SF	NG	All	Existing
4036	Shower Start (Petroleum)	SF	PET	All	Existing
4037	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I)	SF	-	All	NC
4038	High Efficiency Storage Tank Water Heater - HPWH (Tier II)	SF	-	All	NC
4039	Solar WH w/ Electric Backup	SF	-	All	NC
4040	Desuperheater (off GSHP)	SF	-	All	NC
4041	High-Efficiency Gas Storage Tier I	SF	NG	All	NC
4042	High-Efficiency Gas Storage Tier II (Condensing)	SF	NG	All	NC
4043	Whole-Home Gas Tankless 82%	SF	NG	All	NC
4044	Whole-Home Gas Tankless 95%	SF	NG	All	NC
4045	Solar WH w/ Gas Backup	SF	NG	All	NC
4046	Indirect Water Heater (Gas Boiler)	SF	NG	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4047	Combination Heat/Hot Water (Natural Gas Boiler)	SF	NG	All	NC
4048	High-Efficiency petroleum Storage Tier I	SF	PET	All	NC
4049	High-Efficiency petroleum Storage Tier II (Condensing)	SF	PET	All	NC
4050	Whole-Home petroleum Tankless 82%	SF	PET	All	NC
4051	Whole-Home petroleum Tankless 95%	SF	PET	All	NC
4052	Solar WH w/ petroleum Backup	SF	PET	All	NC
4053	Indirect Water Heater (petroleum Boiler)	SF	PET	All	NC
4054	Combination Heat/Hot Water (Natural petroleum Boiler)	SF	PET	All	NC
4055	Pipe Wrap (Electric)	SF	-	All	NC
4056	Pipe Wrap (Natural Gas)	SF	NG	All	NC
4057	Pipe Wrap (Petroleum)	SF	PET	All	NC
4058	Low Flow Showerhead (Electric)	SF	-	All	NC
4059	Low Flow Showerhead (Natural Gas)	SF	NG	All	NC
4060	Low Flow Showerhead (Petroleum)	SF	PET	All	NC
4061	Low Flow Faucets-Kitchen (Electric)	SF	-	All	NC
4062	Low Flow Faucets-Kitchen (Natural Gas)	SF	NG	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4063	Low Flow Faucets-Kitchen (Petroleum)	SF	PET	All	NC
4064	Low Flow Faucets-Bath (Electric)	SF	-	All	NC
4065	Low Flow Faucets-Bath (Natural Gas)	SF	NG	All	NC
4066	Low Flow Faucets-Bath (Petroleum)	SF	PET	All	NC
4067	Shower Start (Electric)	SF	-	All	NC
4068	Shower Start (Natural Gas)	SF	NG	All	NC
4069	Shower Start (Petroleum)	SF	PET	All	NC
4070	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I)	MF	-	All	Existing
4071	High Efficiency Storage Tank Water Heater - HPWH (Tier II)	MF	-	All	Existing
4072	Solar WH w/ Electric Backup	MF	-	All	Existing
4073	Desuperheater (off GSHP)	MF	-	All	Existing
4074	High-Efficiency Gas Storage Tier I	MF	NG	All	Existing
4075	High-Efficiency Gas Storage Tier II (Condensing)	MF	NG	All	Existing
4076	Whole-Home Gas Tankless 82%	MF	NG	All	Existing
4077	Whole-Home Gas Tankless 95%	MF	NG	All	Existing
4078	Solar WH w/ Gas Backup	MF	NG	All	Existing
4079	Indirect Water Heater (Gas Boiler)	MF	NG	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4080	Combination Heat/Hot Water (Natural Gas Boiler)	MF	NG	All	Existing
4081	High-Efficiency petroleum Storage Tier I	MF	PET	All	Existing
4082	High-Efficiency petroleum Storage Tier II (Condensing)	MF	PET	All	Existing
4083	Whole-Home petroleum Tankless 82%	MF	PET	All	Existing
4084	Whole-Home petroleum Tankless 95%	MF	PET	All	Existing
4085	Solar WH w/ petroleum Backup	MF	PET	All	Existing
4086	Indirect Water Heater (petroleum Boiler)	MF	PET	All	Existing
4087	Combination Heat/Hot Water (Natural petroleum Boiler)	MF	PET	All	Existing
4088	Pipe Wrap (Electric)	MF	-	All	Existing
4089	Pipe Wrap (Natural Gas)	MF	NG	All	Existing
4090	Pipe Wrap (Petroleum)	MF	PET	All	Existing
4091	Tank Wrap (Electric)	MF	-	All	Existing
4092	Tank Wrap (Natural Gas)	MF	NG	All	Existing
4093	Tank Wrap (Petroleum)	MF	PET	All	Existing
4094	Low Flow Showerhead (Electric)	MF	-	All	Existing
4095	Low Flow Showerhead (Natural Gas)	MF	NG	All	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4096	Low Flow Showerhead (Petroleum)	MF	PET	All	Existing
4097	Low Flow Faucets-Kitchen (Electric)	MF	-	All	Existing
4098	Low Flow Faucets-Kitchen (Natural Gas)	MF	NG	All	Existing
4099	Low Flow Faucets-Kitchen (Petroleum)	MF	PET	All	Existing
4100	Low Flow Faucets-Bath (Electric)	MF	-	All	Existing
4101	Low Flow Faucets-Bath (Natural Gas)	MF	NG	All	Existing
4102	Low Flow Faucets-Bath (Petroleum)	MF	PET	All	Existing
4103	Shower Start (Electric)	MF	-	All	Existing
4104	Shower Start (Natural Gas)	MF	NG	All	Existing
4105	Shower Start (Petroleum)	MF	PET	All	Existing
4106	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Electric)	MF	-	All	Existing
4107	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Natural Gas)	MF	NG	All	Existing
4108	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Petroleum)	MF	PET	All	Existing
4109	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I)	MF	-	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4110	High Efficiency Storage Tank Water Heater - HPWH (Tier II)	MF	-	All	NC
4111	Solar WH w/ Electric Backup	MF	-	All	NC
4112	Desuperheater (off GSHP)	MF	-	All	NC
4113	High-Efficiency Gas Storage Tier I	MF	NG	All	NC
4114	High-Efficiency Gas Storage Tier II (Condensing)	MF	NG	All	NC
4115	Whole-Home Gas Tankless 82%	MF	NG	All	NC
4116	Whole-Home Gas Tankless 95%	MF	NG	All	NC
4117	Solar WH w/ Gas Backup	MF	NG	All	NC
4118	Indirect Water Heater (Gas Boiler)	MF	NG	All	NC
4119	Combination Heat/Hot Water (Natural Gas Boiler)	MF	NG	All	NC
4120	High-Efficiency petroleum Storage Tier I	MF	PET	All	NC
4121	High-Efficiency petroleum Storage Tier II (Condensing)	MF	PET	All	NC
4122	Whole-Home petroleum Tankless 82%	MF	PET	All	NC
4123	Whole-Home petroleum Tankless 95%	MF	PET	All	NC
4124	Solar WH w/ petroleum Backup	MF	PET	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4125	Indirect Water Heater (petroleum Boiler)	MF	PET	All	NC
4126	Combination Heat/Hot Water (Natural petroleum Boiler)	MF	PET	All	NC
4127	Pipe Wrap (Electric)	MF	-	All	NC
4128	Pipe Wrap (Natural Gas)	MF	NG	All	NC
4129	Pipe Wrap (Petroleum)	MF	PET	All	NC
4130	Low Flow Showerhead (Electric)	MF	-	All	NC
4131	Low Flow Showerhead (Natural Gas)	MF	NG	All	NC
4132	Low Flow Showerhead (Petroleum)	MF	PET	All	NC
4133	Low Flow Faucets-Kitchen (Electric)	MF	-	All	NC
4134	Low Flow Faucets-Kitchen (Natural Gas)	MF	NG	All	NC
4135	Low Flow Faucets-Kitchen (Petroleum)	MF	PET	All	NC
4136	Low Flow Faucets-Bath (Electric)	MF	-	All	NC
4137	Low Flow Faucets-Bath (Natural Gas)	MF	NG	All	NC
4138	Low Flow Faucets-Bath (Petroleum)	MF	PET	All	NC
4139	Shower Start (Electric)	MF	-	All	NC
4140	Shower Start (Natural Gas)	MF	NG	All	NC
4141	Shower Start (Petroleum)	MF	PET	All	NC
4142	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Electric)	MF	-	All	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
4000	**Water Heating**				
4143	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Natural Gas)	MF	NG	All	NC
4144	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Petroleum)	MF	PET	All	NC
5000	**Miscellaneous/Other**				
5001	Variable Speed Pool Pump and Motor	SF	-	ALL	Existing
5002	High Efficiency Two-Speed Pool Pump	SF	-	ALL	Existing
5003	Pool Pump Timer	SF	-	ALL	Existing
5004	Solar Pool Cover	SF	-	ALL	Existing
5005	Efficient Well Pump	SF	-	ALL	Existing
5006	Indirect Energy Consumption Feedback (Electric)	SF	-	ALL	Existing
5007	Indirect Energy Consumption Feedback (Natural Gas)	SF	NG	ALL	Existing
5008	Indirect Energy Consumption Feedback (Petroleum)	SF	PET	ALL	Existing
5009	Direct Feedback Devices (In Home Display) (Electric)	SF	-	ALL	Existing
5010	Direct Feedback Devices (In Home Display) (Natural Gas)	SF	NG	ALL	Existing
5011	Direct Feedback Devices (In Home Display) (Petroleum)	SF	PET	ALL	Existing
5012	Variable Speed Pool Pump and Motor	SF	-	ALL	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
5000	**Miscellaneous/Other**				
5013	High Efficiency Two-Speed Pool Pump	SF	-	ALL	NC
5014	Pool Pump Timer	SF	-	ALL	NC
5015	Solar Pool Cover	SF	-	ALL	NC
5016	Efficient Well Pump	SF	-	ALL	NC
5017	Indirect Energy Consumption Feedback (Electric)	SF	-	ALL	NC
5018	Indirect Energy Consumption Feedback (Natural Gas)	SF	NG	ALL	NC
5019	Indirect Energy Consumption Feedback (Petroleum)	SF	PET	ALL	NC
5020	Direct Feedback Devices (In Home Display) (Electric)	SF	-	ALL	NC
5021	Direct Feedback Devices (In Home Display) (Natural Gas)	SF	NG	ALL	NC
5022	Direct Feedback Devices (In Home Display) (Petroleum)	SF	PET	ALL	NC
5023	Variable Speed Pool Pump and Motor	MF	-	ALL	Existing
5024	High Efficiency Two-Speed Pool Pump	MF	-	ALL	Existing
5025	Pool Pump Timer	MF	-	ALL	Existing
5026	Solar Pool Cover	MF	-	ALL	Existing
5027	Efficient Well Pump	MF	-	ALL	Existing
5029	Indirect Energy Consumption Feedback (Electric)	MF	-	ALL	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
5000	**Miscellaneous/Other**				
5030	Indirect Energy Consumption Feedback (Natural Gas)	MF	NG	ALL	Existing
5031	Indirect Energy Consumption Feedback (Petroleum)	MF	PET	ALL	Existing
5032	Direct Feedback Devices (In Home Display) (Electric)	MF	-	ALL	Existing
5033	Direct Feedback Devices (In Home Display) (Natural Gas)	MF	NG	ALL	Existing
5034	Direct Feedback Devices (In Home Display) (Petroleum)	MF	PET	ALL	Existing
5035	Variable Speed Pool Pump and Motor	MF	-	ALL	NC
5036	High Efficiency Two-Speed Pool Pump	MF	-	ALL	NC
5037	Pool Pump Timer	MF	-	ALL	NC
5038	Solar Pool Cover	MF	-	ALL	NC
5039	Efficient Well Pump	MF	-	ALL	NC
5041	Indirect Energy Consumption Feedback (Electric)	MF	-	ALL	NC
5042	Indirect Energy Consumption Feedback (Natural Gas)	MF	NG	ALL	NC
5043	Indirect Energy Consumption Feedback (Petroleum)	MF	PET	ALL	NC
5044	Direct Feedback Devices (In Home Display) (Electric)	MF	-	ALL	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
5000	**Miscellaneous/Other**				
5045	Direct Feedback Devices (In Home Display) (Natural Gas)	MF	NG	ALL	NC
5046	Direct Feedback Devices (In Home Display) (Petroleum)	MF	PET	ALL	NC
6000	**Building Envelope**				
6001	Improved Floor Insulation (R-0 to R-19)	SF	NG	CZ4	Existing
6002	Improved Floor Insulation (R-0 to R-30)	SF	NG	CZ4	Existing
6003	Improved Wall Insulation (R-0 to R-13)	SF	NG	CZ4	Existing
6004	Improved Wall Insulation (R-7 to R-13)	SF	NG	CZ4	Existing
6005	Improved Attic/Roof Insulation (R-19 to R-38)	SF	NG	CZ4	Existing
6006	Improved Attic/Roof Insulation (R-19 to R-49)	SF	NG	CZ4	Existing
6007	Basement Wall/Foundation/Rim Insulation (R0 to R10)	SF	NG	CZ4	Existing
6008	Improved Air Sealing	SF	NG	CZ4	Existing
6009	Improved Duct Sealing	SF	NG	CZ4	Existing
6010	ES Windows	SF	NG	CZ4	Existing
6011	Storm Windows	SF	NG	CZ4	Existing
6012	Exterior Door	SF	NG	CZ4	Existing
6013	Improved Floor Insulation (R-0 to R19)	SF	NG	CZ5	Existing
6014	Improved Floor Insulation (R0 to R30)	SF	NG	CZ5	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6015	Improved Wall Insulation (R0 to R20)	SF	NG	CZ5	Existing
6016	Improved Wall Insulation (R10 to R20)	SF	NG	CZ5	Existing
6017	Improved Attic/Roof Insulation (R19 to R38)	SF	NG	CZ5	Existing
6018	Improved Attic/Roof Insulation (R19 to R49)	SF	NG	CZ5	Existing
6019	Basement Wall/Foundation/Rim Insulation (R0 to R10)	SF	NG	CZ5	Existing
6020	Improved Air Sealing	SF	NG	CZ5	Existing
6021	Improved Duct Sealing	SF	NG	CZ5	Existing
6022	ES Windows	SF	NG	CZ5	Existing
6023	Storm Windows	SF	NG	CZ5	Existing
6024	Exterior Door	SF	NG	CZ5	Existing
6025	Improved Floor Insulation (R-0 to R19)	SF	NG	CZ6	Existing
6026	Improved Floor Insulation (R0 to R30)	SF	NG	CZ6	Existing
6027	Improved Wall Insulation (R0 to R20)	SF	NG	CZ6	Existing
6028	Improved Wall Insulation (R10 to R20)	SF	NG	CZ6	Existing
6029	Improved Attic/Roof Insulation (R19 to R49)	SF	NG	CZ6	Existing
6030	Improved Attic/Roof Insulation (R19 to R60)	SF	NG	CZ6	Existing
6031	Basement Wall/Foundation/Rim Insulation (R0 to R15)	SF	NG	CZ6	Existing
6032	Improved Air Sealing	SF	NG	CZ6	Existing
6033	Improved Duct Sealing	SF	NG	CZ6	Existing
6034	ES Windows	SF	NG	CZ6	Existing
6035	Storm Windows	SF	NG	CZ6	Existing
6036	Exterior Door	SF	NG	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6037	Improved Floor Insulation (R-0 to R19)	SF	PET	CZ4	Existing
6038	Improved Floor Insulation (R0 to R30)	SF	PET	CZ4	Existing
6039	Improved Wall Insulation (R0 to R13)	SF	PET	CZ4	Existing
6040	Improved Wall Insulation (R7 to R13)	SF	PET	CZ4	Existing
6041	Improved Attic/Roof Insulation (R19 to R38)	SF	PET	CZ4	Existing
6042	Improved Attic/Roof Insulation (R19 to R49)	SF	PET	CZ4	Existing
6043	Basement Wall/Foundation/Rim Insulation (R0 to R10)	SF	PET	CZ4	Existing
6044	Improved Air Sealing	SF	PET	CZ4	Existing
6045	Improved Duct Sealing	SF	PET	CZ4	Existing
6046	ES Windows	SF	PET	CZ4	Existing
6047	Storm Windows	SF	PET	CZ4	Existing
6048	Exterior Door	SF	PET	CZ4	Existing
6049	Improved Floor Insulation (R-0 to R19)	SF	PET	CZ5	Existing
6050	Improved Floor Insulation (R0 to R30)	SF	PET	CZ5	Existing
6051	Improved Wall Insulation (R0 to R20)	SF	PET	CZ5	Existing
6052	Improved Wall Insulation (R10 to R20)	SF	PET	CZ5	Existing
6053	Improved Attic/Roof Insulation (R19 to R38)	SF	PET	CZ5	Existing
6054	Improved Attic/Roof Insulation (R19 to R49)	SF	PET	CZ5	Existing
6055	Basement Wall/Foundation/Rim Insulation (R0 to R10)	SF	PET	CZ5	Existing
6056	Improved Air Sealing	SF	PET	CZ5	Existing
6057	Improved Duct Sealing	SF	PET	CZ5	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6058	ES Windows	SF	PET	CZ5	Existing
6059	Storm Windows	SF	PET	CZ5	Existing
6060	Exterior Door	SF	PET	CZ5	Existing
6061	Improved Floor Insulation (R-0 to R19)	SF	PET	CZ6	Existing
6062	Improved Floor Insulation (R0 to R30)	SF	PET	CZ6	Existing
6063	Improved Wall Insulation (R0 to R20)	SF	PET	CZ6	Existing
6064	Improved Wall Insulation (R10 to R20)	SF	PET	CZ6	Existing
6065	Improved Attic/Roof Insulation (R19 to R49)	SF	PET	CZ6	Existing
6066	Improved Attic/Roof Insulation (R19 to R60)	SF	PET	CZ6	Existing
6067	Basement Wall/Foundation/Rim Insulation (R0 to R15)	SF	PET	CZ6	Existing
6068	Improved Air Sealing	SF	PET	CZ6	Existing
6069	Improved Duct Sealing	SF	PET	CZ6	Existing
6070	ES Windows	SF	PET	CZ6	Existing
6071	Storm Windows	SF	PET	CZ6	Existing
6072	Exterior Door	SF	PET	CZ6	Existing
6073	Improved Floor Insulation (R-0 to R19)	SF	-	CZ4	Existing
6074	Improved Floor Insulation (R0 to R30)	SF	-	CZ4	Existing
6075	Improved Wall Insulation (R0 to R13)	SF	-	CZ4	Existing
6076	Improved Wall Insulation (R7 to R13)	SF	-	CZ4	Existing
6077	Improved Attic/Roof Insulation (R19 to R38)	SF	-	CZ4	Existing
6078	Improved Attic/Roof Insulation (R19 to R49)	SF	-	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6079	Basement Wall/Foundation/Rim Insulation (R0 to R10)	SF	-	CZ4	Existing
6080	Improved Air Sealing	SF	-	CZ4	Existing
6081	Improved Duct Sealing	SF	-	CZ4	Existing
6082	ES Windows	SF	-	CZ4	Existing
6083	Storm Windows	SF	-	CZ4	Existing
6084	Exterior Door	SF	-	CZ4	Existing
6085	Improved Floor Insulation (R-0 to R19)	SF	-	CZ5	Existing
6086	Improved Floor Insulation (R0 to R30)	SF	-	CZ5	Existing
6087	Improved Wall Insulation (R0 to R20)	SF	-	CZ5	Existing
6088	Improved Wall Insulation (R10 to R20)	SF	-	CZ5	Existing
6089	Improved Attic/Roof Insulation (R19 to R38)	SF	-	CZ5	Existing
6090	Improved Attic/Roof Insulation (R19 to R49)	SF	-	CZ5	Existing
6091	Basement Wall/Foundation/Rim Insulation (R0 to R10)	SF	-	CZ5	Existing
6092	Improved Air Sealing	SF	-	CZ5	Existing
6093	Improved Duct Sealing	SF	-	CZ5	Existing
6094	ES Windows	SF	-	CZ5	Existing
6095	Storm Windows	SF	-	CZ5	Existing
6096	Exterior Door	SF	-	CZ5	Existing
6097	Improved Floor Insulation (R-0 to R19)	SF	-	CZ6	Existing
6098	Improved Floor Insulation (R0 to R30)	SF	-	CZ6	Existing
6099	Improved Wall Insulation (R0 to R20)	SF	-	CZ6	Existing
6100	Improved Wall Insulation (R10 to R20)	SF	-	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6101	Improved Attic/Roof Insulation (R19 to R49)	SF	-	CZ6	Existing
6102	Improved Attic/Roof Insulation (R19 to R60)	SF	-	CZ6	Existing
6103	Basement Wall/Foundation/Rim Insulation (R0 to R15)	SF	-	CZ6	Existing
6104	Improved Air Sealing	SF	-	CZ6	Existing
6105	Improved Duct Sealing	SF	-	CZ6	Existing
6106	ES Windows	SF	-	CZ6	Existing
6107	Storm Windows	SF	-	CZ6	Existing
6108	Exterior Door	SF	-	CZ6	Existing
6109	Improved Floor Insulation (R-0 to R-19)	MF	NG	CZ4	Existing
6110	Improved Floor Insulation (R-0 to R-30)	MF	NG	CZ4	Existing
6111	Improved Wall Insulation (R-0 to R-13)	MF	NG	CZ4	Existing
6112	Improved Wall Insulation (R-7 to R-13)	MF	NG	CZ4	Existing
6113	Improved Attic/Roof Insulation (R-19 to R-38)	MF	NG	CZ4	Existing
6114	Improved Attic/Roof Insulation (R-19 to R-49)	MF	NG	CZ4	Existing
6115	Basement Wall/Foundation/Rim Insulation (R0 to R10)	MF	NG	CZ4	Existing
6116	Improved Air Sealing	MF	NG	CZ4	Existing
6117	Improved Duct Sealing	MF	NG	CZ4	Existing
6118	ES Windows	MF	NG	CZ4	Existing
6119	Storm Windows	MF	NG	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6120	Exterior Door	MF	NG	CZ4	Existing
6121	Improved Floor Insulation (R-0 to R-19)	MF	NG	CZ5	Existing
6122	Improved Floor Insulation (R-0 to R-30)	MF	NG	CZ5	Existing
6123	Improved Wall Insulation (R-0 to R-20)	MF	NG	CZ5	Existing
6124	Improved Wall Insulation (R-10 to R-20)	MF	NG	CZ5	Existing
6125	Improved Attic/Roof Insulation (R19 to R38)	MF	NG	CZ5	Existing
6126	Improved Attic/Roof Insulation (R19 to R49)	MF	NG	CZ5	Existing
6127	Basement Wall/Foundation/Rim Insulation (R0 to R10)	MF	NG	CZ5	Existing
6128	Improved Air Sealing	MF	NG	CZ5	Existing
6129	Improved Duct Sealing	MF	NG	CZ5	Existing
6130	ES Windows	MF	NG	CZ5	Existing
6131	Storm Windows	MF	NG	CZ5	Existing
6132	Exterior Door	MF	NG	CZ5	Existing
6133	Improved Floor Insulation (R-0 to R-19)	MF	NG	CZ6	Existing
6134	Improved Floor Insulation (R-0 to R-30)	MF	NG	CZ6	Existing
6135	Improved Wall Insulation (R-0 to R-20)	MF	NG	CZ6	Existing
6136	Improved Wall Insulation (R-10 to R-20)	MF	NG	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6137	Improved Attic/Roof Insulation (R19 to R49)	MF	NG	CZ6	Existing
6138	Improved Attic/Roof Insulation (R19 to R60)	MF	NG	CZ6	Existing
6139	Basement Wall/Foundation/Rim Insulation (R0 to R15)	MF	NG	CZ6	Existing
6140	Improved Air Sealing	MF	NG	CZ6	Existing
6141	Improved Duct Sealing	MF	NG	CZ6	Existing
6142	ES Windows	MF	NG	CZ6	Existing
6143	Storm Windows	MF	NG	CZ6	Existing
6144	Exterior Door	MF	NG	CZ6	Existing
6145	Improved Floor Insulation (R-0 to R-19)	MF	PET	CZ4	Existing
6146	Improved Floor Insulation (R-0 to R-30)	MF	PET	CZ4	Existing
6147	Improved Wall Insulation (R-0 to R-13)	MF	PET	CZ4	Existing
6148	Improved Wall Insulation (R-7 to R-13)	MF	PET	CZ4	Existing
6149	Improved Attic/Roof Insulation (R19 to R38)	MF	PET	CZ4	Existing
6150	Improved Attic/Roof Insulation (R19 to R49)	MF	PET	CZ4	Existing
6151	Basement Wall/Foundation/Rim Insulation (R0 to R10)	MF	PET	CZ4	Existing
6152	Improved Air Sealing	MF	PET	CZ4	Existing
6153	Improved Duct Sealing	MF	PET	CZ4	Existing
6154	ES Windows	MF	PET	CZ4	Existing
6155	Storm Windows	MF	PET	CZ4	Existing
6156	Exterior Door	MF	PET	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6157	Improved Floor Insulation (R-0 to R-19)	MF	PET	CZ5	Existing
6158	Improved Floor Insulation (R-0 to R-30)	MF	PET	CZ5	Existing
6159	Improved Wall Insulation (R-0 to R-20)	MF	PET	CZ5	Existing
6160	Improved Wall Insulation (R-10 to R-20)	MF	PET	CZ5	Existing
6161	Improved Attic/Roof Insulation (R19 to R38)	MF	PET	CZ5	Existing
6162	Improved Attic/Roof Insulation (R19 to R49)	MF	PET	CZ5	Existing
6163	Basement Wall/Foundation/Rim Insulation (R0 to R10)	MF	PET	CZ5	Existing
6164	Improved Air Sealing	MF	PET	CZ5	Existing
6165	Improved Duct Sealing	MF	PET	CZ5	Existing
6166	ES Windows	MF	PET	CZ5	Existing
6167	Storm Windows	MF	PET	CZ5	Existing
6168	Exterior Door	MF	PET	CZ5	Existing
6169	Improved Floor Insulation (R-0 to R-19)	MF	PET	CZ6	Existing
6170	Improved Floor Insulation (R-0 to R-30)	MF	PET	CZ6	Existing
6171	Improved Wall Insulation (R-0 to R-20)	MF	PET	CZ6	Existing
6172	Improved Wall Insulation (R-10 to R-20)	MF	PET	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6173	Improved Attic/Roof Insulation (R19 to R49)	MF	PET	CZ6	Existing
6174	Improved Attic/Roof Insulation (R19 to R60)	MF	PET	CZ6	Existing
6175	Basement Wall/Foundation/Rim Insulation (R0 to R15)	MF	PET	CZ6	Existing
6176	Improved Air Sealing	MF	PET	CZ6	Existing
6177	Improved Duct Sealing	MF	PET	CZ6	Existing
6178	ES Windows	MF	PET	CZ6	Existing
6179	Storm Windows	MF	PET	CZ6	Existing
6180	Exterior Door	MF	PET	CZ6	Existing
6181	Improved Floor Insulation (R-0 to R-19)	MF	-	CZ4	Existing
6182	Improved Floor Insulation (R-0 to R-30)	MF	-	CZ4	Existing
6183	Improved Wall Insulation (R-0 to R-13)	MF	-	CZ4	Existing
6184	Improved Wall Insulation (R-7 to R-13)	MF	-	CZ4	Existing
6185	Improved Attic/Roof Insulation (R19 to R38)	MF	-	CZ4	Existing
6186	Improved Attic/Roof Insulation (R19 to R49)	MF	-	CZ4	Existing
6187	Basement Wall/Foundation/Rim Insulation (R0 to R10)	MF	-	CZ4	Existing
6188	Improved Air Sealing	MF	-	CZ4	Existing
6189	Improved Duct Sealing	MF	-	CZ4	Existing
6190	ES Windows	MF	-	CZ4	Existing
6191	Storm Windows	MF	-	CZ4	Existing
6192	Exterior Door	MF	-	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6000	**Building Envelope**				
6193	Improved Floor Insulation (R-0 to R-19)	MF	-	CZ5	Existing
6194	Improved Floor Insulation (R-0 to R-30)	MF	-	CZ5	Existing
6195	Improved Wall Insulation (R-0 to R-20)	MF	-	CZ5	Existing
6196	Improved Wall Insulation (R-10 to R-20)	MF	-	CZ5	Existing
6197	Improved Attic/Roof Insulation (R19 to R38)	MF	-	CZ5	Existing
6198	Improved Attic/Roof Insulation (R19 to R49)	MF	-	CZ5	Existing
6199	Basement Wall/Foundation/Rim Insulation (R0 to R10)	MF	-	CZ5	Existing
6200	Improved Air Sealing	MF	-	CZ5	Existing
6201	Improved Duct Sealing	MF	-	CZ5	Existing
6202	ES Windows	MF	-	CZ5	Existing
6203	Storm Windows	MF	-	CZ5	Existing
6204	Exterior Door	MF	-	CZ5	Existing
6205	Improved Floor Insulation (R-0 to R-19)	MF	-	CZ6	Existing
6206	Improved Floor Insulation (R-0 to R-30)	MF	-	CZ6	Existing
6207	Improved Wall Insulation (R-0 to R-20)	MF	-	CZ6	Existing
6208	Improved Wall Insulation (R-10 to R-20)	MF	-	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
6209	Improved Attic/Roof Insulation (R19 to R49)	MF	-	CZ6	Existing
6000	**Building Envelope**				
6210	Improved Attic/Roof Insulation (R19 to R60)	MF	-	CZ6	Existing
6211	Basement Wall/Foundation/Rim Insulation (R0 to R15)	MF	-	CZ6	Existing
6212	Improved Air Sealing	MF	-	CZ6	Existing
6213	Improved Duct Sealing	MF	-	CZ6	Existing
6214	ES Windows	MF	-	CZ6	Existing
6215	Storm Windows	MF	-	CZ6	Existing
6216	Exterior Door	MF	-	CZ6	Existing
7000	**HVAC (Equipment)**				
7001	Room AC Recycling	SF	-	CZ4	Existing
7002	AC Tune-Up	SF	-	CZ4	Existing
7003	Refrigerant Charge	SF	-	CZ4	Existing
7004	Room AC SEHA Tier 1 (11.3 EER)	SF	-	CZ4	Existing
7005	Central Air Conditioner Tier 1 (12 EER)	SF	-	CZ4	Existing
7006	Central Air Conditioner Tier 2 (12.5 EER)	SF	-	CZ4	Existing
7007	Central Air Conditioner Tier 3 (13 EER)	SF	-	CZ4	Existing
7008	Central Air Source Heat Pump Tier 1 (12 EER)	SF	-	CZ4	Existing
7009	Central Air Source Heat Pump Tier 2 (12.5 EER)	SF	-	CZ4	Existing
7010	Ductless Minisplit CEE Tier I EER 12	SF	-	CZ4	Existing
7011	Ductless Minisplit CEE Tier 2 EER 12.5	SF	-	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7012	Ground Source Heat Pumps COP 4.2, EER 17	SF	-	CZ4	Existing
7013	Right Sizing - Air Conditioning	SF	-	CZ4	Existing
7014	High Efficiency Gas Furnace 90 AFUE	SF	NG	CZ4	Existing
7015	High Efficiency Gas Furnace 94 AFUE	SF	NG	CZ4	Existing
7016	High Efficiency Gas Furnace 96 AFUE	SF	NG	CZ4	Existing
7017	Tier I High Efficiency Petroleum Furnace	SF	Pet	CZ4	Existing
7018	Tier II High Efficiency Petroleum Furnace	SF	Pet	CZ4	Existing
7019	Tier III High Efficiency Petroleum Furnace	SF	Pet	CZ4	Existing
7020	ECM Furnace Fan Motor	SF	NG	CZ4	Existing
7021	ECM Furnace Fan Motor	SF	Pet	CZ4	Existing
7022	Furnace Tune-Up	SF	NG	CZ4	Existing
7023	Furnace Tune-Up	SF	Pet	CZ4	Existing
7024	Furnace Whistle	SF	NG	CZ4	Existing
7025	Furnace Whistle	SF	Pet	CZ4	Existing
7026	High Efficiency Gas Boiler 90 AFUE (Water)	SF	NG	CZ4	Existing
7027	High Efficiency Gas Boiler 95 AFUE (Water)	SF	NG	CZ4	Existing
7028	Tier I High Efficiency Petroleum Boiler	SF	Pet	CZ4	Existing
7029	Tier II High Efficiency Petroleum Boiler	SF	Pet	CZ4	Existing
7030	High Efficiency Gas steam boiler	SF	NG	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7031	High Efficiency Petroleum steam boiler	SF	Pet	CZ4	Existing
7032	Boiler Tune-Up (Gas)	SF	NG	CZ4	Existing
7033	Boiler Tune-Up (Petroleum)	SF	Pet	CZ4	Existing
7034	Boiler Reset Controls (Gas)	SF	NG	CZ4	Existing
7035	Boiler Reset Controls (Petroleum)	SF	Pet	CZ4	Existing
7036	Programmable Thermostat	SF	-	CZ4	Existing
7037	Programmable Thermostat	SF	NG	CZ4	Existing
7038	Programmable Thermostat	SF	Pet	CZ4	Existing
7039	Heat Recovery Ventilator	SF	-	CZ4	Existing
7040	Heat Recovery Ventilator	SF	NG	CZ4	Existing
7041	Heat Recovery Ventilator	SF	Pet	CZ4	Existing
7042	Room AC Recycling	SF	-	CZ5	Existing
7043	AC Tune-Up	SF	-	CZ5	Existing
7044	Refrigerant Charge	SF	-	CZ5	Existing
7045	Room AC SEHA Tier 1 (11.3 EER)	SF	-	CZ5	Existing
7046	Central Air Conditioner Tier 1 (12 EER)	SF	-	CZ5	Existing
7047	Central Air Conditioner Tier 2 (12.5 EER)	SF	-	CZ5	Existing
7048	Central Air Conditioner Tier 3 (13 EER)	SF	-	CZ5	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7049	Central Air Source Heat Pump Tier 1 (12 EER)	SF	-	CZ5	Existing
7050	Central Air Source Heat Pump Tier 2 (12.5 EER)	SF	-	CZ5	Existing
7051	Ductless Minisplit CEE Tier I EER 12	SF	-	CZ5	Existing
7052	Ductless Minisplit CEE Tier 2 EER 12.5	SF	-	CZ5	Existing
7053	Ground Source Heat Pumps COP 4.2, EER 17	SF	-	CZ5	Existing
7054	Right Sizing - Air Conditioning	SF	-	CZ5	Existing
7055	High Efficiency Gas Furnace 90 AFUE	SF	NG	CZ5	Existing
7056	High Efficiency Gas Furnace 94 AFUE	SF	NG	CZ5	Existing
7057	High Efficiency Gas Furnace 96 AFUE	SF	NG	CZ5	Existing
7058	Tier I High Efficiency Petroleum Furnace	SF	Pet	CZ5	Existing
7059	Tier II High Efficiency Petroleum Furnace	SF	Pet	CZ5	Existing
7060	Tier III High Efficiency Petroleum Furnace	SF	Pet	CZ5	Existing
7061	ECM Furnace Fan Motor	SF	NG	CZ5	Existing
7062	ECM Furnace Fan Motor	SF	Pet	CZ5	Existing
7063	Furnace Tune-Up	SF	NG	CZ5	Existing
7064	Furnace Tune-Up	SF	Pet	CZ5	Existing
7065	Furnace Whistle	SF	NG	CZ5	Existing
7066	Furnace Whistle	SF	Pet	CZ5	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7067	High Efficiency Gas Boiler 90 AFUE (Water)	SF	NG	CZ5	Existing
7068	High Efficiency Gas Boiler 95 AFUE (Water)	SF	NG	CZ5	Existing
7069	Tier I High Efficiency Petroleum Boiler	SF	Pet	CZ5	Existing
7070	Tier II High Efficiency Petroleum Boiler	SF	Pet	CZ5	Existing
7071	High Efficiency Gas steam boiler	SF	NG	CZ5	Existing
7072	High Efficiency Petroleum steam boiler	SF	Pet	CZ5	Existing
7073	Boiler Tune-Up (Gas)	SF	NG	CZ5	Existing
7074	Boiler Tune-Up (Petroleum)	SF	Pet	CZ5	Existing
7075	Boiler Reset Controls (Gas)	SF	NG	CZ5	Existing
7076	Boiler Reset Controls (Petroleum)	SF	Pet	CZ5	Existing
7077	Programmable Thermostat	SF	-	CZ5	Existing
7078	Programmable Thermostat	SF	NG	CZ5	Existing
7079	Programmable Thermostat	SF	Pet	CZ5	Existing
7080	Heat Recovery Ventilator	SF	-	CZ5	Existing
7081	Heat Recovery Ventilator	SF	NG	CZ5	Existing
7082	Heat Recovery Ventilator	SF	Pet	CZ5	Existing
7083	Room AC Recycling	SF	-	CZ6	Existing
7084	AC Tune-Up	SF	-	CZ6	Existing
7085	Refrigerant Charge	SF	-	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7086	Room AC SEHA Tier 1 (11.3 EER)	SF	-	CZ6	Existing
7087	Central Air Conditioner Tier 1 (12 EER)	SF	-	CZ6	Existing
7088	Central Air Conditioner Tier 2 (12.5 EER)	SF	-	CZ6	Existing
7089	Central Air Conditioner Tier 3 (13 EER)	SF	-	CZ6	Existing
7090	Central Air Source Heat Pump Tier 1 (12 EER)	SF	-	CZ6	Existing
7091	Central Air Source Heat Pump Tier 2 (12.5 EER)	SF	-	CZ6	Existing
7092	Ductless Minisplit CEE Tier I EER 12	SF	-	CZ6	Existing
7093	Ductless Minisplit CEE Tier 2 EER 12.5	SF	-	CZ6	Existing
7094	Ground Source Heat Pumps COP 4.2, EER 17	SF	-	CZ6	Existing
7095	Right Sizing - Air Conditioning	SF	-	CZ6	Existing
7096	High Efficiency Gas Furnace 90 AFUE	SF	NG	CZ6	Existing
7097	High Efficiency Gas Furnace 94 AFUE	SF	NG	CZ6	Existing
7098	High Efficiency Gas Furnace 96 AFUE	SF	NG	CZ6	Existing
7099	Tier I High Efficiency Petroleum Furnace	SF	Pet	CZ6	Existing
7100	Tier II High Efficiency Petroleum Furnace	SF	Pet	CZ6	Existing
7101	Tier III High Efficiency Petroleum Furnace	SF	Pet	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7102	ECM Furnace Fan Motor	SF	NG	CZ6	Existing
7103	ECM Furnace Fan Motor	SF	Pet	CZ6	Existing
7104	Furnace Tune-Up	SF	NG	CZ6	Existing
7105	Furnace Tune-Up	SF	Pet	CZ6	Existing
7106	Furnace Whistle	SF	NG	CZ6	Existing
7107	Furnace Whistle	SF	Pet	CZ6	Existing
7108	High Efficiency Gas Boiler 90 AFUE (Water)	SF	NG	CZ6	Existing
7109	High Efficiency Gas Boiler 95 AFUE (Water)	SF	NG	CZ6	Existing
7110	Tier I High Efficiency Petroleum Boiler	SF	Pet	CZ6	Existing
7111	Tier II High Efficiency Petroleum Boiler	SF	Pet	CZ6	Existing
7112	High Efficiency Gas steam boiler	SF	NG	CZ6	Existing
7113	High Efficiency Petroleum steam boiler	SF	Pet	CZ6	Existing
7114	Boiler Tune-Up (Gas)	SF	NG	CZ6	Existing
7115	Boiler Tune-Up (Petroleum)	SF	Pet	CZ6	Existing
7116	Boiler Reset Controls (Gas)	SF	NG	CZ6	Existing
7117	Boiler Reset Controls (Petroleum)	SF	Pet	CZ6	Existing
7118	Programmable Thermostat	SF	-	CZ6	Existing
7119	Programmable Thermostat	SF	NG	CZ6	Existing
7120	Programmable Thermostat	SF	Pet	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7121	Heat Recovery Ventilator	SF	-	CZ6	Existing
7122	Heat Recovery Ventilator	SF	NG	CZ6	Existing
7123	Heat Recovery Ventilator	SF	Pet	CZ6	Existing
7124	Room AC Recycling	MF	-	CZ4	Existing
7125	AC Tune-Up	MF	-	CZ4	Existing
7126	Refrigerant Charge	MF	-	CZ4	Existing
7127	Room AC SEHA Tier 1 (11.3 EER)	MF	-	CZ4	Existing
7128	Central Air Conditioner Tier 1 (12 EER)	MF	-	CZ4	Existing
7129	Central Air Conditioner Tier 2 (12.5 EER)	MF	-	CZ4	Existing
7130	Central Air Conditioner Tier 3 (13 EER)	MF	-	CZ4	Existing
7131	Central Air Source Heat Pump Tier 1 (12 EER)	MF	-	CZ4	Existing
7132	Central Air Source Heat Pump Tier 2 (12.5 EER)	MF	-	CZ4	Existing
7133	Package Terminal Heat Pump Tier 1 (11 EER)	MF	-	CZ4	Existing
7134	Package Terminal Heat Pump Tier 2 (12 EER)	MF	-	CZ4	Existing
7135	Ductless Minisplit CEE Tier I EER 12	MF	-	CZ4	Existing
7136	Ductless Minisplit CEE Tier 2 EER 12.5	MF	-	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7137	Ground Source Heat Pumps COP 4.2, EER 17	MF	-	CZ4	Existing
7138	Right Sizing - Air Conditioning	MF	-	CZ4	Existing
7139	High Efficiency Gas Furnace 90 AFUE	MF	NG	CZ4	Existing
7140	High Efficiency Gas Furnace 94 AFUE	MF	NG	CZ4	Existing
7141	High Efficiency Gas Furnace 96 AFUE	MF	NG	CZ4	Existing
7142	Tier I High Efficiency Petroleum Furnace	MF	Pet	CZ4	Existing
7143	Tier II High Efficiency Petroleum Furnace	MF	Pet	CZ4	Existing
7144	Tier III High Efficiency Petroleum Furnace	MF	Pet	CZ4	Existing
7145	ECM Furnace Fan Motor	MF	NG	CZ4	Existing
7146	ECM Furnace Fan Motor	MF	Pet	CZ4	Existing
7147	Furnace Tune-Up	MF	NG	CZ4	Existing
7148	Furnace Tune-Up	MF	Pet	CZ4	Existing
7149	Furnace Whistle	MF	NG	CZ4	Existing
7150	Furnace Whistle	MF	Pet	CZ4	Existing
7151	High Efficiency Gas Boiler 90 AFUE (Water)	MF	NG	CZ4	Existing
7152	High Efficiency Gas Boiler 95 AFUE (Water)	MF	NG	CZ4	Existing
7153	Tier I High Efficiency Petroleum Boiler	MF	Pet	CZ4	Existing
7154	Tier II High Efficiency Petroleum Boiler	MF	Pet	CZ4	Existing
7155	High Efficiency Gas steam boiler	MF	NG	CZ4	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7156	High Efficiency Petroleum steam boiler	MF	Pet	CZ4	Existing
7157	Boiler Tune-Up (Gas)	MF	NG	CZ4	Existing
7158	Boiler Tune-Up (Petroleum)	MF	Pet	CZ4	Existing
7159	Boiler Reset Controls (Gas)	MF	NG	CZ4	Existing
7160	Boiler Reset Controls (Petroleum)	MF	Pet	CZ4	Existing
7161	Programmable Thermostat	MF	-	CZ4	Existing
7162	Programmable Thermostat	MF	NG	CZ4	Existing
7163	Programmable Thermostat	MF	Pet	CZ4	Existing
7164	Heat Recovery Ventilator	MF	-	CZ4	Existing
7165	Heat Recovery Ventilator	MF	NG	CZ4	Existing
7166	Heat Recovery Ventilator	MF	Pet	CZ4	Existing
7167	EMS (Multifamily)	MF	-	CZ4	Existing
7168	EMS (Multifamily)	MF	NG	CZ4	Existing
7169	EMS (Multifamily)	MF	Pet	CZ4	Existing
7170	Room AC Recycling	MF	-	CZ5	Existing
7171	AC Tune-Up	MF	-	CZ5	Existing
7172	Refrigerant Charge	MF	-	CZ5	Existing
7173	Room AC SEHA Tier 1 (11.3 EER)	MF	-	CZ5	Existing
7174	Central Air Conditioner Tier 1 (12 EER)	MF	-	CZ5	Existing
7175	Central Air Conditioner Tier 2 (12.5 EER)	MF	-	CZ5	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7176	Central Air Conditioner Tier 3 (13 EER)	MF	-	CZ5	Existing
7177	Central Air Source Heat Pump Tier 1 (12 EER)	MF	-	CZ5	Existing
7178	Central Air Source Heat Pump Tier 2 (12.5 EER)	MF	-	CZ5	Existing
7179	Package Terminal Heat Pump Tier 1 (11 EER)	MF	-	CZ5	Existing
7180	Package Terminal Heat Pump Tier 2 (12 EER)	MF	-	CZ5	Existing
7181	Ductless Minisplit CEE Tier I EER 12	MF	-	CZ5	Existing
7182	Ductless Minisplit CEE Tier 2 EER 12.5	MF	-	CZ5	Existing
7183	Ground Source Heat Pumps COP, EER 17	MF	-	CZ5	Existing
7184	Right Sizing - Air Conditioning	MF	-	CZ5	Existing
7185	High Efficiency Gas Furnace 90 AFUE	MF	NG	CZ5	Existing
7186	High Efficiency Gas Furnace 94 AFUE	MF	NG	CZ5	Existing
7187	High Efficiency Gas Furnace 96 AFUE	MF	NG	CZ5	Existing
7188	Tier I High Efficiency Petroleum Furnace	MF	Pet	CZ5	Existing
7189	Tier II High Efficiency Petroleum Furnace	MF	Pet	CZ5	Existing
7190	Tier III High Efficiency Petroleum Furnace	MF	Pet	CZ5	Existing
7191	ECM Furnace Fan Motor	MF	NG	CZ5	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7192	ECM Furnace Fan Motor	MF	Pet	CZ5	Existing
7193	Furnace Tune-Up	MF	NG	CZ5	Existing
7194	Furnace Tune-Up	MF	Pet	CZ5	Existing
7195	Furnace Whistle	MF	NG	CZ5	Existing
7196	Furnace Whistle	MF	Pet	CZ5	Existing
7197	High Efficiency Gas Boiler 90 AFUE (Water)	MF	NG	CZ5	Existing
7198	High Efficiency Gas Boiler 95 AFUE (Water)	MF	NG	CZ5	Existing
7199	Tier I High Efficiency Petroleum Boiler	MF	Pet	CZ5	Existing
7200	Tier II High Efficiency Petroleum Boiler	MF	Pet	CZ5	Existing
7201	High Efficiency Gas steam boiler	MF	NG	CZ5	Existing
7202	High Efficiency Petroleum steam boiler	MF	Pet	CZ5	Existing
7203	Boiler Tune-Up (Gas)	MF	NG	CZ5	Existing
7204	Boiler Tune-Up (Petroleum)	MF	Pet	CZ5	Existing
7205	Boiler Reset Controls (Gas)	MF	NG	CZ5	Existing
7206	Boiler Reset Controls (Petroleum)	MF	Pet	CZ5	Existing
7207	Programmable Thermostat	MF	-	CZ5	Existing
7208	Programmable Thermostat	MF	NG	CZ5	Existing
7209	Programmable Thermostat	MF	Pet	CZ5	Existing
7210	Heat Recovery Ventilator	MF	-	CZ5	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7211	Heat Recovery Ventilator	MF	NG	CZ5	Existing
7212	Heat Recovery Ventilator	MF	Pet	CZ5	Existing
7213	EMS (Multifamily)	MF	-	CZ5	Existing
7214	EMS (Multifamily)	MF	NG	CZ5	Existing
7215	EMS (Multifamily)	MF	Pet	CZ5	Existing
7216	Room AC Recycling	MF	-	CZ6	Existing
7217	AC Tune-Up	MF	-	CZ6	Existing
7218	Refrigerant Charge	MF	-	CZ6	Existing
7219	Room AC SEHA Tier 1 (11.3 EER)	MF	-	CZ6	Existing
7220	Central Air Conditioner Tier 1 (12 EER)	MF	-	CZ6	Existing
7221	Central Air Conditioner Tier 2 (12.5 EER)	MF	-	CZ6	Existing
7222	Central Air Conditioner Tier 3 (13 EER)	MF	-	CZ6	Existing
7223	Central Air Source Heat Pump Tier 1 (12 EER)	MF	-	CZ6	Existing
7224	Central Air Source Heat Pump Tier 2 (12.5 EER)	MF	-	CZ6	Existing
7225	Package Terminal Heat Pump Tier 1 (11 EER)	MF	-	CZ6	Existing
7226	Package Terminal Heat Pump Tier 2 (12 EER)	MF	-	CZ6	Existing
7227	Ductless Minisplit CEE Tier I EER 12	MF	-	CZ6	Existing
7228	Ductless Minisplit CEE Tier 2 EER 12.5	MF	-	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7229	Ground Source Heat Pumps COP x.x, EER 17	MF	-	CZ6	Existing
7230	Right Sizing - Air Conditioning	MF	-	CZ6	Existing
7231	High Efficiency Gas Furnace 90 AFUE	MF	NG	CZ6	Existing
7232	High Efficiency Gas Furnace 94 AFUE	MF	NG	CZ6	Existing
7233	High Efficiency Gas Furnace 96 AFUE	MF	NG	CZ6	Existing
7234	Tier I High Efficiency Petroleum Furnace	MF	Pet	CZ6	Existing
7235	Tier II High Efficiency Petroleum Furnace	MF	Pet	CZ6	Existing
7236	Tier III High Efficiency Petroleum Furnace	MF	Pet	CZ6	Existing
7237	ECM Furnace Fan Motor	MF	NG	CZ6	Existing
7238	ECM Furnace Fan Motor	MF	Pet	CZ6	Existing
7239	Furnace Tune-Up	MF	NG	CZ6	Existing
7240	Furnace Tune-Up	MF	Pet	CZ6	Existing
7241	Furnace Whistle	MF	NG	CZ6	Existing
7242	Furnace Whistle	MF	Pet	CZ6	Existing
7243	High Efficiency Gas Boiler 90 AFUE (Water)	MF	NG	CZ6	Existing
7244	High Efficiency Gas Boiler 95 AFUE (Water)	MF	NG	CZ6	Existing
7245	Tier I High Efficiency Petroleum Boiler	MF	Pet	CZ6	Existing
7246	Tier II High Efficiency Petroleum Boiler	MF	Pet	CZ6	Existing

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
7000	**HVAC (Equipment)**				
7247	High Efficiency Gas steam boiler	MF	NG	CZ6	Existing
7248	High Efficiency Petroleum steam boiler	MF	Pet	CZ6	Existing
7249	Boiler Tune-Up (Gas)	MF	NG	CZ6	Existing
7250	Boiler Tune-Up (Petroleum)	MF	Pet	CZ6	Existing
7251	Boiler Reset Controls (Gas)	MF	NG	CZ6	Existing
7252	Boiler Reset Controls (Petroleum)	MF	Pet	CZ6	Existing
7253	Programmable Thermostat	MF	-	CZ6	Existing
7254	Programmable Thermostat	MF	NG	CZ6	Existing
7255	Programmable Thermostat	MF	Pet	CZ6	Existing
7256	Heat Recovery Ventilator	MF	-	CZ6	Existing
7257	Heat Recovery Ventilator	MF	NG	CZ6	Existing
7258	Heat Recovery Ventilator	MF	Pet	CZ6	Existing
7259	EMS (Multifamily)	MF	-	CZ6	Existing
7260	EMS (Multifamily)	MF	NG	CZ6	Existing
7261	EMS (Multifamily)	MF	Pet	CZ6	Existing
8000	**New Construction**				
8001	New Construction Better than Code envelope	SF	-	CZ4	NC
8002	New Construction Better than Code hvac	SF	-	CZ4	NC
8003	New Construction Better than Code envelope and hvac	SF	-	CZ4	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
8000	**New Construction**				
8004	New Construction Better than Code envelope	SF	NG	CZ4	NC
8005	New Construction Better than Code hvac	SF	NG	CZ4	NC
8006	New Construction Better than Code envelope and hvac	SF	NG	CZ4	NC
8007	New Construction Better than Code envelope	SF	PET	CZ4	NC
8008	New Construction Better than Code hvac	SF	PET	CZ4	NC
8009	New Construction Better than Code envelope and hvac	SF	PET	CZ4	NC
8010	New Construction Better than Code envelope	SF	-	CZ5	NC
8011	New Construction Better than Code hvac	SF	-	CZ5	NC
8012	New Construction Better than Code envelope and hvac	SF	-	CZ5	NC
8013	New Construction Better than Code envelope	SF	NG	CZ5	NC
8014	New Construction Better than Code hvac	SF	NG	CZ5	NC
8015	New Construction Better than Code envelope and hvac	SF	NG	CZ5	NC
8016	New Construction Better than Code envelope	SF	PET	CZ5	NC
8017	New Construction Better than Code hvac	SF	PET	CZ5	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
8000	New Construction				
8018	New Construction Better than Code envelope and hvac	SF	PET	CZ5	NC
8019	New Construction Better than Code envelope	SF	-	CZ6	NC
8020	New Construction Better than Code hvac	SF	-	CZ6	NC
8021	New Construction Better than Code envelope and hvac	SF	-	CZ6	NC
8022	New Construction Better than Code envelope	SF	NG	CZ6	NC
8023	New Construction Better than Code hvac	SF	NG	CZ6	NC
8024	New Construction Better than Code envelope and hvac	SF	NG	CZ6	NC
8025	New Construction Better than Code envelope	SF	PET	CZ6	NC
8026	New Construction Better than Code hvac	SF	PET	CZ6	NC
8027	New Construction Better than Code envelope and hvac	SF	PET	CZ6	NC
8028	New Construction Better than Code envelope	MF	-	CZ4	NC
8029	New Construction Better than Code hvac	MF	-	CZ4	NC
8030	New Construction Better than Code envelope and hvac	MF	-	CZ4	NC
8031	New Construction Better than Code envelope	MF	NG	CZ4	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
8000	**New Construction**				
8032	New Construction Better than Code hvac	MF	NG	CZ4	NC
8033	New Construction Better than Code envelope and hvac	MF	NG	CZ4	NC
8034	New Construction Better than Code envelope	MF	PET	CZ4	NC
8035	New Construction Better than Code hvac	MF	PET	CZ4	NC
8036	New Construction Better than Code envelope and hvac	MF	PET	CZ4	NC
8037	New Construction Better than Code envelope	MF	-	CZ5	NC
8038	New Construction Better than Code hvac	MF	-	CZ5	NC
8039	New Construction Better than Code envelope and hvac	MF	-	CZ5	NC
8040	New Construction Better than Code envelope	MF	NG	CZ5	NC
8041	New Construction Better than Code hvac	MF	NG	CZ5	NC
8042	New Construction Better than Code envelope and hvac	MF	NG	CZ5	NC
8043	New Construction Better than Code envelope	MF	PET	CZ5	NC
8044	New Construction Better than Code hvac	MF	PET	CZ5	NC
8045	New Construction Better than Code envelope and hvac	MF	PET	CZ5	NC

Table B-1 continued

Measure ID	Measure Name	Home Type: Single (SF) or Multifamily (MF)	Fuel Type: Natural Gas (NG) or Petroleum (PET)	Climate Zone: 4, 5, 6 or All (4,5 & 6)	Construction Type (New or Existing)
8000	**New Construction**				
8046	New Construction Better than Code envelope	MF	-	CZ6	NC
8047	New Construction Better than Code hvac	MF	-	CZ6	NC
8048	New Construction Better than Code envelope and hvac	MF	-	CZ6	NC
8049	New Construction Better than Code envelope	MF	NG	CZ6	NC
8050	New Construction Better than Code hvac	MF	NG	CZ6	NC
8051	New Construction Better than Code envelope and hvac	MF	NG	CZ6	NC
8052	New Construction Better than Code envelope	MF	PET	CZ6	NC
8053	New Construction Better than Code hvac	MF	PET	CZ6	NC
8054	New Construction Better than Code envelope and hvac	MF	PET	CZ6	NC

Appendix C: Breakdown of Measure Level Potential Savings by End-Use

Table C-1. MWh saved in each potential scenario for each electric appliance measure.

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)	Construction Type
Appliances									
Single Family									
1001	Refrigerator Retirement (and Recycling) - No Replacement SF	1,426,696	1,426,696	428,008	**428,008**	470,809	513,609	**46.4%**	Existing
1005	Freezer Retirement (and Recycling) - No Replacement SF	722,399	722,399	216,719	**216,719**	238,391	260,063	**23.5%**	Existing
1002	Energy Star Refrigerator SF	113,178	339,534	68,756	**68,756**	36,500	38,622	**7.5%**	Existing
1022	Energy Star Dehumidifier SF	78,759	78,759	23,245	**23,245**	23,245	23,245	**2.5%**	Existing
1016	Clothes Dryer with Moisture Sensor (electric dryer) SF	202,768	202,768	21,725	**21,725**	23,898	26,070	**2.4%**	Existing
1012	CEE Tier 3 Clothes Washer (with natural gas WH) SF NG	88,093	88,093	14,548	**14,548**	15,492	16,435	**1.6%**	Existing
1009	CEE Tier 3 Clothes Washer (with electric WH) SF	78,867	78,867	13,024	**13,024**	13,869	14,715	**1.4%**	Existing
1011	CEE Tier 2 Clothes Washer (with natural gas WH) SF NG	73,530	73,530	12,143	**12,143**	12,931	13,718	**1.3%**	Existing
1008	CEE Tier 2 Clothes Washer (with electric WH) SF	71,363	71,363	11,785	**11,785**	12,550	13,315	**1.3%**	Existing
1007	Energy Star Electric Clothes Washer (with electric WH) SF	62,358	62,358	10,298	**10,298**	10,966	11,634	**1.1%**	Existing

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Single Family									
1010	Energy Star Electric Clothes Washer (with natural gas WH) SF NG	56,055	56,055	9,257	**9,257**	9,858	10,458	**1.0%**	Existing
1006	Energy Star Freezer SF	33,671	33,671	6,381	**6,381**	6,801	7,223	**0.7%**	Existing
1015	CEE Tier 3 Clothes Washer (with Petroleum WH) SF PET	37,510	37,510	6,195	**6,195**	6,596	6,998	**0.7%**	Existing
1014	CEE Tier 2 Clothes Washer (with Petroleum WH) SF PET	29,942	29,942	4,945	**4,945**	5,265	5,586	**0.5%**	Existing
1013	Energy Star Electric Clothes Washer (with Petroleum WH) SF PET	20,861	20,861	3,445	**3,445**	3,669	3,892	**0.4%**	Existing
1019	Energy Star Dishwasher (electric water heating) SF	10,462	10,462	2,583	**2,583**	2,583	2,583	**0.3%**	Existing
1020	Energy Star Dishwasher (natural gas water heating) SF NG	10,311	10,311	2,546	**2,546**	2,546	2,546	**0.3%**	Existing
1024	CEE Tier 2 Refrigerator SF NC	4,082	0	0	**1,843**	2,028	2,212	**0.2%**	New
1023	Energy Star Refrigerator SF NC	3,265	9,797	2,949	**1,475**	1,622	1,769	**0.2%**	New
1021	Energy Star Dishwasher (petroleum water heating) SF PET	5,478	5,478	1,353	**1,353**	1,353	1,353	**0.1%**	Existing
1042	Energy Star Dehumidifier SF NC	1,404	1,404	994	**994**	994	994	**0.1%**	New

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Single Family									
1036	Clothes Dryer with Moisture Sensor (electric dryer) SF NC	2,426	2,426	730	**730**	803	876	**0.1%**	New
1032	CEE Tier 3 Clothes Washer (with natural gas WH) SF NC NG	2,230	2,230	671	**671**	738	806	**0.1%**	New
1031	CEE Tier 2 Clothes Washer (with natural gas WH) SF NC NG	1,862	1,862	560	**560**	616	673	**0.1%**	New
1029	CEE Tier 3 Clothes Washer (with electric WH) SF NC	1,705	1,705	513	**513**	565	616	**0.1%**	New
1028	CEE Tier 2 Clothes Washer (with electric WH) SF NC	1,542	1,542	464	**464**	511	557	**0.1%**	New
1030	Energy Star Electric Clothes Washer (with natural gas WH) SF NC NG	1,419	1,419	427	**427**	470	513	**0.0%**	New
1027	Energy Star Electric Clothes Washer (with electric WH) SF NC	1,348	1,348	406	**406**	446	487	**0.0%**	New
1026	Energy Star Freezer SF NC	1,170	1,170	352	**352**	387	423	**0.0%**	New
1040	Energy Star Dishwasher (natural gas water heating) SF NC NG	814	814	245	**245**	270	294	**0.0%**	New

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Single Family									
1035	CEE Tier 3 Clothes Washer (with Petroleum WH) SF NC PET	768	768	231	**231**	254	277	**0.0%**	New
1039	Energy Star Dishwasher (electric water heating) SF NC	742	742	223	**223**	246	268	**0.0%**	New
1034	CEE Tier 2 Clothes Washer (with Petroleum WH) SF NC PET	613	613	185	**185**	203	221	**0.0%**	New
1033	Energy Star Electric Clothes Washer (with Petroleum WH) SF NC PET	427	427	129	**129**	141	154	**0.0%**	New
1041	Energy Star Dishwasher (petroleum water heating) SF NC PET	334	334	100	**100**	110	121	**0.0%**	New
1004	CEE Tier 3 Refrigerator SF	169,834	0	0	**0**	0	0	**0.0%**	Existing
1003	CEE Tier 2 Refrigerator SF	141,529	0	0	**0**	45,643	48,297	**0.0%**	Existing
1025	CEE Tier 3 Refrigerator SF NC	4,898	0	0	**0**	0	0	**0.0%**	New
1037	Clothes Dryer with Moisture Sensor (natural gas dryer) SF NC NG	0	0	0	**0**	0	0	**0.0%**	New
1017	Clothes Dryer with Moisture Sensor (natural gas dryer) SF NG	0	0	0	**0**	0	0	**0.0%**	Existing

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Single Family									
1018	Clothes Dryer with Moisture Sensor (petroleum dryer) SF PET	0	0	0	**0**	0	0	**0.0%**	Existing
1038	Clothes Dryer with Moisture Sensor (propane dryer) SF NC PET	0	0	0	**0**	0	0	**0.0%**	New
Multifamily									
1047	Freezer Retirement (and Recycling) - No Replacement MF	82,151	82,151	24,645	**24,645**	27,110	29,576	**2.7%**	Existing
1044	Energy Star Refrigerator MF	24,910	74,731	15,133	**15,133**	16,067	17,001	**1.6%**	Existing
1043	Refrigerator Retirement (and Recycling) - No Replacement MF	16,110	16,110	4,833	**4,833**	5,316	5,799	**0.5%**	Existing
1058	Clothes Dryer with Moisture Sensor (electric dryer) MF	12,103	12,103	1,857	**1,857**	1,987	2,116	**0.2%**	Existing
1065	Energy Star Refrigerator MF NC	1,954	5,862	1,765	**1,765**	1,941	2,118	**0.2%**	New
1054	CEE Tier 3 Clothes Washer (with natural gas WH) MF NG	5,876	5,876	970	**970**	1,033	1,096	**0.1%**	Existing
1062	Energy Star Dishwasher (natural gas water heating) MF NG	5,241	5,241	888	**888**	948	1,009	**0.1%**	Existing

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Multifamily									
1053	CEE Tier 2 Clothes Washer (with natural gas WH) MF NG	4,905	4,905	810	**810**	863	915	**0.1%**	Existing
1052	Energy Star Electric Clothes Washer (with natural gas WH) MF NG	3,739	3,739	617	**617**	658	698	**0.1%**	Existing
1064	Energy Star Dehumidifier MF	3,150	3,150	578	**578**	617	657	**0.1%**	Existing
1078	Clothes Dryer with Moisture Sensor (electric dryer) MF NC	1,793	1,793	540	**540**	594	648	**0.1%**	New
1063	Energy Star Dishwasher (petroleum water heating) MF PET	3,121	3,121	529	**529**	565	601	**0.1%**	Existing
1048	Energy Star Freezer MF	2,304	2,304	437	**437**	465	494	**0.0%**	Existing
1057	CEE Tier 3 Clothes Washer (with Petroleum WH) MF PET	1,710	1,710	283	**283**	301	319	**0.0%**	Existing
1056	CEE Tier 2 Clothes Washer (with petroleum WH) MF PET	1,365	1,365	226	**226**	240	254	**0.0%**	Existing
1055	Energy Star Electric Clothes Washer (with Petroleum WH) MF PET	951	951	157	**157**	167	177	**0.0%**	Existing
1074	CEE Tier 3 Clothes Washer (with natural gas WH) MF NC NG	415	415	125	**125**	137	150	**0.0%**	New

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Multifamily									
1073	CEE Tier 2 Clothes Washer (with natural gas WH) MF NC NG	346	346	104	104	115	125	0.0%	New
1082	Energy Star Dishwasher (natural gas water heating) MF NC NG	339	339	102	**102**	112	122	**0.0%**	New
1072	Energy Star Electric Clothes Washer (with natural gas WH) MF NC NG	264	264	79	**79**	87	95	**0.0%**	New
1061	Energy Star Dishwasher (electric water heating) MF	379	379	64	**64**	69	73	**0.0%**	Existing
1083	Energy Star Dishwasher (petroleum water heating) MF NC PET	202	202	61	**61**	67	73	**0.0%**	New
1084	Energy Star Dehumidifier MF NC	132	132	58	**58**	62	66	**0.0%**	New
1068	Energy Star Freezer MF NC	158	158	48	**48**	52	57	**0.0%**	New
1051	CEE Tier 3 Clothes Washer (with electric WH) MF	286	286	47	**47**	50	53	**0.0%**	Existing
1050	CEE Tier 2 Clothes Washer (with electric WH) MF	259	259	42	**42**	45	48	**0.0%**	Existing
1049	Energy Star Electric Clothes Washer (with electric WH) MF	226	226	37	**37**	40	42	**0.0%**	Existing

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Multifamily									
1077	CEE Tier 3 Clothes Washer (with Petroleum WH) MF NC PET	121	121	36	**36**	40	44	**0.0%**	New
1076	CEE Tier 2 Clothes Washer (with Petroleum WH) MF NC PET	96	96	29	**29**	32	35	**0.0%**	New
1075	Energy Star Electric Clothes Washer (with Petroleum WH) MF NC PET	67	67	20	**20**	22	24	**0.0%**	New
1081	Energy Star Dishwasher (electric water heating) MF NC	25	25	7	**7**	8	9	**0.0%**	New
1071	CEE Tier 3 Clothes Washer (with electric WH) MF NC	21	21	6	**6**	7	7	**0.0%**	New
1070	CEE Tier 2 Clothes Washer (with electric WH) MF NC	19	19	6	**6**	6	7	**0.0%**	New
1069	Energy Star Electric Clothes Washer (with electric WH) MF NC	16	16	5	**5**	5	6	**0.0%**	New
1046	CEE Tier 3 Refrigerator MF	37,380	0	0	**0**	0	0	**0.0%**	Existing
1045	CEE Tier 2 Refrigerator MF	31,150	0	0	**0**	0	0	**0.0%**	Existing
1067	CEE Tier 3 Refrigerator MF NC	2,932	0	0	**0**	0	0	**0.0%**	New
1066	CEE Tier 2 Refrigerator MF NC	2,443	0	0	**0**	0	0	**0.0%**	New

Table C-1 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Appliances									
Multifamily									
1079	Clothes Dryer with Moisture Sensor (natural gas dryer) MF NC NG	0	0	0	**0**	0	0	**0.0%**	New
1059	Clothes Dryer with Moisture Sensor (natural gas dryer) MF NG	0	0	0	**0**	0	0	**0.0%**	Existing
1080	Clothes Dryer with Moisture Sensor (petroleum dryer) MF NC PET	0	0	0	**0**	0	0	**0.0%**	New
1060	Clothes Dryer with Moisture Sensor (propane dryer) MF PET	0	0	0	**0**	0	0	**0.0%**	Existing

Table C-2. MWh saved in each potential scenario for each electric building envelope measure.

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6080	Improved Air Sealing SF CZ4	329,253	329,253	108,127	**108,127**	118,005	127,882	**10.5%**	Existing
6092	Improved Air Sealing SF CZ5	247,889	247,889	99,155	**99,155**	106,592	114,031	**9.7%**	Existing
6083	Storm Windows SF CZ4	108,925	0	0	**76,074**	82,609	89,143	**7.4%**	Existing
6078	Improved Attic/Roof Insulation (R19 to R49) SF CZ4	174,739	174,739	69,685	**69,685**	74,927	80,170	**6.8%**	Existing
6077	Improved Attic/Roof Insulation (R19 to R38) SF CZ4	155,475	155,475	62,003	**62,003**	66,667	71,332	**6.0%**	Existing
6090	Improved Attic/Roof Insulation (R19 to R49) SF CZ5	113,723	113,723	53,449	**53,449**	56,864	60,267	**5.2%**	Existing
6089	Improved Attic/Roof Insulation (R19 to R38) SF CZ5	101,311	101,311	47,616	**47,616**	50,658	53,690	**4.6%**	Existing
6104	Improved Air Sealing SF CZ6	116,590	116,590	44,867	**44,867**	48,361	51,860	**4.4%**	Existing
6095	Storm Windows SF CZ5	48,426	0	0	**43,544**	46,450	49,358	**4.2%**	Existing
6075	Improved Wall Insulation (R0 to R13) SF CZ4	35,396	70,800	49,826	**24,934**	24,934	24,934	**2.4%**	Existing
6102	Improved Attic/Roof Insulation (R19 to R60) SF CZ6	51,038	51,038	24,926	**24,926**	26,460	27,990	**2.4%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6021	Improved Duct Sealing SF NG CZ5	47,165	47,165	23,582	**23,582**	24,998	26,413	**2.3%**	Existing
6101	Improved Attic/Roof Insulation (R19 to R49) SF CZ6	47,485	47,485	23,191	**23,191**	24,618	26,042	**2.3%**	Existing
6009	Improved Duct Sealing SF NG CZ4	43,774	43,774	21,887	**21,887**	23,200	24,513	**2.1%**	Existing
6093	Improved Duct Sealing SF CZ5	41,883	41,883	20,941	**20,941**	22,198	23,454	**2.0%**	Existing
6107	Storm Windows SF CZ6	23,312	0	0	**18,071**	19,470	20,868	**1.8%**	Existing
6087	Improved Wall Insulation (R0 to R20) SF CZ5	19,877	19,877	16,871	**16,871**	16,871	16,871	**1.6%**	Existing
6045	Improved Duct Sealing SF PET CZ4	25,982	25,982	12,991	**12,991**	13,770	14,550	**1.3%**	Existing
6042	Improved Attic/Roof Insulation (R19 to R49) SF PET CZ4	31,536	31,536	12,577	**12,577**	13,523	14,469	**1.2%**	Existing
6096	Exterior Door SF CZ5	25,047	0	0	**12,523**	13,275	14,026	**1.2%**	Existing
6081	Improved Duct Sealing SF CZ4	24,913	24,913	12,457	**12,457**	13,204	13,951	**1.2%**	Existing
6041	Improved Attic/Roof Insulation (R19 to R38) SF PET CZ4	28,166	28,166	11,233	**11,233**	12,078	12,923	**1.1%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6003	Improved Wall Insulation (R0 to R13) SF NG CZ4	7,323	14,647	10,311	**10,311**	10,311	10,311	**1.0%**	Existing
6079	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF CZ4	25,894	0	0	**10,088**	10,866	11,640	**1.0%**	Existing
6099	Improved Wall Insulation (R0 to R20) SF CZ6	11,303	11,303	9,140	**9,140**	9,140	9,140	**0.9%**	Existing
6091	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF CZ5	16,096	16,096	7,739	**7,739**	8,218	8,705	**0.8%**	Existing
6074	Improved Floor Insulation (R0 to R30) SF CZ4	17,105	17,105	7,036	**7,036**	7,550	8,064	**0.7%**	Existing
6057	Improved Duct Sealing SF PET CZ5	13,909	13,909	6,955	**6,955**	7,372	7,789	**0.7%**	Existing
6076	Improved Wall Insulation (R7 to R13) SF CZ4	11,071	0	0	**6,805**	6,805	6,805	**0.7%**	Existing
6105	Improved Duct Sealing SF CZ6	12,745	12,745	6,372	**6,372**	6,755	7,137	**0.6%**	Existing
6073	Improved Floor Insulation (R0 to R19) SF CZ4	14,793	14,793	6,085	**6,085**	6,530	6,974	**0.6%**	Existing
6033	Improved Duct Sealing SF NG CZ6	11,304	11,304	5,652	**5,652**	5,991	6,330	**0.6%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6086	Improved Floor Insulation (R0 to R30) SF CZ5	13,241	13,241	5,592	**5,592**	5,989	6,389	**0.5%**	Existing
6088	Improved Wall Insulation (R10 to R20) SF CZ5	7,695	7,695	5,487	**5,487**	5,487	5,487	**0.5%**	Existing
6069	Improved Duct Sealing SF PET CZ6	9,667	9,667	4,834	**4,834**	5,124	5,414	**0.5%**	Existing
6085	Improved Floor Insulation (R0 to R19) SF CZ5	11,346	11,346	4,791	**4,791**	5,132	5,475	**0.5%**	Existing
6103	Basement Wall/Foundation/Rim Insulation (R0 to R15) SF CZ6	7,452	7,452	3,422	**3,422**	3,646	3,870	**0.3%**	Existing
6039	Improved Wall Insulation (R0 to R13) SF PET CZ4	4,415	4,415	3,107	**3,107**	3,107	3,107	**0.3%**	Existing
6098	Improved Floor Insulation (R0 to R30) SF CZ6	7,060	7,060	3,028	**3,028**	3,237	3,447	**0.3%**	Existing
6097	Improved Floor Insulation (R0 to R19) SF CZ6	6,056	6,056	2,598	**2,598**	2,777	2,956	**0.3%**	Existing
6100	Improved Wall Insulation (R10 to R20) SF CZ6	3,540	3,540	2,474	**2,474**	2,474	2,474	**0.2%**	Existing
6015	Improved Wall Insulation (R0 to R20) SF NG CZ5	1,030	2,060	1,749	**1,749**	1,749	1,749	**0.2%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6054	Improved Attic/Roof Insulation (R19 to R49) SF PET CZ5	3,174	3,174	1,492	**1,492**	1,587	1,682	**0.1%**	Existing
6053	Improved Attic/Roof Insulation (R19 to R38) SF PET CZ5	2,805	2,805	1,318	**1,318**	1,402	1,487	**0.1%**	Existing
6040	Improved Wall Insulation (R7 to R13) SF PET CZ4	1,377	1,377	847	**847**	847	847	**0.1%**	Existing
6066	Improved Attic/Roof Insulation (R19 to R60) SF PET CZ6	1,711	1,711	836	**836**	887	938	**0.1%**	Existing
6027	Improved Wall Insulation (R0 to R20) SF NG CZ6	248	495	401	**401**	401	401	**0.0%**	Existing
6065	Improved Attic/Roof Insulation (R19 to R49) SF PET CZ6	797	797	389	**389**	413	437	**0.0%**	Existing
6019	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF NG CZ5	633	0	0	**304**	323	342	**0.0%**	Existing
6051	Improved Wall Insulation (R0 to R20) SF PET CZ5	343	343	291	**291**	291	291	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6055	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF PET CZ5	474	474	228	**228**	242	256	**0.0%**	Existing
6067	Basement Wall/Foundation/Rim Insulation (R0 to R15) SF PET CZ6	466	466	214	**214**	228	242	**0.0%**	Existing
6063	Improved Wall Insulation (R0 to R20) SF PET CZ6	248	248	201	**201**	201	201	**0.0%**	Existing
6044	Improved Air Sealing SF PET CZ4	552	552	181	**181**	198	214	**0.0%**	Existing
6031	Basement Wall/Foundation/Rim Insulation (R0 to R15) SF NG CZ6	249	0	0	**114**	122	129	**0.0%**	Existing
6052	Improved Wall Insulation (R10 to R20) SF PET CZ5	125	125	89	**89**	89	89	**0.0%**	Existing
6064	Improved Wall Insulation (R10 to R20) SF PET CZ6	74	74	52	**52**	52	52	**0.0%**	Existing
6082	ES Windows SF CZ4	130,166	0	0	**0**	0	0	**0.0%**	Existing
6094	ES Windows SF CZ5	111,935	0	0	**0**	0	0	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6006	Improved Attic/Roof Insulation (R19 to R49) SF NG CZ4	48,448	0	0	**0**	0	0	**0.0%**	Existing
6106	ES Windows SF CZ6	42,804	0	0	**0**	0	0	**0.0%**	Existing
6005	Improved Attic/Roof Insulation (R19 to R38) SF NG CZ4	42,519	0	0	**0**	0	0	**0.0%**	Existing
6084	Exterior Door SF CZ4	27,841	0	0	**0**	0	0	**0.0%**	Existing
6108	Exterior Door SF CZ6	11,271	0	0	**0**	5,974	6,312	**0.0%**	Existing
6018	Improved Attic/Roof Insulation (R19 to R49) SF NG CZ5	9,538	0	0	**0**	0	0	**0.0%**	Existing
6017	Improved Attic/Roof Insulation (R19 to R38) SF NG CZ5	8,517	0	0	**0**	0	0	**0.0%**	Existing
6015, 6016	Improved Wall Insulation (R-7 to R-13) SF NG CZ4	2,072	0	0	**0**	0	0	**0.0%**	Existing
6030	Improved Attic/Roof Insulation (R19 to R60) SF NG CZ6	1,599	0	0	**0**	0	0	**0.0%**	Existing
6029	Improved Attic/Roof Insulation (R19 to R49) SF NG CZ6	1,498	0	0	**0**	0	0	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6016	Improved Wall Insulation (R10 to R20) SF NG CZ5	372	0	0	**0**	0	0	**0.0%**	Existing
6028	Improved Wall Insulation (R10 to R20) SF NG CZ6	74	0	0	**0**	0	0	**0.0%**	Existing
6007	Basement Wall/Foundation/Rim Insulation (R0 to R-10) SF NG CZ4	67	0	0	**0**	28	30	**0.0%**	Existing
6013	Improved Floor Insulation (R0 to R19) SF NG CZ5	-257	0	0	**0**	0	0	**0.0%**	Existing
6014	Improved Floor Insulation (R0 to R30) SF NG CZ5	-293	0	0	**0**	0	0	**0.0%**	Existing
6025	Improved Floor Insulation (R0 to R19) SF NG CZ6	-638	0	0	**0**	0	0	**0.0%**	Existing
6026	Improved Floor Insulation (R0 to R30) SF NG CZ6	-745	0	0	**0**	0	0	**0.0%**	Existing
6034	ES Windows SF NG CZ6	-2,515	0	0	**0**	0	0	**0.0%**	Existing
6001	Improved Floor Insulation (R0 to R19) SF NG CZ4	-2,621	0	0	**0**	0	0	**0.0%**	Existing
6008	Improved Air Sealing SF NG CZ4	-2,827	0	0	**0**	0	0	**0.0%**	Existing
6002	Improved Floor Insulation (R0 to R30) SF NG CZ4	-3,019	0	0	**0**	0	0	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6058	ES Windows SF PET CZ5	-3,582	0	0	**0**	-1,782	-1,890	**0.0%**	Existing
6046	ES Windows SF PET CZ4	-5,623	0	0	**0**	0	0	**0.0%**	Existing
6010	ES Windows SF NG CZ4	-10,584	0	0	**0**	0	0	**0.0%**	Existing
6022	ES Windows SF NG CZ5	-13,007	0	0	**0**	0	0	**0.0%**	Existing
6061	Improved Floor Insulation (R0 to R19) SF PET CZ6	-199	-199	-85	**-85**	-91	-97	**0.0%**	Existing
6062	Improved Floor Insulation (R0 to R30) SF PET CZ6	-232	-232	-100	**-100**	-106	-113	**0.0%**	Existing
6050	Improved Floor Insulation (R0 to R30) SF PET CZ5	-1,105	0	0	**-467**	-500	-533	**0.0%**	Existing
6037	Improved Floor Insulation (R0 to R19) SF PET CZ4	-1,602	-1,602	-659	**-659**	-707	-755	**-0.1%**	Existing
6068	Improved Air Sealing SF PET CZ6	-2,241	-2,241	-863	**-863**	-930	-997	**-0.1%**	Existing
6070	ES Windows SF PET CZ6	-1,864	0	0	**-938**	-990	-1,046	**-0.1%**	Existing
6038	Improved Floor Insulation (R0 to R30) SF PET CZ4	-2,346	-2,346	-965	**-965**	-1,035	-1,106	**-0.1%**	Existing
6032	Improved Air Sealing SF NG CZ6	-3,098	-3,098	-1,192	**-1,192**	-1,285	-1,378	**-0.1%**	Existing
6049	Improved Floor Insulation (R0 to R19) SF PET CZ5	-3,504	0	0	**-1,480**	-1,585	-1,689	**-0.1%**	Existing
6056	Improved Air Sealing SF PET CZ5	-5,805	-5,805	-2,322	**-2,322**	-2,496	-2,670	**-0.2%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Single Family									
6043	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF PET CZ4	-11,415	-11,415	-4,447	**-4,447**	-4,790	-5,132	**-0.4%**	Existing
6020	Improved Air Sealing SF NG CZ5	-21,277	0	0	**-8,511**	-9,149	-9,787	**-0.8%**	Existing
Multifamily									
6185, 6186	Improved Attic/Roof Insulation (R-X or R-X) MF CZ4	35,164	38,365	15,288	**14,013**	15,067	16,121	**1.4%**	Existing
6201	Improved Duct Sealing MF CZ5	23,163	23,163	11,580	**11,580**	12,278	12,973	**1.1%**	Existing
6188	Improved Air Sealing MF CZ4	31,366	0	0	**10,303**	11,239	12,190	**1.0%**	Existing
6200	Improved Air Sealing MF CZ5	24,204	24,204	9,688	**9,688**	10,409	11,136	**0.9%**	Existing
6149, 6150	Improved Attic/Roof Insulation (R-X or R-X) MF PET CZ4	20,325	20,649	8,227	**8,227**	8,847	9,468	**0.8%**	Existing
6197, 6198	Improved Attic/Roof Insulation (R-X or R-X) MF CZ5	8,095	0	0	**6,270**	6,270	6,270	**0.6%**	Existing
6114	Improved Attic/Roof Insulation (R19 to R49) MF NG CZ4	15,451	0	0	**6,255**	6,727	7,195	**0.6%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Multifamily									
6113	Improved Attic/Roof Insulation (R19 to R38) MF NG CZ4	13,560	0	0	**5,489**	5,904	6,315	**0.5%**	Existing
6209, 6210	Improved Attic/Roof Insulation (R-X or R-X) MF CZ6	6,511	0	0	**3,917**	3,917	3,917	**0.4%**	Existing
6212	Improved Air Sealing MF CZ6	9,681	9,681	3,725	**3,725**	4,016	4,308	**0.4%**	Existing
6165	Improved Duct Sealing MF PET CZ5	4,314	4,314	2,157	**2,157**	2,287	2,416	**0.2%**	Existing
6189	Improved Duct Sealing MF CZ4	2,569	0	0	**1,279**	1,361	1,438	**0.1%**	Existing
6205	Improved Floor Insulation (R0 to R19) MF CZ6	1,468	0	0	**1,230**	665	705	**0.1%**	Existing
6161, 6162	Improved Attic/Roof Insulation (R-X or R-X) MF PET CZ5	1,132	1,132	873	**873**	873	873	**0.1%**	Existing
6194	Improved Floor Insulation (R0 to R30) MF CZ5	1,506	0	0	**624**	677	715	**0.1%**	Existing
6193	Improved Floor Insulation (R0 to R19) MF CZ5	1,290	0	0	**534**	580	613	**0.1%**	Existing
6182	Improved Floor Insulation (R0 to R30) MF CZ4	1,219	1,330	550	**505**	561	561	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Multifamily									
6173, 6174	Improved Attic/Roof Insulation (R-X or R-X) MF PET CZ6	834	834	501	**501**	501	501	**0.0%**	Existing
6195, 6196	Improved Wall Insulation (R10 to R20) MF CZ5	543	0	0	**446**	446	446	**0.0%**	Existing
6181	Improved Floor Insulation (R0 to R19) MF CZ4	1,055	1,151	476	**436**	485	485	**0.0%**	Existing
6177	Improved Duct Sealing MF PET CZ6	757	757	377	**377**	401	424	**0.0%**	Existing
6211	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF CZ6	847	0	0	**352**	381	400	**0.0%**	Existing
6199	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF CZ5	785	785	323	**323**	348	373	**0.0%**	Existing
6187	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF CZ4	536	536	225	**225**	241	256	**0.0%**	Existing
6183, 6184	Improved Wall Insulation (R7 to R13) MF CZ4	207	207	173	**173**	173	173	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Multifamily									
6208	Improved Wall Insulation (R10 to R20) MF CZ6	187	0	0	**144**	144	144	**0.0%**	Existing
6111, 6112	Improved Wall Insulation (R7 to R13) MF NG CZ4	118	0	0	**107**	107	107	**0.0%**	Existing
6175	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF PET CZ6	245	245	101	**101**	109	116	**0.0%**	Existing
6147, 6148	Improved Wall Insulation (R7 to R13) MF PET CZ4	83	83	78	**78**	78	78	**0.0%**	Existing
6152	Improved Air Sealing MF PET CZ4	173	173	57	**57**	62	67	**0.0%**	Existing
6127	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ5	125	0	0	**52**	56	59	**0.0%**	Existing
6163	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF PET CZ5	107	107	45	**45**	48	51	**0.0%**	Existing
6160	Improved Wall Insulation (R10 to R20) MF PET CZ5	42	42	33	**33**	33	33	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Multifamily									
6115	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ4	42	42	17	**17**	18	20	**0.0%**	Existing
6171, 6172	Improved Wall Insulation (R10 to R20) MF PET CZ6	20	20	16	**16**	16	16	**0.0%**	Existing
6191	Storm Windows MF CZ4	16,839	0	0	**0**	0	0	**0.0%**	Existing
6190	ES Windows MF CZ4	16,400	0	0	**0**	0	0	**0.0%**	Existing
6202	ES Windows MF CZ5	11,838	0	0	**0**	0	0	**0.0%**	Existing
6203	Storm Windows MF CZ5	11,735	0	0	**0**	0	0	**0.0%**	Existing
6192	Exterior Door MF CZ4	5,625	0	0	**0**	0	0	**0.0%**	Existing
6214	ES Windows MF CZ6	5,123	0	0	**0**	0	0	**0.0%**	Existing
6215	Storm Windows MF CZ6	4,337	0	0	**0**	0	0	**0.0%**	Existing
6129	Improved Duct Sealing MF NG CZ5	4,165	0	0	**0**	0	0	**0.0%**	Existing
6118	ES Windows MF NG CZ4	3,815	0	0	**0**	0	0	**0.0%**	Existing
6125, 6126	Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ5	2,989	0	0	**0**	0	0	**0.0%**	Existing
6204	Exterior Door MF CZ5	2,882	0	0	**0**	0	0	**0.0%**	Existing
6206	Improved Floor Insulation (R0 to R30) MF CZ6	1,711	0	0	**0**	775	822	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Multifamily									
6216	Exterior Door MF CZ6	1,321	0	0	**0**	0	0	**0.0%**	Existing
6137, 6138	Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ6	882	0	0	**0**	0	0	**0.0%**	Existing
6141	Improved Duct Sealing MF NG CZ6	737	0	0	**0**	391	413	**0.0%**	Existing
6153	Improved Duct Sealing MF PET CZ4	561	0	0	**0**	0	0	**0.0%**	Existing
6117	Improved Duct Sealing MF NG CZ4	557	0	0	**0**	0	0	**0.0%**	Existing
6213	Improved Duct Sealing MF CZ6	460	0	0	**0**	0	0	**0.0%**	Existing
6139	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ6	115	0	0	**0**	0	0	**0.0%**	Existing
6123, 6124	Improved Wall Insulation (R10 to R20) MF NG CZ5	109	0	0	**0**	0	0	**0.0%**	Existing
6135, 6136	Improved Wall Insulation (R10 to R20) MF NG CZ6	17	0	0	**0**	0	0	**0.0%**	Existing
6121	Improved Floor Insulation (R0 to R19) MF NG CZ5	-326	0	0	**0**	0	0	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
6122	Improved Floor Insulation (R0 to R30) MF NG CZ5	-373	0	0	**0**	0	0	**0.0%**	Existing
6109	Improved Floor Insulation (R0 to R19) MF NG CZ4	-576	0	0	**0**	0	0	**0.0%**	Existing
6110	Improved Floor Insulation (R0 to R30) MF NG CZ4	-664	0	0	**0**	0	0	**0.0%**	Existing
6158	Improved Floor Insulation (R0 to R30) MF PET CZ5	-667	0	0	**0**	0	0	**0.0%**	Existing
6133	Improved Floor Insulation (R0 to R19) MF NG CZ6	-679	0	0	**0**	0	0	**0.0%**	Existing
6134	Improved Floor Insulation (R0 to R30) MF NG CZ6	-793	0	0	**0**	0	0	**0.0%**	Existing
6169	Improved Floor Insulation (R0 to R19) MF PET CZ6	-807	0	0	**0**	0	0	**0.0%**	Existing
6116	Improved Air Sealing MF NG CZ4	-831	0	0	**0**	0	0	**0.0%**	Existing
6170	Improved Floor Insulation (R0 to R30) MF PET CZ6	-940	0	0	**0**	0	0	**0.0%**	Existing
6178	ES Windows MF PET CZ6	-1,079	0	0	**0**	0	0	**0.0%**	Existing
6140	Improved Air Sealing MF NG CZ6	-1,118	0	0	**0**	0	0	**0.0%**	Existing
6142	ES Windows MF NG CZ6	-1,253	0	0	**0**	0	0	**0.0%**	Existing
6166	ES Windows MF PET CZ5	-1,731	0	0	**0**	0	0	**0.0%**	Existing

Table C-2 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Building Envelope									
Multifamily									
6154	ES Windows MF PET CZ4	-2,168	0	0	**0**	0	0	**0.0%**	Existing
6130	ES Windows MF NG CZ5	-5,507	0	0	**0**	0	0	**0.0%**	Existing
6128	Improved Air Sealing MF NG CZ5	-8,505	0	0	**0**	0	0	**0.0%**	Existing
6145	Improved Floor Insulation (R0 to R19) MF PET CZ4	-371	-377	-156	**-156**	-165	-180	**0.0%**	Existing
6146	Improved Floor Insulation (R0 to R30) MF PET CZ4	-543	-552	-228	**-228**	-242	-263	**0.0%**	Existing
6151	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF PET CZ4	-709	-709	-295	**-295**	-317	-336	**0.0%**	Existing
6176	Improved Air Sealing MF PET CZ6	-939	-939	-361	**-361**	-390	-418	**0.0%**	Existing
6164	Improved Air Sealing MF PET CZ5	-2,648	-2,648	-1,059	**-1,059**	-1,139	-1,218	**-0.1%**	Existing

Table C-3: MWh saved in each potential scenario for each electric electronics measure.

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Electronics									
Single Family									
2002	"Smart Strip" Plug Outlet, 7-plug SF	550,208	550,208	198,735	**198,735**	215,241	231,747	**23.7%**	Existing
2003	ES Desktop SF	231,501	231,501	113,806	**113,806**	121,908	130,011	**13.5%**	Existing
2007	HE Television replacing Plasma SF	135,002	135,002	83,364	**83,364**	83,364	83,364	**9.9%**	Existing
2001	"Smart Strip" Plug Outlet, 5-plug SF	227,116	227,116	82,034	**82,034**	88,848	95,661	**9.8%**	Existing
2009	Room Air Cleaner SF	264,932	264,932	61,818	**61,818**	66,233	70,648	**7.4%**	Existing
2004	ES Laptop SF	96,357	96,357	56,754	**56,754**	56,754	57,496	**6.8%**	Existing
2005	LCD Computer Monitors SF	39,115	39,115	23,899	**23,899**	23,899	23,899	**2.8%**	Existing
2008	HE Television replacing Projection SF	50,205	50,205	12,551	**12,551**	13,806	15,061	**1.5%**	Existing
2011	"Smart Strip" Plug Outlet, 7-plug SF NC	11,250	11,250	4,461	**4,461**	4,800	5,138	**0.5%**	New
2018	Room Air Cleaner SF NC	8,061	8,061	2,427	**2,427**	2,669	2,912	**0.3%**	New
2010	"Smart Strip" Plug Outlet, 5-plug SF NC	4,644	4,644	1,841	**1,841**	1,981	2,121	**0.2%**	New
2016	HE Television replacing Plasma SF NC	1,575	1,575	1,167	**1,167**	1,167	1,167	**0.1%**	New

Table C-3 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Electronics									
Single Family									
2012	ES Desktop SF NC	2,751	2,751	1,085	**1,085**	1,162	1,240	**0.1%**	New
2013	ES Laptop SF NC	1,464	1,464	692	**692**	692	701	**0.1%**	New
2014	LCD Computer Monitors SF NC	476	476	233	**233**	233	233	**0.0%**	New
2017	HE Television replacing Projection SF NC	341	341	103	**103**	113	123	**0.0%**	New
2006	HE Television replacing Standard SF	45,853	0	0	**0**	0	0	**0.0%**	Existing
2015	HE Television replacing Standard SF NC	178	0	0	**0**	0	0	**0.0%**	New
Multifamily									
2020	"Smart Strip" Plug Outlet, 7-plug MF	264,742	264,742	95,201	**95,201**	103,143	111,086	**11.3%**	Existing
2019	"Smart Strip" Plug Outlet, 5-plug MF	109,281	109,281	39,297	**39,297**	42,576	45,854	**4.7%**	Existing
2021	ES Desktop MF	37,691	37,691	18,529	**18,529**	19,848	21,167	**2.2%**	Existing
2022	ES Laptop MF	23,197	23,197	13,663	**13,663**	13,663	13,842	**1.6%**	Existing
2025	HE Television replacing Plasma MF	20,973	20,973	12,951	**12,951**	12,951	12,951	**1.5%**	Existing
2027	Room Air Cleaner MF	17,865	17,865	4,169	**4,169**	4,466	4,764	**0.5%**	Existing
2023	LCD Computer Monitors MF	6,003	6,003	3,668	**3,668**	3,668	3,668	**0.4%**	Existing

Table C-3 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Electronics									
Multifamily									
2029	"Smart Strip" Plug Outlet, 7-plug MF NC	6,181	6,181	2,451	**2,451**	2,637	2,823	**0.3%**	New
2034	HE Television replacing Plasma MF NC	1,389	1,389	1,029	**1,029**	1,029	1,029	**0.1%**	New
2028	"Smart Strip" Plug Outlet, 5-plug MF NC	2,552	2,552	1,012	**1,012**	1,089	1,165	**0.1%**	New
2026	HE Television replacing Projection MF	3,982	3,982	996	**996**	1,095	1,194	**0.1%**	Existing
2030	ES Desktop MF NC	2,426	2,426	957	**957**	1,025	1,093	**0.1%**	New
2031	ES Laptop MF NC	1,291	1,291	610	**610**	610	618	**0.1%**	New
2036	Room Air Cleaner MF NC	1,007	1,007	327	**327**	358	388	**0.0%**	New
2032	LCD Computer Monitors MF NC	419	419	206	**206**	206	206	**0.0%**	New
2035	HE Television replacing Projection MF NC	301	301	90	**90**	100	109	**0.0%**	New
2024	HE Television replacing Standard MF	7,855	0	0	**0**	0	0	**0.0%**	Existing
2033	HE Television replacing Standard MF NC	157	0	0	**0**	0	0	**0.0%**	New

Table C-4: MWh saved in each potential scenario for each electric HVAC equipment measure.

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7001	Room AC Recycling SF CZ4	230,714	230,714	116,395	**116,395**	123,743	131,818	**25.7%**	Existing
7004	Room AC SEHA Tier 1 (11.3 EER) SF CZ4	183,086	183,086	65,677	**65,677**	65,677	65,677	**14.5%**	Existing
7011	Ductless Minisplit CEE Tier 2 EER 12.5 SF CZ4	227,501	227,501	48,966	**48,966**	48,966	48,966	**10.8%**	Existing
7042	Room AC Recycling SF CZ5	37,324	37,324	19,341	**19,341**	20,172	21,478	**4.3%**	Existing
7045	Room AC SEHA Tier 1 (11.3 EER) SF CZ5	44,438	52,589	15,698	**13,265**	13,453	14,193	**2.9%**	Existing
7036	Programmable Thermostat SF CZ4	47,070	47,070	11,447	**11,447**	11,640	12,281	**2.5%**	Existing
7057	High Efficiency Gas Furnace 96 AFUE SF NG CZ5	57,249	0	0	**10,232**	10,232	10,394	**2.3%**	Existing
7051	Ductless Minisplit CEE Tier I EER 12 SF CZ5	20,166	23,865	4,274	**9,261**	9,392	9,909	**2.0%**	Existing
7077	Programmable Thermostat SF CZ5	33,635	33,635	8,179	**8,179**	8,317	8,775	**1.8%**	Existing
7086	Room AC SEHA Tier 1 (11.3 EER) SF CZ6	12,753	23,400	7,740	**7,740**	7,740	7,776	**1.7%**	Existing
7083	Room AC Recycling SF CZ6	10,858	10,858	5,814	**5,814**	5,925	6,305	**1.3%**	Existing
7037	Programmable Thermostat SF NG CZ4	17,370	17,370	5,801	**5,801**	5,801	5,801	**1.3%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7016	High Efficiency Gas Furnace 96 AFUE SF NG CZ4	27,637	0	0	**5,014**	5,014	5,094	**1.1%**	Existing
7038	Programmable Thermostat SF Pet CZ4	15,921	15,921	4,355	**4,355**	4,355	4,355	**1.0%**	Existing
7010	Ductless Minisplit CEE Tier I EER 12 SF CZ4	17,438	17,438	3,753	**3,753**	3,753	3,753	**0.8%**	Existing
7118	Programmable Thermostat SF CZ6	15,122	15,122	3,677	**3,677**	3,739	3,946	**0.8%**	Existing
7056	High Efficiency Gas Furnace 94 AFUE SF NG CZ5	10,714	0	0	**1,768**	1,768	1,796	**0.4%**	Existing
7061	ECM Furnace Fan Motor SF NG CZ5	2,876	3,404	1,990	**1,681**	1,681	1,708	**0.4%**	Existing
7098	High Efficiency Gas Furnace 96 AFUE SF NG CZ6	9,424	0	0	**1,663**	1,663	1,689	**0.4%**	Existing
7078	Programmable Thermostat SF NG CZ5	4,615	4,615	1,541	**1,541**	1,541	1,541	**0.3%**	Existing
7058	Tier I High Efficiency Petroleum Furnace SF Pet CZ5	11,931	11,123	1,434	**1,538**	1,643	1,748	**0.3%**	Existing
7020	ECM Furnace Fan Motor SF NG CZ4	2,623	13,117	7,667	**1,534**	1,534	1,558	**0.3%**	Existing
7015	High Efficiency Gas Furnace 94 AFUE SF NG CZ4	8,021	0	0	**1,320**	1,320	1,342	**0.3%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7014	High Efficiency Gas Furnace 90 AFUE SF NG CZ4	7,246	0	0	**1,192**	1,192	1,212	**0.3%**	Existing
7099	Tier I High Efficiency Petroleum Furnace SF Pet CZ6	9,073	9,073	1,169	**1,169**	1,249	1,329	**0.3%**	Existing
7017	Tier I High Efficiency Petroleum Furnace SF Pet CZ4	7,481	7,875	1,015	**1,015**	1,084	1,154	**0.2%**	Existing
7055	High Efficiency Gas Furnace 90 AFUE SF NG CZ5	5,523	0	0	**912**	912	926	**0.2%**	Existing
7060	Tier III High Efficiency Petroleum Furnace SF Pet CZ5	6,593	6,147	792	**850**	908	966	**0.2%**	Existing
7021	ECM Furnace Fan Motor SF Pet CZ4	1,663	1,751	767	**729**	779	829	**0.2%**	Existing
7101	Tier III High Efficiency Petroleum Furnace SF Pet CZ6	4,396	4,396	567	**567**	605	644	**0.1%**	Existing
7079	Programmable Thermostat SF Pet CZ5	1,796	1,796	491	**491**	491	491	**0.1%**	Existing
7092	Ductless Minisplit CEE Tier I EER 12 SF CZ6	1,311	2,405	477	**477**	477	479	**0.1%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7062	ECM Furnace Fan Motor SF Pet CZ5	1,079	1,079	473	**473**	505	537	**0.1%**	Existing
7103	ECM Furnace Fan Motor SF Pet CZ6	679	679	297	**297**	318	338	**0.1%**	Existing
7097	High Efficiency Gas Furnace 94 AFUE SF NG CZ6	1,782	0	0	**290**	290	294	**0.1%**	Existing
7102	ECM Furnace Fan Motor SF NG CZ6	461	3,075	1,797	**270**	270	274	**0.1%**	Existing
7119	Programmable Thermostat SF NG CZ6	662	662	221	**221**	221	221	**0.0%**	Existing
7096	High Efficiency Gas Furnace 90 AFUE SF NG CZ6	1,335	0	0	**216**	216	220	**0.0%**	Existing
7120	Programmable Thermostat SF Pet CZ6	779	779	213	**213**	213	213	**0.0%**	Existing
7059	Tier II High Efficiency Petroleum Furnace SF Pet CZ5	1,263	1,178	152	**163**	174	185	**0.0%**	Existing
7019	Tier III High Efficiency Petroleum Furnace SF Pet CZ4	820	863	111	**150**	160	170	**0.0%**	Existing
7100	Tier II High Efficiency Petroleum Furnace SF Pet CZ6	733	733	94	**94**	101	107	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7065	Furnace Whistle SF NG CZ5	67	79	63	**53**	53	53	**0.0%**	Existing
7024	Furnace Whistle SF NG CZ4	43	426	341	**34**	34	34	**0.0%**	Existing
7018	Tier II High Efficiency Petroleum Furnace SF Pet CZ4	230	242	31	**31**	33	35	**0.0%**	Existing
7025	Furnace Whistle SF Pet CZ4	18	19	15	**15**	15	15	**0.0%**	Existing
7066	Furnace Whistle SF Pet CZ5	17	17	13	**13**	13	13	**0.0%**	Existing
7107	Furnace Whistle SF Pet CZ6	11	11	9	**9**	9	9	**0.0%**	Existing
7106	Furnace Whistle SF NG CZ6	11	75	60	**9**	9	9	**0.0%**	Existing
7009	Central Air Source Heat Pump Tier 2 (12.5 EER) SF CZ4	126,785	0	0	**0**	0	0	**0.0%**	Existing
7012	Ground Source Heat Pumps COP 4.2, EER 17 SF CZ4	65,741	0	0	**0**	0	0	**0.0%**	Existing
7005	Central Air Conditioner Tier 1 (12 EER) SF CZ4	61,660	0	0	**0**	0	0	**0.0%**	Existing
7008	Central Air Source Heat Pump Tier 1 (12 EER) SF CZ4	51,243	0	0	**0**	0	0	**0.0%**	Existing
7052	Ductless Minisplit CEE Tier 2 EER 12.5 SF CZ5	36,325	0	0	**0**	0	0	**0.0%**	Existing
7007	Central Air Conditioner Tier 3 (13 EER) SF CZ4	30,338	0	0	**0**	0	0	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7006	Central Air Conditioner Tier 2 (12.5 EER) SF CZ4	18,218	0	0	**0**	0	0	**0.0%**	Existing
7093	Ductless Minisplit CEE Tier 2 EER 12.5 SF CZ6	15,263	0	0	**0**	0	0	**0.0%**	Existing
7046	Central Air Conditioner Tier 1 (12 EER) SF CZ5	14,974	0	0	**0**	0	0	**0.0%**	Existing
7094	Ground Source Heat Pumps COP 4.2, EER 17 SF CZ6	14,966	0	0	**0**	0	0	**0.0%**	Existing
7049	Central Air Source Heat Pump Tier 1 (12 EER) SF CZ5	13,914	0	0	**0**	0	0	**0.0%**	Existing
7080	Heat Recovery Ventilator SF CZ5	12,411	0	0	**0**	0	0	**0.0%**	Existing
7039	Heat Recovery Ventilator SF CZ4	10,788	0	0	**0**	0	0	**0.0%**	Existing
7048	Central Air Conditioner Tier 3 (13 EER) SF CZ5	8,807	0	0	**0**	0	0	**0.0%**	Existing
7053	Ground Source Heat Pumps COP 4.2, EER 17 SF CZ5	7,565	0	0	**0**	0	0	**0.0%**	Existing
7050	Central Air Source Heat Pump Tier 2 (12.5 EER) SF CZ5	7,406	0	0	**0**	0	0	**0.0%**	Existing
7002	AC Tune-Up SF CZ4	5,434	0	0	**0**	0	0	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7003	Refrigerant Charge SF CZ4	5,434	0	0	**0**	0	0	**0.0%**	Existing
7121	Heat Recovery Ventilator SF CZ6	5,123	0	0	**0**	0	0	**0.0%**	Existing
7091	Central Air Source Heat Pump Tier 2 (12.5 EER) SF CZ6	3,288	0	0	**0**	0	0	**0.0%**	Existing
7087	Central Air Conditioner Tier 1 (12 EER) SF CZ6	2,864	0	0	**0**	0	0	**0.0%**	Existing
7013	Right Sizing - Air Conditioning SF CZ4	2,420	0	0	**0**	0	0	**0.0%**	Existing
7047	Central Air Conditioner Tier 2 (12.5 EER) SF CZ5	1,773	0	0	**0**	0	0	**0.0%**	Existing
7043	AC Tune-Up SF CZ5	1,381	0	0	**0**	0	0	**0.0%**	Existing
7044	Refrigerant Charge SF CZ5	1,381	0	0	**0**	0	0	**0.0%**	Existing
7089	Central Air Conditioner Tier 3 (13 EER) SF CZ6	937	0	0	**0**	0	0	**0.0%**	Existing
7090	Central Air Source Heat Pump Tier 1 (12 EER) SF CZ6	730	0	0	**0**	0	0	**0.0%**	Existing
7054	Right Sizing - Air Conditioning SF CZ5	380	0	0	**0**	0	0	**0.0%**	Existing
7084	AC Tune-Up SF CZ6	222	0	0	**0**	0	0	**0.0%**	Existing
7085	Refrigerant Charge SF CZ6	222	0	0	**0**	0	0	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Single Family									
7088	Central Air Conditioner Tier 2 (12.5 EER) SF CZ6	145	0	0	**0**	0	0	**0.0%**	Existing
7095	Right Sizing - Air Conditioning SF CZ6	78	0	0	**0**	0	0	**0.0%**	Existing
Multifamily									
7124	Room AC Recycling MF CZ4	40,622	40,622	24,895	**24,895**	24,895	24,895	**5.5%**	Existing
7127	Room AC SEHA Tier 1 (11.3 EER) MF CZ4	37,227	37,227	16,365	**16,365**	16,365	16,365	**3.6%**	Existing
7173	Room AC SEHA Tier 1 (11.3 EER) MF CZ5	24,176	24,176	6,429	**6,429**	6,831	7,235	**1.4%**	Existing
7168	EMS (Multifamily) CZ4 MF NG	20,016	20,016	6,176	**6,176**	6,777	7,377	**1.4%**	Existing
7167	EMS (Multifamily) CZ4 MF	16,763	16,763	5,174	**5,174**	5,681	6,181	**1.1%**	Existing
7169	EMS (Multifamily) CZ4 MF PET	13,273	13,273	4,095	**4,095**	4,496	4,893	**0.9%**	Existing
7213	EMS (Multifamily) CZ5 MF	13,006	13,006	4,010	**4,010**	4,405	4,795	**0.9%**	Existing
7182	Ductless Minisplit CEE Tier 2 EER 12.5 MF CZ5	20,124	22,344	3,563	**3,209**	3,410	3,618	**0.7%**	Existing
7134	Package Terminal Heat Pump Tier 2 (12 EER) MF CZ4	4,315	21,348	2,724	**2,752**	2,967	3,172	**0.6%**	Existing
7170	Room AC Recycling MF CZ5	5,120	5,120	2,512	**2,512**	2,693	2,871	**0.6%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7181	Ductless Minisplit CEE Tier I EER 12 MF CZ5	11,172	12,404	1,980	**1,783**	1,895	2,001	**0.4%**	Existing
7180	Package Terminal Heat Pump Tier 2 (12 EER) MF CZ5	2,505	13,909	1,772	**1,516**	1,550	1,664	**0.3%**	Existing
7259	EMS (Multifamily) MF CZ6	4,802	4,802	1,482	**1,482**	1,626	1,768	**0.3%**	Existing
7215	EMS (Multifamily) MF CZ5 PET	4,357	4,357	1,345	**1,345**	1,475	1,605	**0.3%**	Existing
7133	Package Terminal Heat Pump Tier 1 (11 EER) MF CZ4	2,080	10,289	1,313	**1,326**	1,430	1,529	**0.3%**	Existing
7179	Package Terminal Heat Pump Tier 1 (11 EER) MF CZ5	1,950	10,826	1,379	**1,180**	1,206	1,295	**0.3%**	Existing
7219	Room AC SEHA Tier 1 (11.3 EER) MF CZ6	2,347	2,347	1,057	**1,057**	1,057	1,057	**0.2%**	Existing
7162	Programmable Thermostat MF NG CZ4	2,558	2,558	855	**855**	855	855	**0.2%**	Existing
7228	Ductless Minisplit CEE Tier 2 EER 12.5 MF CZ6	2,875	3,281	877	**767**	767	767	**0.2%**	Existing
7261	EMS (Multifamily) MF Pet CZ6	2,462	2,462	760	**760**	834	908	**0.2%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7163	Programmable Thermostat MF Pet CZ4	2,506	2,506	686	**686**	686	686	**0.2%**	Existing
7216	Room AC Recycling MF CZ6	1,288	1,288	635	**635**	679	723	**0.1%**	Existing
7208	Programmable Thermostat MF NG CZ5	941	1,882	629	**629**	629	629	**0.1%**	Existing
7161	Programmable Thermostat MF CZ4	2,409	2,409	586	**586**	596	629	**0.1%**	Existing
7136	Ductless Minisplit CEE Tier 2 EER 12.5 MF CZ4	1,778	1,759	464	**469**	469	469	**0.1%**	Existing
7207	Programmable Thermostat MF CZ5	1,737	1,737	422	**422**	429	453	**0.1%**	Existing
7210	Heat Recovery Ventilator MF CZ5	1,288	0	0	**394**	432	471	**0.1%**	Existing
7164	Heat Recovery Ventilator MF CZ4	1,106	1,106	338	**338**	371	405	**0.1%**	Existing
7187	High Efficiency Gas Furnace 96 AFUE MF NG CZ5	1,570	1,677	272	**276**	276	280	**0.1%**	Existing
7171	AC Tune-Up MF CZ5	400	0	0	**206**	214	226	**0.0%**	Existing
7253	Programmable Thermostat MF CZ6	685	685	167	**167**	169	179	**0.0%**	Existing
7226	Package Terminal Heat Pump Tier 2 (12 EER) MF CZ6	254	1,446	184	**161**	174	187	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7225	Package Terminal Heat Pump Tier 1 (11 EER) MF CZ6	198	1,126	143	**125**	135	146	**0.0%**	Existing
7209	Programmable Thermostat MF Pet CZ5	419	419	115	**115**	115	115	**0.0%**	Existing
7141	High Efficiency Gas Furnace 96 AFUE MF NG CZ4	524	567	92	**107**	107	109	**0.0%**	Existing
7254	Programmable Thermostat MF NG CZ6	121	243	81	**81**	81	81	**0.0%**	Existing
7227	Ductless Minisplit CEE Tier I EER 12 MF CZ6	247	282	80	**70**	70	70	**0.0%**	Existing
7186	High Efficiency Gas Furnace 94 AFUE MF NG CZ5	294	314	50	**50**	50	52	**0.0%**	Existing
7233	High Efficiency Gas Furnace 96 AFUE MF NG CZ6	274	289	47	**47**	47	48	**0.0%**	Existing
7191	ECM Furnace Fan Motor MF NG CZ5	79	83	49	**46**	46	47	**0.0%**	Existing
7255	Programmable Thermostat MF Pet CZ6	165	165	45	**45**	45	45	**0.0%**	Existing
7188	Tier I High Efficiency Petroleum Furnace MF Pet CZ5	325	325	42	**42**	44	47	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7135	Ductless Minisplit CEE Tier I EER 12 MF CZ4	136	135	36	**36**	36	36	**0.0%**	Existing
7234	Tier I High Efficiency Petroleum Furnace MF Pet CZ6	283	277	36	**36**	38	40	**0.0%**	Existing
7185	High Efficiency Gas Furnace 90 AFUE MF NG CZ5	152	162	26	**26**	26	27	**0.0%**	Existing
7140	High Efficiency Gas Furnace 94 AFUE MF NG CZ4	152	165	26	**25**	25	26	**0.0%**	Existing
7139	High Efficiency Gas Furnace 90 AFUE MF NG CZ4	137	149	24	**23**	23	23	**0.0%**	Existing
7190	Tier III High Efficiency Petroleum Furnace MF Pet CZ5	174	174	22	**22**	25	26	**0.0%**	Existing
7142	Tier I High Efficiency Petroleum Furnace MF Pet CZ4	152	152	20	**20**	21	22	**0.0%**	Existing
7236	Tier III High Efficiency Petroleum Furnace MF Pet CZ6	132	129	17	**17**	18	19	**0.0%**	Existing
7146	ECM Furnace Fan Motor MF Pet CZ4	34	34	15	**15**	16	17	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7192	ECM Furnace Fan Motor MF Pet CZ5	32	32	14	**14**	15	16	**0.0%**	Existing
7232	High Efficiency Gas Furnace 94 AFUE MF NG CZ6	52	55	10	**10**	10	10	**0.0%**	Existing
7238	ECM Furnace Fan Motor MF Pet CZ6	21	21	9	**9**	10	10	**0.0%**	Existing
7237	ECM Furnace Fan Motor MF NG CZ6	13	14	8	**8**	8	8	**0.0%**	Existing
7231	High Efficiency Gas Furnace 90 AFUE MF NG CZ6	39	41	7	**7**	7	7	**0.0%**	Existing
7189	Tier II High Efficiency Petroleum Furnace MF Pet CZ5	33	33	4	**4**	5	5	**0.0%**	Existing
7235	Tier II High Efficiency Petroleum Furnace MF Pet CZ6	22	21	2	**2**	3	3	**0.0%**	Existing
7144	Tier III High Efficiency Petroleum Furnace MF Pet CZ4	16	16	2	**2**	2	2	**0.0%**	Existing
7195	Furnace Whistle MF NG CZ5	2	2	2	**2**	2	2	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7143	Tier II High Efficiency Petroleum Furnace MF Pet CZ4	5	5	0	**0**	1	1	**0.0%**	Existing
7196	Furnace Whistle MF Pet CZ5	0	0	0	**0**	0	0	**0.0%**	Existing
7149	Furnace Whistle MF NG CZ4	0	1	0	**0**	0	0	**0.0%**	Existing
7241	Furnace Whistle MF NG CZ6	0	0	0	**0**	0	0	**0.0%**	Existing
7242	Furnace Whistle MF Pet CZ6	0	0	0	**0**	0	0	**0.0%**	Existing
7150	Furnace Whistle MF Pet CZ4	0	0	0	**0**	0	0	**0.0%**	Existing
7214	EMS (Multifamily) MF NG CZ5	13,235	0	0	**0**	0	0	**0.0%**	Existing
7132	Central Air Source Heat Pump Tier 2 (12.5 EER) MF CZ4	7,626	0	0	**0**	0	0	**0.0%**	Existing
7137	Ground Source Heat Pumps COP 4.2, EER 17 MF CZ4	6,048	0	0	**0**	0	0	**0.0%**	Existing
7174	Central Air Conditioner Tier 1 (12 EER) MF CZ5	4,822	0	0	**0**	0	0	**0.0%**	Existing

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Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC equipment									
Multifamily									
7177	Central Air Source Heat Pump Tier 1 (12 EER) MF CZ5	4,482	0	0	**0**	0	0	**0.0%**	Existing
7128	Central Air Conditioner Tier 1 (12 EER) MF CZ4	3,709	0	0	**0**	0	0	**0.0%**	Existing
7131	Central Air Source Heat Pump Tier 1 (12 EER) MF CZ4	3,080	0	0	**0**	0	0	**0.0%**	Existing
7176	Central Air Conditioner Tier 3 (13 EER) MF CZ5	2,835	0	0	**0**	0	0	**0.0%**	Existing
7260	EMS (Multifamily) MF NG CZ6	2,507	0	0	**0**	0	0	**0.0%**	Existing
7178	Central Air Source Heat Pump Tier 2 (12.5 EER) MF CZ5	2,385	0	0	**0**	0	0	**0.0%**	Existing
7130	Central Air Conditioner Tier 3 (13 EER) MF CZ4	1,824	0	0	**0**	0	0	**0.0%**	Existing
7129	Central Air Conditioner Tier 2 (12.5 EER) MF CZ4	1,096	0	0	**0**	0	0	**0.0%**	Existing
7224	Central Air Source Heat Pump Tier 2 (12.5 EER) MF CZ6	640	0	0	**0**	0	0	**0.0%**	Existing

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Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7175	Central Air Conditioner Tier 2 (12.5 EER) MF CZ5	572	0	0	**0**	0	0	**0.0%**	Existing
7220	Central Air Conditioner Tier 1 (12 EER) MF CZ6	558	0	0	**0**	0	0	**0.0%**	Existing
7256	Heat Recovery Ventilator MF CZ6	466	0	0	**0**	0	0	**0.0%**	Existing
7172	Refrigerant Charge MF CZ5	400	0	0	**0**	214	226	**0.0%**	Existing
7125	AC Tune-Up MF CZ4	327	0	0	**0**	0	0	**0.0%**	Existing
7126	Refrigerant Charge MF CZ4	327	0	0	**0**	0	0	**0.0%**	Existing
7222	Central Air Conditioner Tier 3 (13 EER) MF CZ6	183	0	0	**0**	0	0	**0.0%**	Existing
7223	Central Air Source Heat Pump Tier 1 (12 EER) MF CZ6	143	0	0	**0**	0	0	**0.0%**	Existing
7138	Right Sizing - Air Conditioning MF CZ4	122	0	0	**0**	0	0	**0.0%**	Existing
7184	Right Sizing - Air Conditioning MF CZ5	107	0	0	**0**	0	0	**0.0%**	Existing
7145	ECM Furnace Fan Motor MF NG CZ4	50	53	31	**0**	0	0	**0.0%**	Existing
7217	AC Tune-Up MF CZ6	41	0	0	**0**	0	0	**0.0%**	Existing
7218	Refrigerant Charge MF CZ6	41	0	0	**0**	0	0	**0.0%**	Existing

Table C-4 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
HVAC Equipment									
Multifamily									
7221	Central Air Conditioner Tier 2 (12.5 EER) MF CZ6	28	0	0	**0**	0	0	**0.0%**	Existing
7230	Right Sizing - Air Conditioning MF CZ6	14	0	0	**0**	0	0	**0.0%**	Existing

Table C-5. MWh saved in each potential scenario for each electric lighting measure

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Lighting									
Single Family									
3001	ENERGY STAR Specialty CFL SF	1,350,066	1,350,066	498,624	**498,624**	532,376	566,128	**19.2%**	Existing
3008	LED Lighting (screw-in) ; 2013-2019 SF	949,555	949,555	350,702	**350,702**	374,441	398,180	**13.5%**	Existing
3010	LED Specialty Lighting SF	1,514,514	1,514,514	167,808	**167,808**	179,167	190,526	**6.4%**	Existing

Table C-5 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Lighting									
Single Family									
3013	Exterior Lighting Controls SF	705,123	705,123	159,640	**159,640**	170,217	180,794	**6.1%**	Existing
3006	Energy Star Dedicated CFL Fixture SF	748,910	748,910	138,299	**138,299**	147,660	157,021	**5.3%**	Existing
3005	ENERGY STAR Standard CFL (23 W CFL replacing 100 W incandescent) SF	324,918	324,918	120,003	**120,003**	128,126	136,249	**4.6%**	Existing
3012	Torchieres SF	246,142	246,142	109,090	**109,090**	116,474	123,858	**4.2%**	Existing
3011	LED Fixture (Exterior) SF	480,070	480,070	85,212	**85,212**	91,213	97,214	**3.3%**	Existing
3004	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) SF	225,453	225,453	83,267	**83,267**	88,904	94,540	**3.2%**	Existing
3007	Energy Star Dedicated Exterior Fixture SF	450,065	450,065	79,887	**79,887**	85,512	91,138	**3.1%**	Existing
3014	Electroluminescent nightlights SF	280,780	280,780	77,776	**77,776**	83,041	88,305	**3.0%**	Existing
3003	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) SF	192,298	192,298	71,022	**71,022**	75,830	80,637	**2.7%**	Existing
3002	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) SF	132,619	132,619	48,981	**48,981**	52,296	55,612	**1.9%**	Existing

Table C-5 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Lighting									
Single Family									
3009	LED Lighting (screw-in) ; 2020 and later SF	198,929	198,929	22,041	**22,041**	23,533	25,025	**0.8%**	Existing
3023	LED Specialty Lighting SF NC	20,576	20,576	9,125	**9,125**	9,745	10,364	**0.4%**	New
3015	ENERGY STAR Specialty CFL SF NC	18,341	18,341	8,134	**8,134**	8,686	9,239	**0.3%**	New
3021	LED Lighting (screw-in) ; 2013-2019 SF NC	12,900	12,900	5,721	**5,721**	6,110	6,498	**0.2%**	New
3019	Energy Star Dedicated CFL Fixture SF NC	10,174	10,174	4,512	**4,512**	4,819	5,125	**0.2%**	New
3026	Exterior Lighting Controls SF NC	9,828	9,828	4,390	**4,390**	4,686	4,981	**0.2%**	New
3024	LED Fixture (Exterior) SF NC	6,522	6,522	2,781	**2,781**	2,977	3,174	**0.1%**	New
3020	Energy Star Dedicated Exterior Fixture SF NC	6,114	6,114	2,607	**2,607**	2,791	2,975	**0.1%**	New
3018	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) SF NC	4,084	4,084	1,811	**1,811**	1,934	2,057	**0.1%**	New
3027	Electroluminescent nightlights SF NC	3,815	3,815	1,692	**1,692**	1,806	1,921	**0.1%**	New

Table C-5 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Lighting									
Single Family									
3017	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) SF NC	3,483	3,483	1,545	**1,545**	1,650	1,755	**0.1%**	New
3025	Torchieres SF NC	3,344	3,344	1,483	**1,483**	1,584	1,684	**0.1%**	New
3022	LED Lighting (screw-in) ; 2020 and later SF NC	2,703	2,703	1,199	**1,199**	1,280	1,361	**0.0%**	New
3016	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) SF NC	2,402	2,402	1,065	**1,065**	1,138	1,210	**0.0%**	New
Multifamily									
3028	ENERGY STAR Specialty CFL MF	456,918	456,918	203,709	**203,709**	207,136	218,559	**7.8%**	Existing
3039	Torchieres MF	260,327	260,327	139,275	**139,275**	141,618	149,427	**5.4%**	Existing
3035	LED Lighting (screw-in) ; 2013-2019 MF	80,342	80,342	35,819	**35,819**	36,422	38,430	**1.4%**	Existing
3043	Common Area CFL lamps MF	33,753	33,753	22,558	**22,558**	22,558	22,558	**0.9%**	Existing
3042	Electroluminescent nightlights MF	58,064	58,064	19,415	**19,415**	19,742	20,830	**0.7%**	Existing
3038	LED Fixture (Exterior) MF	86,612	86,612	17,972	**17,972**	19,055	20,137	**0.7%**	Existing

Table C-5 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Lighting									
Multifamily									
3037	LED Specialty Lighting MF	128,144	128,144	17,139	**17,139**	17,428	18,389	**0.7%**	Existing
3034	Energy Star Dedicated Exterior Fixture MF	81,199	81,199	16,849	**16,849**	17,864	18,879	**0.6%**	Existing
3033	Energy Star Dedicated CFL Fixture MF	63,392	63,392	14,131	**14,131**	14,369	15,161	**0.5%**	Existing
3032	ENERGY STAR Standard CFL (23 W CFL replacing 100 W incandescent) MF	27,491	27,491	12,257	**12,257**	12,463	13,150	**0.5%**	Existing
3031	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) MF	19,076	19,076	8,505	**8,505**	8,648	9,125	**0.3%**	Existing
3030	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) MF	16,270	16,270	7,254	**7,254**	7,376	7,783	**0.3%**	Existing
3029	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) MF	11,221	11,221	5,003	**5,003**	5,087	5,367	**0.2%**	Existing
3055	Torchieres MF NC	8,740	8,740	4,676	**4,676**	4,755	5,018	**0.2%**	New
3044	Common Area Efficient Linear Fluorescent Lamps MF	17,221	17,221	3,453	**3,453**	3,453	3,453	**0.1%**	Existing
3053	LED Specialty Lighting MF NC	4,302	4,302	2,302	**2,302**	2,340	2,470	**0.1%**	New

Table C-5 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Lighting									
Multifamily									
3036	LED Lighting (screw-in) ; 2020 and later MF	16,831	16,831	2,251	**2,251**	2,289	2,415	**0.1%**	Existing
3045	ENERGY STAR Specialty CFL MF NC	3,835	3,835	2,052	**2,052**	2,086	2,202	**0.1%**	New
3051	LED Lighting (screw-in) ; 2013-2019 MF NC	2,697	2,697	1,443	**1,443**	1,467	1,549	**0.1%**	New
3058	Electroluminescent nightlights MF NC	2,437	2,437	1,304	**1,304**	1,326	1,399	**0.1%**	New
3049	Energy Star Dedicated CFL Fixture MF NC	2,256	2,256	1,207	**1,207**	1,227	1,295	**0.0%**	New
3059	Common Area CFL lamps MF NC	1,416	1,416	1,136	**1,136**	1,136	1,136	**0.0%**	New
3054	LED Fixture (Exterior) MF NC	1,817	1,817	905	**905**	960	1,014	**0.0%**	New
3050	Energy Star Dedicated Exterior Fixture MF NC	1,569	1,569	839	**839**	853	901	**0.0%**	New
3060	Common Area Efficient Linear Fluorescent Lamps MF NC	723	723	580	**580**	580	580	**0.0%**	New
3048	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) MF NC	1,067	1,067	571	**571**	581	613	**0.0%**	New

Table C-5 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Lighting									
Multifamily									
3047	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) MF NC	910	910	487	**487**	495	523	**0.0%**	New
3046	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) MF NC	628	628	336	**336**	342	360	**0.0%**	New
3052	LED Lighting (screw-in) ; 2020 and later MF NC	565	565	302	**302**	307	324	**0.0%**	New
3041	Exterior Lighting Controls MF	30,347	0	0	**0**	0	0	**0.0%**	Existing
3040	Interior Lighting Controls (Common Areas) MF	2,974	0	0	**0**	0	0	**0.0%**	Existing
3057	Exterior Lighting Controls MF NC	1,307	0	0	**0**	0	0	**0.0%**	New
3056	Interior Lighting Controls (Common Areas) MF NC	128	0	0	**0**	0	0	**0.0%**	New

Table C-6. MWh saved in each potential scenario for each miscellaneous electric measure

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Miscellaneous									
Single Family									
5009	Direct Feedback Devices (In Home Display) (Electric) SF	197,225	197,225	78,890	**78,890**	86,780	94,668	**10.3%**	Existing
5004	Solar Pool Cover SF	183,542	183,542	65,856	**65,856**	72,282	78,695	**8.6%**	Existing
5006	Indirect Energy Consumption Feedback (Electric) SF	95,132	95,132	47,566	**47,566**	52,323	57,079	**6.2%**	Existing
5007	Indirect Energy Consumption Feedback (Natural Gas) SF NG	44,864	89,728	44,864	**44,864**	49,351	53,837	**5.9%**	Existing
5008	Indirect Energy Consumption Feedback (Petroleum) SF PET	23,716	47,432	23,716	**23,716**	26,088	28,459	**3.1%**	Existing
5002	High Efficiency Two-Speed Pool Pump SF	13,596	13,596	4,105	**4,105**	4,105	4,105	**0.5%**	Existing
5001	Variable Speed Pool Pump and Motor SF	10,624	10,624	3,208	**3,208**	3,208	3,208	**0.4%**	Existing
5003	Pool Pump Timer SF	5,457	5,457	1,816	**1,816**	1,816	1,816	**0.2%**	Existing
5015	Solar Pool Cover SF NC	2,570	2,570	722	**722**	800	870	**0.1%**	New

Table C-6 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Miscellaneous									
Single Family									
5020	Direct Feedback Devices (In Home Display) (Electric) SF NC	1,640	1,640	396	**396**	435	475	**0.1%**	New
5013	High Efficiency Two-Speed Pool Pump SF NC	466	466	139	**139**	158	169	**0.0%**	New
5012	Variable Speed Pool Pump and Motor SF NC	364	364	109	**109**	124	132	**0.0%**	New
5018	Indirect Energy Consumption Feedback (Natural Gas) SF NC NG	473	946	96	**96**	105	115	**0.0%**	New
5017	Indirect Energy Consumption Feedback (Electric) SF NC	791	791	80	**80**	88	96	**0.0%**	New
5014	Pool Pump Timer SF NC	222	222	66	**66**	75	80	**0.0%**	New
5019	Indirect Energy Consumption Feedback (Petroleum) SF NC PET	241	482	49	**49**	54	58	**0.0%**	New
5010	Direct Feedback Devices (In Home Display) (Natural Gas) SF NG	93,011	0	0	**0**	0	0	**0.0%**	Existing
5011	Direct Feedback Devices (In Home Display) (Petroleum) SF PET	49,168	0	0	**0**	0	0	**0.0%**	Existing

Table C-6 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Miscellaneous									
Single Family									
5005	Efficient Well Pump SF	40,343	0	0	**0**	0	0	**0.0%**	Existing
5021	Direct Feedback Devices (In Home Display) (Natural Gas) SF NC NG	981	0	0	**0**	0	0	**0.0%**	New
5016	Efficient Well Pump SF NC	731	0	0	**0**	0	0	**0.0%**	New
5022	Direct Feedback Devices (In Home Display) (Petroleum) SF NC PET	499	0	0	**0**	0	0	**0.0%**	New
Multifamily									
5030	Indirect Energy Consumption Feedback (Natural Gas) MF NG	187,162	374,324	187,162	**187,162**	205,878	224,595	**24.5%**	Existing
5031	Indirect Energy Consumption Feedback (Petroleum) MF PET	107,744	215,489	107,744	**107,744**	118,519	129,293	**14.1%**	Existing
5032	Direct Feedback Devices (In Home Display) (Electric) MF	244,815	244,815	97,926	**97,926**	107,717	117,512	**12.8%**	Existing
5029	Indirect Energy Consumption Feedback (Electric) MF	118,087	118,087	59,044	**59,044**	64,948	70,852	**7.7%**	Existing
5026	Solar Pool Cover MF	97,715	97,715	34,200	**34,200**	37,620	41,036	**4.5%**	Existing

Table C-6 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Miscellaneous									
Single Family									
5024	High Efficiency Two-Speed Pool Pump MF	6,886	6,886	2,068	**2,068**	2,068	2,068	**0.3%**	Existing
5023	Variable Speed Pool Pump and Motor MF	5,381	5,381	1,616	**1,616**	1,616	1,616	**0.2%**	Existing
5038	Solar Pool Cover MF NC	4,096	4,096	1,153	**1,153**	1,266	1,382	**0.2%**	New
5025	Pool Pump Timer MF	4,809	4,809	1,120	**1,120**	1,192	1,264	**0.1%**	Existing
5043	Indirect Energy Consumption Feedback (Petroleum) MF NC PET	3,272	6,543	661	**661**	727	793	**0.1%**	New
5041	Indirect Energy Consumption Feedback (Electric) MF NC	2,970	5,941	600	**600**	660	720	**0.1%**	New
5036	High Efficiency Two-Speed Pool Pump MF NC	722	722	222	**222**	238	262	**0.0%**	New
5035	Variable Speed Pool Pump and Motor MF NC	564	564	173	**173**	186	204	**0.0%**	New
5037	Pool Pump Timer MF NC	344	344	106	**106**	114	125	**0.0%**	New
5033	Direct Feedback Devices (In Home Display) (Natural Gas) MF NG	388,019	0	0	**0**	0	0	**0.0%**	Existing
5034	Direct Feedback Devices (In Home Display) (Petroleum) MF PET	223,373	0	0	**0**	0	0	**0.0%**	Existing

Table C-6 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)	Construction Type
Miscellaneous									
Single Family									
5046	Direct Feedback Devices (In Home Display) (Petroleum) MF NC PET	17,080	0	0	**0**	0	0	**0.0%**	New
5045	Direct Feedback Devices (In Home Display) (Natural Gas) MF NC NG	12,143	0	0	**0**	0	0	**0.0%**	New
5027	Efficient Well Pump MF	11,518	0	0	**0**	0	0	**0.0%**	Existing
5044	Direct Feedback Devices (In Home Display) (Electric) MF NC	6,158	0	0	**0**	0	0	**0.0%**	New
5042	Indirect Energy Consumption Feedback (Natural Gas) MF NC NG	5,857	0	0	**0**	0	0	**0.0%**	New
5039	Efficient Well Pump MF NC	645	0	0	**0**	0	0	**0.0%**	New

Table C-7. MWh saved in each potential scenario for each electric new construction measure

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)
New Construction								
Single Family								
8001	New Construction Better than Code envelope SF CZ4	4,324	0	0	**3,471**	3,796	4,120	**28.4%**
8010	New Construction Better than Code envelope SF CZ5	3,348	0	0	**2,687**	2,939	3,187	**22.0%**
8019	New Construction Better than Code envelope SF CZ6	1,077	0	0	**811**	892	973	**6.6%**
8009	New Construction Better than Code envelope and hvac SF CZ4 PET	646	0	0	**342**	374	406	**2.8%**
8007	New Construction Better than Code envelope SF CZ4 PET	310	776	234	**156**	172	188	**1.3%**
8018	New Construction Better than Code envelope and hvac SF CZ5 PET	208	343	103	**103**	113	123	**0.8%**
8016	New Construction Better than Code envelope SF CZ5 PET	177	296	89	**89**	98	107	**0.7%**
8026	New Construction Better than Code hvac SF CZ6 PET	169	169	50	**50**	56	61	**0.4%**
8027	New Construction Better than Code envelope and hvac SF CZ6 PET	129	129	39	**39**	43	47	**0.3%**
8025	New Construction Better than Code envelope SF CZ6 PET	110	110	33	**33**	36	39	**0.3%**
8003	New Construction Better than Code envelope and hvac SF CZ4	2,491	0	0	**0**	0	0	**0.0%**

Table C-7 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)
New Construction								
Single Family								
8005	New Construction Better than Code hvac SF CZ4 NG	1,867	0	0	**0**	0	0	**0.0%**
8012	New Construction Better than Code envelope and hvac SF CZ5	1,860	0	0	**0**	0	0	**0.0%**
8014	New Construction Better than Code hvac SF CZ5 NG	1,330	0	0	**0**	0	0	**0.0%**
8006	New Construction Better than Code envelope and hvac SF CZ4 NG	1,104	0	0	**0**	0	0	**0.0%**
8008	New Construction Better than Code hvac SF CZ4 PET	1,066	0	0	**0**	0	0	**0.0%**
8015	New Construction Better than Code envelope and hvac SF CZ5 NG	878	0	0	**0**	0	0	**0.0%**
8013	New Construction Better than Code envelope SF CZ5 NG	635	0	0	**0**	0	0	**0.0%**
8021	New Construction Better than Code envelope and hvac SF CZ6	569	0	0	**0**	0	0	**0.0%**
8002	New Construction Better than Code hvac SF CZ4	501	0	0	**0**	0	0	**0.0%**
8004	New Construction Better than Code envelope SF CZ4 NG	418	0	0	**0**	0	0	**0.0%**
8023	New Construction Better than Code hvac SF CZ6 NG	287	0	0	**0**	0	0	**0.0%**

Table C-7 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)
New Construction								
Single Family								
8017	New Construction Better than Code hvac SF CZ5 PET	265	0	0	**0**	0	0	**0.0%**
8038	New Construction Better than Code hvac SF CZ5	235	0	0	**0**	0	0	**0.0%**
8024	New Construction Better than Code envelope and hvac SF CZ6 NG	189	0	0	**0**	0	0	**0.0%**
8022	New Construction Better than Code envelope SF CZ6 NG	125	0	0	**0**	0	0	**0.0%**
8020	New Construction Better than Code hvac SF CZ6	83	0	0	**0**	0	0	**0.0%**
Multifamily								
8032	New Construction Better than Code hvac MF CZ4 NG	3,025	0	0	**906**	1,004	1,089	**7.4%**
8028	New Construction Better than Code envelope MF CZ4	1,608	2,720	814	**814**	893	993	**6.7%**
8035	New Construction Better than Code hvac MF CZ4 PET	1,804	1,804	541	**541**	597	660	**4.4%**
8033	New Construction Better than Code envelope and hvac MF CZ4 NG	1,788	0	0	**540**	594	648	**4.4%**
8030	New Construction Better than Code envelope and hvac MF CZ4	869	1,456	434	**434**	456	543	**3.6%**
8036	New Construction Better than Code envelope and hvac MF CZ4 PET	1,156	1,156	361	**361**	377	409	**3.0%**

Table C-7 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential-Base (MWh)	2018 Achievable Potential-Scenario 1 (MWh)	2018 Achievable Potential-Scenario 2 (MWh)	2018 Achievable Potential-Scenario 3 (MWh)	% of 2018 Achievable Potential-Scenario 1 (MWh)
New Construction								
Multifamily								
8046	New Construction Better than Code envelope MF CZ6	294	758	229	**229**	170	189	**1.9%**
8031	New Construction Better than Code envelope MF CZ4 NG	643	0	0	**193**	213	231	**1.6%**
8034	New Construction Better than Code envelope MF CZ4 PET	525	525	157	**157**	174	192	**1.3%**
8048	New Construction Better than Code envelope and hvac MF CZ6	264	0	0	**132**	145	158	**1.1%**
8052	New Construction Better than Code envelope MF CZ6 PET	214	537	172	**116**	127	136	**0.9%**
8041	New Construction Better than Code hvac MF CZ5 NG	2,667	0	0	**0**	0	0	**0.0%**
8042	New Construction Better than Code envelope and hvac MF CZ5 NG	1,675	0	0	**0**	0	0	**0.0%**
8040	New Construction Better than Code envelope MF CZ5 NG	1,273	0	0	**0**	0	0	**0.0%**
8037	New Construction Better than Code envelope MF CZ5	1,192	0	0	**0**	0	0	**0.0%**
8039	New Construction Better than Code envelope and hvac MF CZ5	647	0	0	**0**	0	0	**0.0%**
8044	New Construction Better than Code hvac MF CZ5 PET	604	0	0	**0**	0	0	**0.0%**

Table C-7 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)
New Construction								
Multifamily								
8045	New Construction Better than Code envelope and hvac MF CZ5 PET	502	0	0	**0**	0	0	**0.0%**
8050	New Construction Better than Code hvac MF CZ6 NG	478	0	0	**0**	0	0	**0.0%**
8043	New Construction Better than Code envelope MF CZ5 PET	403	0	0	**0**	0	0	**0.0%**
8047	New Construction Better than Code hvac MF CZ6	347	0	0	**0**	0	0	**0.0%**
8051	New Construction Better than Code envelope and hvac MF CZ6 NG	304	0	0	**0**	0	0	**0.0%**
8049	New Construction Better than Code envelope MF CZ6 NG	208	0	0	**0**	0	0	**0.0%**
8029	New Construction Better than Code hvac MF CZ4	186	0	0	**0**	0	0	**0.0%**
8048	New Construction Better than Code envelope and hvac MF CZ6	138	0	0	**0**	90	97	**0.0%**
8038	New Construction Better than Code hvac MF CZ5	79	0	0	**0**	0	0	**0.0%**
8047	New Construction Better than Code hvac MF CZ6	23	0	0	**0**	0	0	**0.0%**

Table C-8. MWh saved in each potential scenario for each electric water heating measure

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)	Construction Type
Water Heating									
Single Family									
4002	High Efficiency Storage Tank Water Heater - HPWH (Tier II) SF	268,171	383,485	55,332	**58,040**	62,348	66,661	**15.5%**	Existing
4001	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I) SF	240,055	343,279	49,531	**51,955**	55,812	59,672	**13.9%**	Existing
4019	Pipe Wrap (Electric) SF	67,019	67,019	40,413	**40,413**	40,413	40,413	**10.8%**	Existing
4028	Low Flow Faucets- Kitchen (Electric) SF	61,516	61,516	30,758	**30,758**	32,604	34,449	**8.2%**	Existing
4034	Shower Start (Electric) SF	33,890	33,890	20,334	**20,334**	20,334	20,334	**5.4%**	Existing
4025	Low Flow Showerhead (Electric) SF	33,321	33,321	19,993	**19,993**	19,993	19,993	**5.4%**	Existing
4031	Low Flow Faucets- Bath (Electric) SF	35,152	35,152	17,576	**17,576**	18,631	19,685	**4.7%**	Existing
4022	Tank Wrap (Electric) SF	13,363	18,975	11,404	**8,031**	8,031	8,031	**2.1%**	Existing
4038	High Efficiency Storage Tank Water Heater - HPWH (Tier II) SF NC	8,121	12,181	3,666	**3,666**	4,035	4,402	**1.0%**	New
4037	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I) SF NC	7,270	10,903	3,281	**3,281**	3,612	3,941	**0.9%**	New
4004	Desuperheater (off GSHP) SF	15,470	0	0	**2,083**	2,238	2,393	**0.6%**	Existing
4040	Desuperheater (off GSHP) SF NC	4,705	0	0	**1,416**	1,558	1,700	**0.4%**	New

Table C-8 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)	Construction Type
Water Heating									
Single Family									
4055	Pipe Wrap (Electric) SF NC	3,420	3,420	1,030	**1,030**	1,132	1,235	**0.3%**	New
4061	Low Flow Faucets- Kitchen (Electric) SF NC	2,482	2,482	747	**747**	822	897	**0.2%**	New
4058	Low Flow Showerhead (Electric) SF NC	1,681	1,681	506	**506**	557	607	**0.1%**	New
4064	Low Flow Faucets- Bath (Electric) SF NC	1,418	1,418	427	**427**	470	512	**0.1%**	New
4067	Shower Start (Electric) SF NC	1,169	1,169	352	**352**	387	422	**0.1%**	New
4003	Solar WH w/ Electric Backup SF	298,471	0	0	**0**	0	0	**0.0%**	Existing
4039	Solar WH w/ Electric Backup SF NC	6,702	0	0	**0**	0	0	**0.0%**	New
Multifamily									
4071	High Efficiency Storage Tank Water Heater - HPWH (Tier II) MF	111,410	159,317	22,988	**24,112**	25,902	27,693	**6.5%**	Existing
4070	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I) MF	99,729	142,613	20,578	**21,584**	23,186	24,789	**5.8%**	Existing
4088	Pipe Wrap (Electric) MF	27,843	27,843	16,789	**16,789**	16,789	16,789	**4.5%**	Existing
4097	Low Flow Faucets- Kitchen (Electric) MF	25,557	25,557	12,778	**12,778**	13,545	14,312	**3.4%**	Existing
4094	Low Flow Showerhead (Electric) MF	13,843	13,843	8,306	**8,306**	8,306	8,306	**2.2%**	Existing

Table C-8 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)	Construction Type
Water Heating									
Multifamily									
4103	Shower Start (Electric) MF	13,755	13,755	8,253	**8,253**	8,253	8,253	**2.2%**	Existing
4100	Low Flow Faucets- Bath (Electric) MF	14,604	14,604	7,302	**7,302**	7,740	8,178	**2.0%**	Existing
4091	Tank Wrap (Electric) MF	5,551	7,883	4,737	**3,337**	3,337	3,337	**0.9%**	Existing
4110	High Efficiency Storage Tank Water Heater - HPWH (Tier II) MF NC	10,527	10,527	3,167	**3,167**	3,485	3,802	**0.8%**	New
4109	High Efficiency Storage Tank Water Heater - HPWH (ES/Tier I) MF NC	9,423	9,423	2,835	**2,835**	3,119	3,404	**0.8%**	New
4112	Desuperheater (off GSHP) MF NC	4,150	0	0	**1,249**	1,374	1,499	**0.3%**	New
4127	Pipe Wrap (Electric) MF NC	2,955	2,955	890	**890**	979	1,067	**0.2%**	New
4133	Low Flow Faucets- Kitchen (Electric) MF NC	2,145	2,145	646	**646**	710	775	**0.2%**	New
4073	Desuperheater (off GSHP) MF	4,417	0	0	**595**	639	683	**0.2%**	Existing
4130	Low Flow Showerhead (Electric) MF NC	1,452	1,452	437	**437**	481	525	**0.1%**	New
4139	Shower Start (Electric) MF NC	1,443	1,443	434	**434**	478	521	**0.1%**	New
4136	Low Flow Faucets- Bath (Electric) MF NC	1,226	1,226	369	**369**	406	443	**0.1%**	New
4072	Solar WH w/ Electric Backup MF	123,997	0	0	**0**	0	0	**0.0%**	Existing

Table C-8 continued

Measure ID	Measure Name	2018 Technical Potential (MWh)	2018 Economic Potential (MWh)	2018 Achievable Potential- Base (MWh)	2018 Achievable Potential- Scenario 1 (MWh)	2018 Achievable Potential- Scenario 2 (MWh)	2018 Achievable Potential- Scenario 3 (MWh)	% of 2018 Achievable Potential- Scenario 1 (MWh)	Construction Type
Water Heating									
Multifamily									
4111	Solar WH w/ Electric Backup MF NC	17,374	0	0	**0**	0	0	**0.0%**	New
4106	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Electric) MF	7,873	0	0	**0**	0	0	**0.0%**	Existing
4142	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Electric) MF NC	330	0	0	**0**	0	0	**0.0%**	New

Table C-9: MMBtu saved in each potential scenario for each non-electric appliances measure.

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Appliances									
Single Family									
1012	CEE Tier 3 Clothes Washer (with natural gas WH) SF NG	358,117	358,117	59,140	**59,140**	62,977	66,813	**15.5%**	Existing
1011	CEE Tier 2 Clothes Washer (with natural gas WH) SF NG	352,594	352,594	58,228	**58,228**	62,006	65,783	**15.2%**	Existing
1010	Energy Star Electric Clothes Washer (with natural gas WH) SF NG	345,967	345,967	57,134	**57,134**	60,840	64,546	**14.9%**	Existing
1021	Energy Star Dishwasher (petroleum water heating) SF PET	179,927	179,927	44,430	**44,430**	44,430	44,430	**11.6%**	Existing
1015	CEE Tier 3 Clothes Washer (with Petroleum WH) SF PET	186,095	186,095	30,732	**30,732**	32,725	34,720	**8.0%**	Existing
1014	CEE Tier 2 Clothes Washer (with Petroleum WH) SF PET	183,226	183,226	30,258	**30,258**	32,221	34,185	**7.9%**	Existing
1013	Energy Star Electric Clothes Washer (with Petroleum WH) SF PET	179,782	179,782	29,690	**29,690**	31,615	33,542	**7.8%**	Existing
1020	Energy Star Dishwasher (natural gas water heating) SF NG	68,885	68,885	17,010	**17,010**	17,010	17,010	**4.4%**	Existing
1032	CEE Tier 3 Clothes Washer (with natural gas WH) SF NC NG	8,735	8,735	2,629	**2,629**	2,892	3,156	**0.7%**	New

Table C-9 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Appliances									
Single Family									
1031	CEE Tier 2 Clothes Washer (with natural gas WH) SF NC NG	8,595	8,595	2,587	**2,587**	2,846	3,105	**0.7%**	New
1030	Energy Star Electric Clothes Washer (with natural gas WH) SF NC NG	8,427	8,427	2,537	**2,537**	2,790	3,045	**0.7%**	New
1040	Energy Star Dishwasher (natural gas water heating) SF NC NG	5,795	5,795	1,744	**1,744**	1,919	2,093	**0.5%**	New
1035	CEE Tier 3 Clothes Washer (with Petroleum WH) SF NC PET	3,678	3,678	1,108	**1,108**	1,218	1,329	**0.3%**	New
1034	CEE Tier 2 Clothes Washer (with Petroleum WH) SF NC PET	3,620	3,620	1,090	**1,090**	1,199	1,307	**0.3%**	New
1033	Energy Star Electric Clothes Washer (with Petroleum WH) SF NC PET	3,549	3,549	1,069	**1,069**	1,175	1,282	**0.3%**	New
1041	Energy Star Dishwasher (petroleum water heating) SF NC PET	2,375	2,375	715	**715**	787	858	**0.2%**	New
1017	Clothes Dryer with Moisture Sensor (natural gas dryer) SF NG	249,876	0	0	**0**	0	0	**0.0%**	Existing
1018	Clothes Dryer with Moisture Sensor (petroleum dryer) SF PET	47,802	0	0	**0**	0	0	**0.0%**	Existing

Table C-9 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Appliances									
Single Family									
1037	Clothes Dryer with Moisture Sensor (natural gas dryer) SF NC NG	4,679	0	0	**0**	0	0	**0.0%**	New
1038	Clothes Dryer with Moisture Sensor (propane dryer) SF NC PET	1,358	0	0	**0**	0	0	**0.0%**	New
Multifamily									
1063	Energy Star Dishwasher (petroleum water heating) MF PET	102,519	102,519	17,365	**17,365**	18,549	19,732	**4.5%**	Existing
1062	Energy Star Dishwasher (natural gas water heating) MF NG	35,018	35,018	5,931	**5,931**	6,335	6,739	**1.6%**	Existing
1054	CEE Tier 3 Clothes Washer (with natural gas WH) MF NG	23,887	23,887	3,945	**3,945**	4,201	4,457	**1.0%**	Existing
1053	CEE Tier 2 Clothes Washer (with natural gas WH) MF NG	23,519	23,519	3,884	**3,884**	4,136	4,388	**1.0%**	Existing
1052	Energy Star Electric Clothes Washer (with natural gas WH) MF NG	23,077	23,077	3,811	**3,811**	4,058	4,306	**1.0%**	Existing
1057	CEE Tier 3 Clothes Washer (with Petroleum WH) MF PET	8,483	8,483	1,402	**1,402**	1,491	1,581	**0.4%**	Existing
1056	CEE Tier 2 Clothes Washer (with petroleum WH) MF PET	8,352	8,352	1,380	**1,380**	1,468	1,557	**0.4%**	Existing

Table C-9 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Appliances									
Multifamily									
1055	Energy Star Electric Clothes Washer (with Petroleum WH) MF PET	8,195	8,195	1,354	**1,354**	1,441	1,527	**0.4%**	Existing
1082	Energy Star Dishwasher (natural gas water heating) MF NC NG	2,413	2,413	726	**726**	799	871	**0.2%**	New
1074	CEE Tier 3 Clothes Washer (with natural gas WH) MF NC NG	1,626	1,626	489	**489**	537	587	**0.1%**	New
1073	CEE Tier 2 Clothes Washer (with natural gas WH) MF NC NG	1,600	1,600	481	**481**	529	577	**0.1%**	New
1072	Energy Star Electric Clothes Washer (with natural gas WH) MF NC NG	1,568	1,568	472	**472**	519	566	**0.1%**	New
1083	Energy Star Dishwasher (petroleum water heating) MF NC PET	1,437	1,437	432	**432**	476	519	**0.1%**	New
1077	CEE Tier 3 Clothes Washer (with Petroleum WH) MF NC PET	579	579	174	**174**	191	209	**0.0%**	New
1076	CEE Tier 2 Clothes Washer (with Petroleum WH) MF NC PET	569	569	171	**171**	188	206	**0.0%**	New
1075	Energy Star Electric Clothes Washer (with Petroleum WH) MF NC PET	558	558	168	**168**	184	202	**0.0%**	New

Table C-9 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Appliances									
Multifamily									
1059	Clothes Dryer with Moisture Sensor (natural gas dryer) MF NG	4,383	0	0	**0**	0	0	**0.0%**	Existing
1079	Clothes Dryer with Moisture Sensor (natural gas dryer) MF NC NG	3,450	0	0	**0**	0	0	**0.0%**	New
1060	Clothes Dryer with Moisture Sensor (propane dryer) MF PET	2,818	0	0	**0**	0	0	**0.0%**	Existing
1080	Clothes Dryer with Moisture Sensor (petroleum dryer) MF NC PET	1,002	0	0	**0**	0	0	**0.0%**	New

Table C-10: MMBtu saved in each potential scenario for each non-electric building envelope measure.

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Single Family									
6020	Improved Air Sealing SF NG CZ5	4,697,273	0	0	**1,878,912**	2,019,828	2,160,750	**10.4%**	Existing
6044	Improved Air Sealing SF PET CZ4	5,277,299	5,277,299	1,733,067	**1,733,067**	1,891,382	2,049,702	**9.6%**	Existing
6047	Storm Windows SF PET CZ4	2,450,873	4,901,739	1,711,691	**1,711,691**	1,858,735	2,005,793	**9.5%**	Existing
6003	Improved Wall Insulation (R-0 to R-13) SF NG CZ4	928,566	1,857,171	1,307,437	**1,307,437**	1,307,437	1,307,437	**7.3%**	Existing
6042	Improved Attic/Roof Insulation (R19 to R49) SF PET CZ4	2,722,714	2,722,714	1,085,819	**1,085,819**	1,167,496	1,249,173	**6.0%**	Existing
6041	Improved Attic/Roof Insulation (R19 to R38) SF PET CZ4	2,422,531	2,422,531	966,106	**966,106**	1,038,778	1,111,449	**5.4%**	Existing
6021	Improved Duct Sealing SF NG CZ5	1,360,459	1,360,459	680,224	**680,224**	721,045	761,859	**3.8%**	Existing
6015	Improved Wall Insulation (R0 to R20) SF NG CZ5	368,564	737,128	625,853	**625,853**	625,853	625,853	**3.5%**	Existing
6056	Improved Air Sealing SF PET CZ5	1,423,216	1,423,216	569,283	**569,283**	611,993	654,682	**3.2%**	Existing
6032	Improved Air Sealing SF NG CZ6	1,324,833	1,324,833	509,795	**509,795**	549,540	589,293	**2.8%**	Existing
6068	Improved Air Sealing SF PET CZ6	1,139,289	1,139,289	438,397	**438,397**	472,576	506,754	**2.4%**	Existing
6009	Improved Duct Sealing SF NG CZ4	788,998	788,998	394,500	**394,500**	418,168	441,838	**2.2%**	Existing
6039	Improved Wall Insulation (R0 to R13) SF PET CZ4	550,874	550,874	387,759	**387,759**	387,759	387,759	**2.2%**	Existing
6059	Storm Windows SF PET CZ5	384,910	769,819	346,110	**346,110**	184,601	196,162	**1.9%**	Existing
6054	Improved Attic/Roof Insulation (R19 to R49) SF PET CZ5	620,913	620,913	291,825	**291,825**	310,467	329,088	**1.6%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Single Family									
6043	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF PET CZ4	718,902	718,902	280,087	**280,087**	301,651	323,215	**1.6%**	Existing
6019	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF NG CZ5	578,209	0	0	**278,002**	295,338	312,688	**1.5%**	Existing
6053	Improved Attic/Roof Insulation (R19 to R38) SF PET CZ5	551,094	551,094	259,010	**259,010**	275,556	292,083	**1.4%**	Existing
6045	Improved Duct Sealing SF PET CZ4	514,953	514,953	257,479	**257,479**	272,923	288,372	**1.4%**	Existing
6048	Exterior Door SF PET CZ4	479,983	0	0	**239,993**	254,390	268,790	**1.3%**	Existing
6066	Improved Attic/Roof Insulation (R19 to R60) SF PET CZ6	470,837	470,837	229,959	**229,959**	244,083	258,207	**1.3%**	Existing
6057	Improved Duct Sealing SF PET CZ5	442,085	442,085	221,048	**221,048**	234,304	247,567	**1.2%**	Existing
6070	ES Windows SF PET CZ6	430,861	0	0	**216,713**	228,876	241,805	**1.2%**	Existing
6065	Improved Attic/Roof Insulation (R19 to R49) SF PET CZ6	436,021	436,021	212,955	**212,955**	226,035	239,114	**1.2%**	Existing
6027	Improved Wall Insulation (R0 to R20) SF NG CZ6	124,046	248,152	200,663	**200,663**	200,663	200,663	**1.1%**	Existing
6033	Improved Duct Sealing SF NG CZ6	302,469	302,469	151,233	**151,233**	160,308	169,383	**0.8%**	Existing
6069	Improved Duct Sealing SF PET CZ6	277,562	277,562	138,785	**138,785**	147,108	155,435	**0.8%**	Existing
6071	Storm Windows SF PET CZ6	308,643	617,278	239,256	**119,628**	128,875	138,152	**0.7%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Single Family									
6040	Improved Wall Insulation (R7 to R13) SF PET CZ4	176,222	176,222	108,364	**108,364**	108,364	108,364	**0.6%**	Existing
6051	Improved Wall Insulation (R0 to R20) SF PET CZ5	111,974	111,974	95,025	**95,025**	95,025	95,025	**0.5%**	Existing
6063	Improved Wall Insulation (R0 to R20) SF PET CZ6	107,277	107,277	86,814	**86,814**	86,814	86,814	**0.5%**	Existing
6055	Basement Wall/Foundation/Rim Insulation (R0 to R10) SF PET CZ5	173,418	173,418	83,382	**83,382**	88,582	93,783	**0.5%**	Existing
6060	Exterior Door SF PET CZ5	145,458	0	0	**72,730**	77,092	81,457	**0.4%**	Existing
6038	Improved Floor Insulation (R0 to R30) SF PET CZ4	175,807	175,807	72,290	**72,290**	77,565	82,841	**0.4%**	Existing
6031	Basement Wall/Foundation/Rim Insulation (R0 to R15) SF NG CZ6	151,253	0	0	**69,443**	74,000	78,528	**0.4%**	Existing
6037	Improved Floor Insulation (R-0 to R19) SF PET CZ4	151,498	151,498	62,294	**62,294**	66,840	71,386	**0.3%**	Existing
6067	Basement Wall/Foundation/Rim Insulation (R0 to R15) SF PET CZ6	129,022	129,022	59,255	**59,255**	63,115	66,989	**0.3%**	Existing
6072	Exterior Door SF PET CZ6	109,613	0	0	**54,807**	58,095	61,383	**0.3%**	Existing
6052	Improved Wall Insulation (R10 to R20) SF PET CZ5	44,041	44,041	31,343	**31,343**	31,343	31,343	**0.2%**	Existing
6064	Improved Wall Insulation (R10 to R20) SF PET CZ6	34,655	34,655	24,225	**24,225**	24,225	24,225	**0.1%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Single Family									
6050	Improved Floor Insulation (R0 to R30) SF PET CZ5	31,751	0	0	**13,411**	14,366	15,306	**0.1%**	Existing
6049	Improved Floor Insulation (R-0 to R19) SF PET CZ5	27,104	0	0	**11,449**	12,263	13,066	**0.1%**	Existing
6062	Improved Floor Insulation (R0 to R30) SF PET CZ6	10,853	10,853	4,652	**4,652**	4,975	5,285	**0.0%**	Existing
6061	Improved Floor Insulation (R-0 to R19) SF PET CZ6	9,296	9,296	3,985	**3,985**	4,262	4,527	**0.0%**	Existing
6008	Improved Air Sealing SF NG CZ4	8,122,700	0	0	**0**	0	0	**0.0%**	Existing
6035	Storm Windows SF NG CZ6	7,934,612	0	0	**0**	0	0	**0.0%**	Existing
6006	Improved Attic/Roof Insulation (R-19 to R-49) SF NG CZ4	4,141,071	0	0	**0**	0	0	**0.0%**	Existing
6005	Improved Attic/Roof Insulation (R-19 to R-38) SF NG CZ4	3,652,136	0	0	**0**	0	0	**0.0%**	Existing
6010	ES Windows SF NG CZ4	3,317,465	0	0	**0**	0	0	**0.0%**	Existing
6011	Storm Windows SF NG CZ4	2,815,983	0	0	**0**	0	0	**0.0%**	Existing
6022	ES Windows SF NG CZ5	2,182,765	0	0	**0**	0	0	**0.0%**	Existing
6046	ES Windows SF PET CZ4	2,180,261	0	0	**0**	0	0	**0.0%**	Existing
6018	Improved Attic/Roof Insulation (R19 to R49) SF NG CZ5	2,050,582	0	0	**0**	0	0	**0.0%**	Existing
6017	Improved Attic/Roof Insulation (R19 to R38) SF NG CZ5	1,827,968	0	0	**0**	0	0	**0.0%**	Existing
6023	Storm Windows SF NG CZ5	1,267,038	0	0	**0**	0	0	**0.0%**	Existing
6058	ES Windows SF PET CZ5	664,458	0	0	**0**	330,639	350,573	**0.0%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Single Family									
6012	Exterior Door SF NG CZ4	656,563	0	0	**0**	0	0	**0.0%**	Existing
6030	Improved Attic/Roof Insulation (R19 to R60) SF NG CZ6	544,587	0	0	**0**	0	0	**0.0%**	Existing
6029	Improved Attic/Roof Insulation (R19 to R49) SF NG CZ6	505,659	0	0	**0**	0	0	**0.0%**	Existing
6034	ES Windows SF NG CZ6	498,226	0	0	**0**	0	0	**0.0%**	Existing
6024	Exterior Door SF NG CZ5	394,272	0	0	**0**	0	0	**0.0%**	Existing
6002	Improved Floor Insulation (R-0 to R-30) SF NG CZ4	267,274	0	0	**0**	0	0	**0.0%**	Existing
6004	Improved Wall Insulation (R-7 to R-13) SF NG CZ4	266,953	0	0	**0**	0	0	**0.0%**	Existing
6001	Improved Floor Insulation (R-0 to R-19) SF NG CZ4	229,092	0	0	**0**	0	0	**0.0%**	Existing
6016	Improved Wall Insulation (R10 to R20) SF NG CZ5	144,877	0	0	**0**	0	0	**0.0%**	Existing
6036	Exterior Door SF NG CZ6	112,953	0	0	**0**	0	0	**0.0%**	Existing
6007	Basement Wall/Foundation/Rim Insulation (R-0 to R-10) SF NG CZ4	107,489	0	0	**0**	45,108	48,321	**0.0%**	Existing
6014	Improved Floor Insulation (R0 to R30) SF NG CZ5	90,620	0	0	**0**	0	0	**0.0%**	Existing
6013	Improved Floor Insulation (R-0 to R19) SF NG CZ5	76,835	0	0	**0**	0	0	**0.0%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Single Family									
6028	Improved Wall Insulation (R10 to R20) SF NG CZ6	39,976	0	0	**0**	0	0	**0.0%**	Existing
6026	Improved Floor Insulation (R0 to R30) SF NG CZ6	39,132	0	0	**0**	0	0	**0.0%**	Existing
6025	Improved Floor Insulation (R-0 to R19) SF NG CZ6	33,595	0	0	**0**	0	0	**0.0%**	Existing
Multifamily									
6155	Storm Windows MF PET CZ4	418,326	836,652	250,966	**250,966**	276,161	301,209	**1.4%**	Existing
6149, 6150	Improved Attic/Roof Insulation (R-X or R-X) MF PET CZ4	620,391	627,385	249,957	**249,957**	268,810	287,663	**1.4%**	Existing
6114	Improved Attic/Roof Insulation (R19 to R49) MF NG CZ4	484,977	0	0	**208,665**	224,416	240,043	**1.2%**	Existing
6113	Improved Attic/Roof Insulation (R19 to R38) MF NG CZ4	427,716	0	0	**184,028**	197,920	211,701	**1.0%**	Existing
6152	Improved Air Sealing MF PET CZ4	554,715	554,715	182,170	**182,170**	198,823	215,441	**1.0%**	Existing
6164	Improved Air Sealing MF PET CZ5	162,295	162,295	64,922	**64,922**	69,798	74,674	**0.4%**	Existing
6176	Improved Air Sealing MF PET CZ6	113,633	113,633	43,734	**43,734**	47,164	50,534	**0.2%**	Existing
6173, 6174	Improved Attic/Roof Insulation (R-X or R-X) MF PET CZ6	71,866	71,866	43,169	**43,169**	43,169	43,169	**0.2%**	Existing
6161, 6162	Improved Attic/Roof Insulation (R-X or R-X) MF PET CZ5	55,110	55,110	42,482	**42,482**	42,482	42,482	**0.2%**	Existing
6165	Improved Duct Sealing MF PET CZ5	69,455	69,455	34,721	**34,721**	36,817	38,900	**0.2%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Multifamily									
6144	Exterior Door MF NG CZ6	157,193	0	0	**32,294**	35,505	38,717	**0.2%**	Existing
6179	Storm Windows MF PET CZ6	45,205	0	0	**28,653**	31,355	34,083	**0.2%**	Existing
6127	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ5	28,699	0	0	**11,933**	12,833	13,633	**0.1%**	Existing
6115	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ4	23,302	23,302	9,668	**9,668**	10,350	11,031	**0.1%**	Existing
6175	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF PET CZ6	16,419	16,419	6,811	**6,811**	7,289	7,768	**0.0%**	Existing
6151	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF PET CZ4	15,067	15,067	6,278	**6,278**	6,741	7,137	**0.0%**	Existing
6146	Improved Floor Insulation (R0 to R30) MF PET CZ4	13,437	13,589	5,626	**5,626**	5,960	6,484	**0.0%**	Existing
6112	Improved Wall Insulation (R7 to R13) MF NG CZ4	5,443	0	0	**4,972**	4,972	4,972	**0.0%**	Existing
6145	Improved Floor Insulation (R0 to R19) MF PET CZ4	11,579	11,710	4,848	**4,848**	5,136	5,588	**0.0%**	Existing
6177	Improved Duct Sealing MF PET CZ6	9,381	9,381	4,668	**4,668**	4,972	5,253	**0.0%**	Existing
6163	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF PET CZ5	9,633	9,633	4,011	**4,011**	4,311	4,573	**0.0%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Multifamily									
6148	Improved Wall Insulation (R7 to R13) MF PET CZ4	3,683	3,683	3,453	**3,453**	3,453	3,453	**0.0%**	Existing
6160	Improved Wall Insulation (R10 to R20) MF PET CZ5	3,702	3,702	2,887	**2,887**	2,887	2,887	**0.0%**	Existing
6172	Improved Wall Insulation (R10 to R20) MF PET CZ6	2,219	2,219	1,795	**1,795**	1,795	1,795	**0.0%**	Existing
6116	Improved Air Sealing MF NG CZ4	828,450	0	0	**0**	0	0	**0.0%**	Existing
6128	Improved Air Sealing MF NG CZ5	485,730	0	0	**0**	0	0	**0.0%**	Existing
6119	Storm Windows MF NG CZ4	466,714	0	0	**0**	0	0	**0.0%**	Existing
6118	ES Windows MF NG CZ4	448,835	0	0	**0**	0	0	**0.0%**	Existing
6131	Storm Windows MF NG CZ5	333,771	0	0	**0**	0	0	**0.0%**	Existing
6154	ES Windows MF PET CZ4	303,669	0	0	**0**	0	0	**0.0%**	Existing
6130	ES Windows MF NG CZ5	250,149	0	0	**0**	0	0	**0.0%**	Existing
6125	Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ5	169,144	0	0	**0**	0	0	**0.0%**	Existing
6120	Exterior Door MF NG CZ4	142,264	0	0	**0**	0	0	**0.0%**	Existing
6140	Improved Air Sealing MF NG CZ6	120,873	0	0	**0**	0	0	**0.0%**	Existing
6166	ES Windows MF PET CZ5	83,846	0	0	**0**	0	0	**0.0%**	Existing
6137	Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ6	76,944	0	0	**0**	0	0	**0.0%**	Existing
6143	Storm Windows MF NG CZ6	72,413	0	0	**0**	0	0	**0.0%**	Existing
6142	ES Windows MF NG CZ6	65,923	0	0	**0**	0	0	**0.0%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Multifamily									
6178	ES Windows MF PET CZ6	62,242	0	0	**0**	0	0	**0.0%**	Existing
6167	Storm Windows MF PET CZ5	55,927	0	0	**0**	0	0	**0.0%**	Existing
6132	Exterior Door MF NG CZ5	49,154	0	0	**0**	0	0	**0.0%**	Existing
6129	Improved Duct Sealing MF NG CZ5	33,747	0	0	**0**	0	0	**0.0%**	Existing
6110	Improved Floor Insulation (R0 to R30) MF NG CZ4	20,315	0	0	**0**	0	0	**0.0%**	Existing
6139	Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ6	17,736	0	0	**0**	0	0	**0.0%**	Existing
6109	Improved Floor Insulation (R0 to R19) MF NG CZ4	17,413	0	0	**0**	0	0	**0.0%**	Existing
6122	Improved Floor Insulation (R0 to R30) MF NG CZ5	12,125	0	0	**0**	0	0	**0.0%**	Existing
6124	Improved Wall Insulation (R10 to R20) MF NG CZ5	11,092	0	0	**0**	0	0	**0.0%**	Existing
6134	Improved Floor Insulation (R0 to R30) MF NG CZ6	10,495	0	0	**0**	0	0	**0.0%**	Existing
6121	Improved Floor Insulation (R0 to R19) MF NG CZ5	10,281	0	0	**0**	0	0	**0.0%**	Existing
6170	Improved Floor Insulation (R0 to R30) MF PET CZ6	10,089	0	0	**0**	0	0	**0.0%**	Existing
6133	Improved Floor Insulation (R0 to R19) MF NG CZ6	9,010	0	0	**0**	0	0	**0.0%**	Existing

Table C-10 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Building Envelope									
Multifamily									
6169	Improved Floor Insulation (R0 to R19) MF PET CZ6	8,643	0	0	**0**	0	0	**0.0%**	Existing
6141	Improved Duct Sealing MF NG CZ6	6,102	0	0	**0**	3,234	3,417	**0.0%**	Existing
6153	Improved Duct Sealing MF PET CZ4	5,368	0	0	**0**	0	0	**0.0%**	Existing
6117	Improved Duct Sealing MF NG CZ4	5,292	0	0	**0**	0	0	**0.0%**	Existing
6158	Improved Floor Insulation (R0 to R30) MF PET CZ5	4,654	0	0	**0**	0	0	**0.0%**	Existing
6136	Improved Wall Insulation (R10 to R20) MF NG CZ6	2,341	0	0	**0**	0	0	**0.0%**	Existing

Table C-11: MMBtu saved in each potential scenario for each non-electric HVAC measure.

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Single Family									
7034	Boiler Reset Controls (Gas) SF NG CZ4	3,845,667	0	0	**1,331,211**	1,446,581	1,561,952	**21.4%**	Existing
7035	Boiler Reset Controls (Petroleum) SF Pet CZ4	3,831,597	3,831,597	1,326,348	**1,326,348**	1,441,296	1,556,240	**21.4%**	Existing
7057	High Efficiency Gas Furnace 96 AFUE SF NG CZ5	2,099,983	0	0	**428,054**	428,054	434,831	**6.9%**	Existing
7029	Tier II High Efficiency Petroleum Boiler SF Pet CZ4	86,575	1,017,317	138,947	**303,247**	304,423	321,078	**4.9%**	Existing
7075	Boiler Reset Controls (Gas) SF NG CZ5	865,277	0	0	**299,525**	325,484	351,444	**4.8%**	Existing
7037	Programmable Thermostat SF NG CZ4	637,026	637,026	212,768	**212,768**	212,768	212,768	**3.4%**	Existing
7076	Boiler Reset Controls (Petroleum) SF Pet CZ5	548,944	548,944	190,025	**190,025**	206,491	222,962	**3.1%**	Existing
7016	High Efficiency Gas Furnace 96 AFUE SF NG CZ4	938,468	0	0	**185,964**	185,964	188,929	**3.0%**	Existing
7038	Programmable Thermostat SF Pet CZ4	630,530	630,530	172,480	**172,480**	172,480	172,480	**2.8%**	Existing
7078	Programmable Thermostat SF NG CZ5	427,859	427,859	142,907	**142,907**	142,907	142,907	**2.3%**	Existing
7117	Boiler Reset Controls (Petroleum) SF Pet CZ6	311,025	311,025	107,668	**107,668**	116,992	126,331	**1.7%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Single Family									
7116	Boiler Reset Controls (Gas) SF NG CZ6	258,476	0	0	**89,476**	97,228	104,981	**1.4%**	Existing
7098	High Efficiency Gas Furnace 96 AFUE SF NG CZ6	372,596	0	0	**73,603**	73,603	74,770	**1.2%**	Existing
7056	High Efficiency Gas Furnace 94 AFUE SF NG CZ5	378,772	0	0	**71,290**	71,290	72,427	**1.1%**	Existing
7033	Boiler Tune-Up (Petroleum) SF Pet CZ4	44,389	521,604	417,282	**71,019**	71,019	71,019	**1.1%**	Existing
7079	Programmable Thermostat SF Pet CZ5	197,677	197,677	54,070	**54,070**	54,070	54,070	**0.9%**	Existing
7015	High Efficiency Gas Furnace 94 AFUE SF NG CZ4	256,810	0	0	**46,154**	46,154	46,910	**0.7%**	Existing
7058	Tier I High Efficiency Petroleum Furnace SF Pet CZ5	328,809	332,818	42,895	**42,378**	45,281	48,178	**0.7%**	Existing
7017	Tier I High Efficiency Petroleum Furnace SF Pet CZ4	296,059	311,640	40,165	**40,165**	42,914	45,664	**0.6%**	Existing
7120	Programmable Thermostat SF Pet CZ6	145,011	145,011	39,667	**39,667**	39,667	39,667	**0.6%**	Existing
7014	High Efficiency Gas Furnace 90 AFUE SF NG CZ4	204,636	0	0	**36,782**	36,782	37,372	**0.6%**	Existing
7119	Programmable Thermostat SF NG CZ6	108,875	108,875	36,364	**36,364**	36,364	36,364	**0.6%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Single Family									
7055	High Efficiency Gas Furnace 90 AFUE SF NG CZ5	171,032	0	0	**32,203**	32,203	32,713	**0.5%**	Existing
7099	Tier I High Efficiency Petroleum Furnace SF Pet CZ6	244,589	244,589	31,526	**31,526**	33,680	35,839	**0.5%**	Existing
7060	Tier III High Efficiency Petroleum Furnace SF Pet CZ5	229,057	231,850	29,883	**29,523**	31,528	33,572	**0.5%**	Existing
7101	Tier III High Efficiency Petroleum Furnace SF Pet CZ6	165,772	165,772	21,378	**21,378**	22,827	24,290	**0.3%**	Existing
7069	Tier I High Efficiency Petroleum Boiler SF Pet CZ5	115,874	0	0	**15,835**	15,893	16,760	**0.3%**	Existing
7097	High Efficiency Gas Furnace 94 AFUE SF NG CZ6	67,712	0	0	**12,319**	12,319	12,520	**0.2%**	Existing
7096	High Efficiency Gas Furnace 90 AFUE SF NG CZ6	44,418	0	0	**8,058**	8,058	8,208	**0.1%**	Existing
7110	Tier I High Efficiency Petroleum Boiler SF Pet CZ6	54,959	0	0	**7,512**	7,538	7,949	**0.1%**	Existing
7070	Tier II High Efficiency Petroleum Boiler SF Pet CZ5	52,709	295,979	40,412	**7,198**	7,225	7,613	**0.1%**	Existing
7064	Furnace Tune-Up SF Pet CZ5	7,712	7,712	6,168	**6,168**	6,168	6,168	**0.1%**	Existing
7059	Tier II High Efficiency Petroleum Furnace SF Pet CZ5	41,526	42,032	5,421	**5,356**	5,718	6,081	**0.1%**	Existing
7019	Tier III High Efficiency Petroleum Furnace SF Pet CZ4	29,024	30,553	3,945	**5,311**	5,668	6,026	**0.1%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Single Family									
7111	Tier II High Efficiency Petroleum Boiler SF Pet CZ6	38,567	172,327	23,542	**5,284**	5,284	5,598	**0.1%**	Existing
7074	Boiler Tune-Up (Petroleum) SF Pet CZ5	6,266	33,545	26,835	**5,010**	5,010	5,010	**0.1%**	Existing
7105	Furnace Tune-Up SF Pet CZ6	5,483	5,483	4,386	**4,386**	4,386	4,386	**0.1%**	Existing
7072	High Efficiency Petroleum steam boiler SF Pet CZ5	37,996	0	0	**3,726**	4,012	4,297	**0.1%**	Existing
7100	Tier II High Efficiency Petroleum Furnace SF Pet CZ6	28,312	28,312	3,648	**3,648**	3,904	4,147	**0.1%**	Existing
7115	Boiler Tune-Up (Petroleum) SF Pet CZ6	3,593	16,046	12,840	**2,871**	2,871	2,871	**0.0%**	Existing
7113	High Efficiency Petroleum steam boiler SF Pet CZ6	27,590	0	0	**2,706**	2,912	3,122	**0.0%**	Existing
7018	Tier II High Efficiency Petroleum Furnace SF Pet CZ4	7,727	8,126	1,051	**1,051**	1,119	1,178	**0.0%**	Existing
7027	High Efficiency Gas Boiler 95 AFUE (Water) SF NG CZ4	2,446,270	0	0	**0**	0	0	**0.0%**	Existing
7028	Tier I High Efficiency Petroleum Boiler SF Pet CZ4	573,526	0	0	**0**	0	0	**0.0%**	Existing
7068	High Efficiency Gas Boiler 95 AFUE (Water) SF NG CZ5	418,354	0	0	**0**	0	0	**0.0%**	Existing
7026	High Efficiency Gas Boiler 90 AFUE (Water) SF NG CZ4	280,266	0	0	**0**	0	0	**0.0%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Single Family									
7031	High Efficiency Petroleum steam boiler SF Pet CZ4	247,039	0	0	**0**	0	0	**0.0%**	Existing
7067	High Efficiency Gas Boiler 90 AFUE (Water) SF NG CZ5	214,694	0	0	**0**	0	0	**0.0%**	Existing
7030	High Efficiency Gas steam boiler SF NG CZ4	204,249	0	0	**0**	0	0	**0.0%**	Existing
7109	High Efficiency Gas Boiler 95 AFUE (Water) SF NG CZ6	132,293	0	0	**0**	0	0	**0.0%**	Existing
7032	Boiler Tune-Up (Gas) SF NG CZ4	45,070	0	0	**0**	0	0	**0.0%**	Existing
7071	High Efficiency Gas steam boiler SF NG CZ5	42,014	0	0	**0**	0	0	**0.0%**	Existing
7108	High Efficiency Gas Boiler 90 AFUE (Water) SF NG CZ6	38,630	0	0	**0**	0	0	**0.0%**	Existing
7063	Furnace Tune-Up SF NG CZ5	30,114	0	0	**0**	0	0	**0.0%**	Existing
7022	Furnace Tune-Up SF NG CZ4	17,045	0	0	**0**	0	0	**0.0%**	Existing
7112	High Efficiency Gas steam boiler SF NG CZ6	13,552	0	0	**0**	0	0	**0.0%**	Existing
7073	Boiler Tune-Up (Gas) SF NG CZ5	9,947	0	0	**0**	0	0	**0.0%**	Existing
7023	Furnace Tune-Up SF Pet CZ4	7,384	0	0	**0**	0	0	**0.0%**	Existing
7104	Furnace Tune-Up SF NG CZ6	5,333	0	0	**0**	0	0	**0.0%**	Existing
7114	Boiler Tune-Up (Gas) SF NG CZ6	2,966	0	0	**0**	0	0	**0.0%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Multifamily									
7205	Boiler Reset Controls (Gas) MF NG CZ5	154,565	154,565	118,178	**118,178**	118,178	118,178	**1.9%**	Existing
7168	EMS (Multifamily) CZ4 MF NG	278,816	278,816	86,033	**86,033**	94,394	102,754	**1.4%**	Existing
7206	Boiler Reset Controls (Petroleum) MF Pet CZ5	95,673	95,673	73,156	**73,156**	73,156	73,156	**1.2%**	Existing
7159	Boiler Reset Controls (Gas) MF NG CZ4	84,961	84,961	64,931	**64,931**	64,931	64,931	**1.0%**	Existing
7169	EMS (Multifamily) CZ4 MF PET	190,211	190,211	58,684	**58,684**	64,434	70,116	**0.9%**	Existing
7160	Boiler Reset Controls (Petroleum) MF Pet CZ4	74,305	74,305	56,794	**56,794**	56,794	56,794	**0.9%**	Existing
7252	Boiler Reset Controls (Petroleum) MF Pet CZ6	61,538	61,538	47,050	**47,050**	47,050	47,050	**0.8%**	Existing
7152	High Efficiency Gas Boiler 95 AFUE (Water) MF NG CZ4	217,592	0	0	**26,437**	28,194	29,950	**0.4%**	Existing
7251	Boiler Reset Controls (Gas) MF NG CZ6	16,750	25,126	19,185	**19,185**	19,185	19,185	**0.3%**	Existing
7215	Efficient Wall Furnace MF Pet CZ5	59,358	59,358	18,320	**18,320**	20,100	21,868	**0.3%**	Existing
7187	High Efficiency Gas Furnace 96 AFUE MF NG CZ5	85,238	101,662	16,514	**16,748**	16,748	16,959	**0.3%**	Existing
7208	Programmable Thermostat MF NG CZ5	23,773	47,546	15,879	**15,879**	15,879	15,879	**0.3%**	Existing
7261	EMS (Multifamily) MF Pet CZ6	38,041	38,041	11,741	**11,741**	12,881	14,031	**0.2%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Multifamily									
7162	Programmable Thermostat MF NG CZ4	34,690	34,690	11,587	**11,587**	11,587	11,587	**0.2%**	Existing
7141	High Efficiency Gas Furnace 96 AFUE MF NG CZ4	53,765	62,720	10,225	**11,265**	11,265	11,419	**0.2%**	Existing
7163	Programmable Thermostat MF Pet CZ4	35,348	35,348	9,670	**9,670**	9,670	9,670	**0.2%**	Existing
7153	Tier I High Efficiency Petroleum Boiler MF Pet CZ4	49,709	49,648	6,770	**6,770**	6,813	7,179	**0.1%**	Existing
7254	Programmable Thermostat MF NG CZ6	5,409	10,817	3,614	**3,614**	3,614	3,614	**0.1%**	Existing
7209	Programmable Thermostat MF Pet CZ5	12,107	12,107	3,312	**3,312**	3,312	3,312	**0.1%**	Existing
7233	High Efficiency Gas Furnace 96 AFUE MF NG CZ6	17,149	20,226	3,299	**3,299**	3,299	3,385	**0.1%**	Existing
7186	High Efficiency Gas Furnace 94 AFUE MF NG CZ5	15,375	18,345	2,942	**2,942**	2,942	3,026	**0.0%**	Existing
7151	High Efficiency Gas Boiler 90 AFUE (Water) MF NG CZ4	24,938	0	0	**2,861**	3,048	3,272	**0.0%**	Existing
7158	Boiler Tune-Up (Petroleum) MF Pet CZ4	3,238	3,238	2,582	**2,582**	2,582	2,582	**0.0%**	Existing
7140	High Efficiency Gas Furnace 94 AFUE MF NG CZ4	14,704	17,168	2,745	**2,509**	2,509	2,600	**0.0%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Multifamily									
7142	Tier I High Efficiency Petroleum Furnace MF Pet CZ4	16,591	16,571	2,138	**2,138**	2,285	2,425	**0.0%**	Existing
7255	Programmable Thermostat MF Pet CZ6	7,819	7,819	2,137	**2,137**	2,137	2,137	**0.0%**	Existing
7139	High Efficiency Gas Furnace 90 AFUE MF NG CZ4	11,722	13,682	2,243	**2,050**	2,050	2,050	**0.0%**	Existing
7156	High Efficiency Petroleum steam boiler MF Pet CZ4	20,729	20,704	2,030	**2,030**	2,196	2,342	**0.0%**	Existing
7188	Tier I High Efficiency Petroleum Furnace MF Pet CZ5	13,849	13,849	1,772	**1,772**	1,896	2,020	**0.0%**	Existing
7244	High Efficiency Gas Boiler 95 AFUE (Water) MF NG CZ6	8,708	0	0	**1,663**	1,777	1,892	**0.0%**	Existing
7234	Tier I High Efficiency Petroleum Furnace MF Pet CZ6	10,970	11,146	1,430	**1,430**	1,539	1,628	**0.0%**	Existing
7185	High Efficiency Gas Furnace 90 AFUE MF NG CZ5	6,946	8,278	1,333	**1,333**	1,333	1,364	**0.0%**	Existing
7204	Boiler Tune-Up (Petroleum) MF Pet CZ5	1,667	1,667	1,331	**1,331**	1,331	1,331	**0.0%**	Existing
7190	Tier III High Efficiency Petroleum Furnace MF Pet CZ5	9,150	9,150	1,179	**1,179**	1,310	1,354	**0.0%**	Existing
7199	Tier I High Efficiency Petroleum Boiler MF Pet CZ5	6,758	7,112	988	**988**	988	1,029	**0.0%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Multifamily									
7154	Tier II High Efficiency Petroleum Boiler MF Pet CZ4	7,368	7,359	954	**954**	954	1,090	**0.0%**	Existing
7236	Tier III High Efficiency Petroleum Furnace MF Pet CZ6	7,060	7,173	942	**942**	995	1,047	**0.0%**	Existing
7232	High Efficiency Gas Furnace 94 AFUE MF NG CZ6	3,120	3,672	642	**642**	642	642	**0.0%**	Existing
7245	Tier I High Efficiency Petroleum Boiler MF Pet CZ6	3,589	3,647	512	**512**	512	530	**0.0%**	Existing
7200	Tier II High Efficiency Petroleum Boiler MF Pet CZ5	3,211	3,374	465	**465**	465	465	**0.0%**	Existing
7231	High Efficiency Gas Furnace 90 AFUE MF NG CZ6	2,041	2,419	384	**384**	384	384	**0.0%**	Existing
7148	Furnace Tune-Up MF Pet CZ4	411	411	336	**336**	336	336	**0.0%**	Existing
7246	Tier II High Efficiency Petroleum Boiler MF Pet CZ6	2,279	2,316	263	**263**	263	342	**0.0%**	Existing
7194	Furnace Tune-Up MF Pet CZ5	306	306	240	**240**	240	240	**0.0%**	Existing
7144	Tier III High Efficiency Petroleum Furnace MF Pet CZ4	1,582	1,580	226	**226**	226	226	**0.0%**	Existing
7202	High Efficiency Petroleum steam boiler MF Pet CZ5	114	2,252	219	**219**	240	253	**0.0%**	Existing
7189	Tier II High Efficiency Petroleum Furnace MF Pet CZ5	1,656	1,656	214	**214**	234	234	**0.0%**	Existing
7240	Furnace Tune-Up MF Pet CZ6	247	247	194	**194**	194	194	**0.0%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
HVAC Equipment									
Multifamily									
7235	Tier II High Efficiency Petroleum Furnace MF Pet CZ6	1,195	1,214	140	**140**	163	187	**0.0%**	Existing
7248	High Efficiency Petroleum steam boiler MF Pet CZ6	644	979	96	**96**	105	110	**0.0%**	Existing
7250	Boiler Tune-Up (Petroleum) MF Pet CZ6	82	82	54	**54**	54	54	**0.0%**	Existing
7143	Tier II High Efficiency Petroleum Furnace MF Pet CZ4	428	428	45	**45**	68	68	**0.0%**	Existing
7214	Efficient Wall Furnace MF NG CZ5	174,194	0	0	**0**	0	0	**0.0%**	Existing
7260	EMS (Multifamily) MF NG CZ6	39,379	0	0	**0**	0	0	**0.0%**	Existing
7198	High Efficiency Gas Boiler 95 AFUE (Water) MF NG CZ5	22,955	0	0	**0**	0	0	**0.0%**	Existing
7155	High Efficiency Gas steam boiler MF NG CZ4	17,930	0	0	**0**	2,877	2,877	**0.0%**	Existing
7197	High Efficiency Gas Boiler 90 AFUE (Water) MF NG CZ5	11,779	0	0	**0**	0	0	**0.0%**	Existing
7157	Boiler Tune-Up (Gas) MF NG CZ4	3,741	0	0	**0**	0	0	**0.0%**	Existing
7243	High Efficiency Gas Boiler 90 AFUE (Water) MF NG CZ6	2,537	0	0	**0**	0	0	**0.0%**	Existing
7201	High Efficiency Gas steam boiler MF NG CZ5	2,494	0	0	**0**	0	0	**0.0%**	Existing
7193	Furnace Tune-Up MF NG CZ5	1,194	0	0	**0**	0	0	**0.0%**	Existing

Table C-11 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
7147	Furnace Tune-Up MF NG CZ4	981	0	0	**0**	0	0	**0.0%**	Existing
7247	High Efficiency Gas steam boiler MF NG CZ6	301	0	0	**0**	0	0	**0.0%**	Existing
7239	Furnace Tune-Up MF NG CZ6	247	0	0	**0**	0	0	**0.0%**	Existing
7203	Boiler Tune-Up (Gas) MF NG CZ5	203	0	0	**0**	0	0	**0.0%**	Existing
7249	Boiler Tune-Up (Gas) MF NG CZ6	81	0	0	**0**	0	0	**0.0%**	Existing

Table C-12: MMBtu saved in each potential scenario for each non-electric lighting measure.

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Lighting									
Single Family									
3001	ENERGY STAR Specialty CFL SF	-2,051,112	-2,051,112	-757,544	**-757,544**	-808,822	-860,099	**22.0%**	Existing
3008	LED Lighting (screw-in) ; 2013-2019 SF	-1,442,629	-1,442,629	-532,811	**-532,811**	-568,876	-604,942	**15.5%**	Existing
3010	LED Specialty Lighting SF	-2,300,952	-2,300,952	-254,946	**-254,946**	-272,203	-289,460	**7.4%**	Existing
3006	Energy Star Dedicated CFL Fixture SF	-1,371,161	-1,371,161	-253,208	**-253,208**	-270,347	-287,487	**7.4%**	Existing
3005	ENERGY STAR Standard CFL (23 W CFL replacing 100 W incandescent) SF	-493,637	-493,637	-182,317	**-182,317**	-194,657	-206,998	**5.3%**	Existing
3012	Torchieres SF	-373,955	-373,955	-165,737	**-165,737**	-176,956	-188,174	**4.8%**	Existing
3004	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) SF	-342,524	-342,524	-126,505	**-126,505**	-135,068	-143,632	**3.7%**	Existing
3014	Electroluminescent nightlights SF	-426,579	-426,579	-118,162	**-118,162**	-126,161	-134,159	**3.4%**	Existing
3003	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) SF	-292,152	-292,152	-107,902	**-107,902**	-115,205	-122,509	**3.1%**	Existing
3002	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) SF	-201,484	-201,484	-74,415	**-74,415**	-79,452	-84,489	**2.2%**	Existing

Table C-12 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Lighting									
Single Family									
3009	LED Lighting (screw-in) ; 2020 and later SF	-302,227	-302,227	-33,487	**-33,487**	-35,753	-38,020	**1.0%**	Existing
3023	LED Specialty Lighting SF NC	-31,260	-31,260	-13,864	**-13,864**	-14,805	-15,746	**0.4%**	New
3015	ENERGY STAR Specialty CFL SF NC	-27,866	-27,866	-12,358	**-12,358**	-13,197	-14,036	**0.4%**	New
3021	LED Lighting (screw-in) ; 2013-2019 SF NC	-19,599	-19,599	-8,692	**-8,692**	-9,282	-9,872	**0.3%**	New
3019	Energy Star Dedicated CFL Fixture SF NC	-18,628	-18,628	-8,261	**-8,261**	-8,822	-9,383	**0.2%**	New
3018	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) SF NC	-6,205	-6,205	-2,752	**-2,752**	-2,938	-3,125	**0.1%**	New
3027	Electroluminescent nightlights SF NC	-5,795	-5,795	-2,570	**-2,570**	-2,744	-2,919	**0.1%**	New
3017	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) SF NC	-5,292	-5,292	-2,347	**-2,347**	-2,506	-2,666	**0.1%**	New
3025	Torchieres SF NC	-5,080	-5,080	-2,253	**-2,253**	-2,406	-2,559	**0.1%**	New
3022	LED Lighting (screw-in) ; 2020 and later SF NC	-4,106	-4,106	-1,821	**-1,821**	-1,945	-2,068	**0.1%**	New
3016	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) SF NC	-3,650	-3,650	-1,619	**-1,619**	-1,728	-1,838	**0.0%**	New

Table C-12 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Lighting									
Single Family									
3007	Energy Star Dedicated Exterior Fixture SF	0	0	0	**0**	0	0	**0.0%**	Existing
3020	Energy Star Dedicated Exterior Fixture SF NC	0	0	0	**0**	0	0	**0.0%**	New
3013	Exterior Lighting Controls SF	0	0	0	**0**	0	0	**0.0%**	Existing
3026	Exterior Lighting Controls SF NC	0	0	0	**0**	0	0	**0.0%**	New
3011	LED Fixture (Exterior) SF	0	0	0	**0**	0	0	**0.0%**	Existing
3024	LED Fixture (Exterior) SF NC	0	0	0	**0**	0	0	**0.0%**	New
Multifamily									
3028	ENERGY STAR Specialty CFL MF	-694,181	-694,181	-309,489	**-309,489**	-314,695	-332,050	**9.0%**	Existing
3039	Torchieres MF	-395,506	-395,506	-211,596	**-211,596**	-215,155	-227,020	**6.2%**	Existing
3035	LED Lighting (screw-in) ; 2013-2019 MF	-122,061	-122,061	-54,419	**-54,419**	-55,334	-58,386	**1.6%**	Existing
3043	Common Area CFL lamps MF	-51,279	-51,279	-34,272	**-34,272**	-34,272	-34,272	**1.0%**	Existing
3042	Electroluminescent nightlights MF	-88,214	-88,214	-29,497	**-29,497**	-29,993	-31,647	**0.9%**	Existing
3037	LED Specialty Lighting MF	-194,684	-194,684	-26,039	**-26,039**	-26,477	-27,937	**0.8%**	Existing
3033	Energy Star Dedicated CFL Fixture MF	-116,063	-116,063	-25,872	**-25,872**	-26,308	-27,758	**0.8%**	Existing
3032	ENERGY STAR Standard CFL (23 W CFL replacing 100 W incandescent) MF	-41,767	-41,767	-18,621	**-18,621**	-18,934	-19,978	**0.5%**	Existing

Table C-12 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Lighting									
Multifamily									
3031	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) MF	-28,981	-28,981	-12,921	**-12,921**	-13,138	-13,863	**0.4%**	Existing
3030	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) MF	-24,719	-24,719	-11,021	**-11,021**	-11,206	-11,824	**0.3%**	Existing
3029	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) MF	-17,048	-17,048	-7,600	**-7,600**	-7,728	-8,154	**0.2%**	Existing
3055	Torchieres MF NC	-13,278	-13,278	-7,104	**-7,104**	-7,224	-7,623	**0.2%**	New
3044	Common Area Efficient Linear Fluorescent Lamps MF	-26,163	-26,163	-5,246	**-5,246**	-5,246	-5,246	**0.2%**	Existing
3053	LED Specialty Lighting MF NC	-6,536	-6,536	-3,497	**-3,497**	-3,556	-3,752	**0.1%**	New
3036	LED Lighting (screw-in) ; 2020 and later MF	-25,571	-25,571	-3,420	**-3,420**	-3,478	-3,670	**0.1%**	Existing
3045	ENERGY STAR Specialty CFL MF NC	-5,826	-5,826	-3,117	**-3,117**	-3,170	-3,345	**0.1%**	New
3049	Energy Star Dedicated CFL Fixture MF NC	-4,131	-4,131	-2,210	**-2,210**	-2,247	-2,372	**0.1%**	New
3051	LED Lighting (screw-in) ; 2013-2019 MF NC	-4,098	-4,098	-2,192	**-2,192**	-2,229	-2,353	**0.1%**	New
3058	Electroluminescent nightlights MF NC	-3,702	-3,702	-1,980	**-1,980**	-2,014	-2,125	**0.1%**	New

Table C-12 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Lighting									
Multifamily									
3059	Common Area CFL lamps MF NC	-2,152	-2,152	-1,726	**-1,726**	-1,726	-1,726	**0.1%**	New
3060	Common Area Efficient Linear Fluorescent Lamps MF NC	-1,098	-1,098	-881	**-881**	-881	-881	**0.0%**	New
3048	ENERGY STAR Standard CFL (19 W CFL replacing 75 W incandescent) MF NC	-1,622	-1,622	-868	**-868**	-882	-931	**0.0%**	New
3047	ENERGY STAR Standard CFL (14 W CFL replacing 60 W incandescent) MF NC	-1,383	-1,383	-740	**-740**	-752	-794	**0.0%**	New
3046	ENERGY STAR Standard CFL (9 W CFL replacing 40 W incandescent) MF NC	-954	-954	-510	**-510**	-519	-548	**0.0%**	New
3052	LED Lighting (screw-in) ; 2020 and later MF NC	-858	-858	-459	**-459**	-467	-493	**0.0%**	New
3034	Energy Star Dedicated Exterior Fixture MF	0	0	0	**0**	0	0	**0.0%**	Existing
3050	Energy Star Dedicated Exterior Fixture MF NC	0	0	0	**0**	0	0	**0.0%**	New
3041	Exterior Lighting Controls MF	0	0	0	**0**	0	0	**0.0%**	Existing
3057	Exterior Lighting Controls MF NC	0	0	0	**0**	0	0	**0.0%**	New
3038	LED Fixture (Exterior) MF	0	0	0	**0**	0	0	**0.0%**	Existing

Table C-12 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Lighting									
Multifamily									
3054	LED Fixture (Exterior) MF NC	0	0	0	**0**	0	0	**0.0%**	New
3056	Interior Lighting Controls (Common Areas) MF NC	-131	0	0	**0**	0	0	**0.0%**	New
3040	Interior Lighting Controls (Common Areas) MF	-3,042	0	0	**0**	0	0	**0.0%**	Existing

Table C-13: MMBtu saved in each potential scenario for each miscellaneous non-electric measure.

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Miscellaneous									
Single Family									
5007	Indirect Energy Consumption Feedback (Natural Gas) SF NG	1,190,025	2,380,050	1,190,025	**1,190,025**	1,309,028	1,428,030	**26.6%**	Existing
5008	Indirect Energy Consumption Feedback (Petroleum) SF PET	670,935	1,341,871	670,935	**670,935**	738,029	805,123	**15.0%**	Existing
5018	Indirect Energy Consumption Feedback (Natural Gas) SF NC NG	12,352	24,704	2,496	**2,496**	2,745	2,995	**0.1%**	New
5019	Indirect Energy Consumption Feedback (Petroleum) SF NC PET	6,269	12,537	1,267	**1,267**	1,393	1,520	**0.0%**	New
5010	Direct Feedback Devices (In Home Display) (Natural Gas) SF NG	1,190,025	0	0	**0**	0	0	**0.0%**	Existing
5011	Direct Feedback Devices (In Home Display) (Petroleum) SF PET	670,935	0	0	**0**	0	0	**0.0%**	Existing
5021	Direct Feedback Devices (In Home Display) (Natural Gas) SF NC NG	12,352	0	0	**0**	0	0	**0.0%**	New
5022	Direct Feedback Devices (In Home Display) (Petroleum) SF NC PET	6,269	0	0	**0**	0	0	**0.0%**	New

Table C-13 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Miscellaneous									
Multifamily									
5030	Indirect Energy Consumption Feedback (Natural Gas) MF NG	1,632,005	3,264,015	1,632,005	**1,632,005**	1,795,208	1,958,410	**36.5%**	Existing
5031	Indirect Energy Consumption Feedback (Petroleum) MF PET	965,001	1,930,003	965,001	**965,001**	1,061,501	1,158,002	**21.6%**	Existing
5043	Indirect Energy Consumption Feedback (Petroleum) MF NC PET	24,571	49,137	4,963	**4,963**	5,461	5,956	**0.1%**	New
5033	Direct Feedback Devices (In Home Display) (Natural Gas) MF NG	1,632,005	0	0	**0**	0	0	**0.0%**	Existing
5034	Direct Feedback Devices (In Home Display) (Petroleum) MF PET	965,001	0	0	**0**	0	0	**0.0%**	Existing
5045	Direct Feedback Devices (In Home Display) (Natural Gas) MF NC NG	45,062	0	0	**0**	0	0	**0.0%**	New
5042	Indirect Energy Consumption Feedback (Natural Gas) MF NC NG	45,062	0	0	**0**	0	0	**0.0%**	New
5046	Direct Feedback Devices (In Home Display) (Petroleum) MF NC PET	24,571	0	0	**0**	0	0	**0.0%**	New

Table C-14: MMBtu saved in each potential scenario for each non-electric new construction measure.

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)
New Construction								
Single Family								
8007	New Construction Better than Code envelope SF CZ4 PET	84,219	210,549	63,376	**42,439**	46,714	50,958	**30.0%**
8009	New Construction Better than Code envelope and hvac SF CZ4 PET	43,486	0	0	**23,028**	25,173	27,317	**16.3%**
8016	New Construction Better than Code envelope SF CZ5 PET	31,690	53,049	15,965	**15,965**	17,559	19,176	**11.3%**
8018	New Construction Better than Code envelope and hvac SF CZ5 PET	17,576	28,979	8,740	**8,740**	9,587	10,435	**6.2%**
8025	New Construction Better than Code envelope SF CZ6 PET	19,631	19,631	5,879	**5,879**	6,477	7,075	**4.2%**
8027	New Construction Better than Code envelope and hvac SF CZ6 PET	11,539	11,539	3,525	**3,525**	3,854	4,207	**2.5%**
8026	New Construction Better than Code hvac SF CZ6 PET	6,826	6,826	2,044	**2,044**	2,252	2,460	**1.4%**
8004	New Construction Better than Code envelope SF CZ4 NG	141,114	0	0	**0**	0	0	**0.0%**
8013	New Construction Better than Code envelope SF CZ5 NG	121,845	0	0	**0**	0	0	**0.0%**

Table C-14 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)
New Construction								
Single Family								
8006	New Construction Better than Code envelope and hvac SF CZ4 NG	81,172	0	0	**0**	0	0	**0.0%**
8015	New Construction Better than Code envelope and hvac SF CZ5 NG	75,540	0	0	**0**	0	0	**0.0%**
8014	New Construction Better than Code hvac SF CZ5 NG	42,798	0	0	**0**	0	0	**0.0%**
8005	New Construction Better than Code hvac SF CZ4 NG	40,421	0	0	**0**	0	0	**0.0%**
8022	New Construction Better than Code envelope SF CZ6 NG	21,719	0	0	**0**	0	0	**0.0%**
8024	New Construction Better than Code envelope and hvac SF CZ6 NG	15,552	0	0	**0**	0	0	**0.0%**
8008	New Construction Better than Code hvac SF CZ4 PET	11,401	0	0	**0**	0	0	**0.0%**
8023	New Construction Better than Code hvac SF CZ6 NG	10,901	0	0	**0**	0	0	**0.0%**
8017	New Construction Better than Code hvac SF CZ5 PET	4,890	0	0	**0**	0	0	**0.0%**

Table C-14 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)
New Construction								
Multifamily								
8031	New Construction Better than Code envelope MF CZ4 NG	39,546	0	0	**11,847**	13,125	14,233	**8.4%**
8034	New Construction Better than Code envelope MF CZ4 PET	25,391	25,391	7,608	**7,608**	8,405	9,289	**5.4%**
8033	New Construction Better than Code envelope and hvac MF CZ4 NG	23,942	0	0	**7,224**	7,946	8,669	**5.1%**
8036	New Construction Better than Code envelope and hvac MF CZ4 PET	13,846	13,846	4,327	**4,327**	4,519	4,904	**3.1%**
8032	New Construction Better than Code hvac MF CZ4 NG	11,922	0	0	**3,572**	3,957	4,291	**2.5%**
8052	New Construction Better than Code envelope MF CZ6 PET	4,773	11,954	3,819	**2,573**	2,823	3,030	**1.8%**
8054	New Construction Better than Code envelope and hvac MF CZ6	2,937	0	0	**1,468**	1,615	1,762	**1.0%**
8035	New Construction Better than Code hvac MF CZ4 PET	3,437	3,437	1,030	**1,030**	1,138	1,258	**0.7%**
8040	New Construction Better than Code envelope MF CZ5 NG	23,478	0	0	**0**	0	0	**0.0%**
8042	New Construction Better than Code envelope and hvac MF CZ5 NG	13,844	0	0	**0**	0	0	**0.0%**

Table C-14 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)
New Construction								
Multifamily								
8041	New Construction Better than Code hvac MF CZ5 NG	8,247	0	0	**0**	0	0	**0.0%**
8043	New Construction Better than Code envelope MF CZ5 PET	7,277	0	0	**0**	0	0	**0.0%**
8049	New Construction Better than Code envelope MF CZ6 NG	4,677	0	0	**0**	0	0	**0.0%**
8045	New Construction Better than Code envelope and hvac MF CZ5 PET	4,276	0	0	**0**	0	0	**0.0%**
8051	New Construction Better than Code envelope and hvac MF CZ6 NG	3,236	0	0	**0**	0	0	**0.0%**
8050	New Construction Better than Code hvac MF CZ6 NG	2,347	0	0	**0**	0	0	**0.0%**
8047	New Construction Better than Code hvac MF CZ6	1,746	0	0	**0**	0	0	**0.0%**
8044	New Construction Better than Code hvac MF CZ5 PET	1,123	0	0	**0**	0	0	**0.0%**

Table C-15: MMBtu saved in each potential scenario for each non-electric water heating measure.

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Water Heating									
Single Family									
4020	Pipe Wrap (Natural Gas) SF NG	1,214,195	1,214,195	711,518	**711,518**	711,518	721,719	**11.7%**	Existing
4011	Combination Heat/Hot Water (Natural Gas Boiler) SF NG	1,454,482	0	0	**556,197**	599,826	643,454	**9.1%**	Existing
4023	Tank Wrap (Natural Gas) SF NG	213,333	1,706,657	1,061,544	**530,768**	530,768	530,768	**8.7%**	Existing
4029	Low Flow Faucets- Kitchen (Natural Gas) SF NG	887,798	887,798	443,900	**443,900**	470,533	497,167	**7.3%**	Existing
4021	Pipe Wrap (Petroleum) SF PET	595,893	595,893	362,302	**362,302**	362,302	362,302	**6.0%**	Existing
4035	Shower Start (Natural Gas) SF NG	492,674	492,674	295,606	**295,606**	295,606	295,606	**4.9%**	Existing
4026	Low Flow Showerhead (Natural Gas) SF NG	480,888	480,888	288,534	**288,534**	288,534	288,534	**4.7%**	Existing
4032	Low Flow Faucets- Bath (Natural Gas) SF NG	507,313	507,313	253,657	**253,657**	268,876	284,095	**4.2%**	Existing
4030	Low Flow Faucets- Kitchen (Petroleum) SF PET	450,314	450,314	225,156	**225,156**	238,667	252,176	**3.7%**	Existing
4016	Solar WH w/ petroleum Backup SF PET	1,587,085	0	0	**190,974**	210,006	229,048	**3.1%**	Existing
4027	Low Flow Showerhead (Petroleum) SF PET	243,919	243,919	146,351	**146,351**	146,351	146,351	**2.4%**	Existing
4036	Shower Start (Petroleum) SF PET	238,220	238,220	142,933	**142,933**	142,933	142,933	**2.4%**	Existing

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Water Heating									
Single Family									
4033	Low Flow Faucets- Bath (Petroleum) SF PET	257,322	257,322	128,661	**128,661**	136,381	144,101	**2.1%**	Existing
4013	High-Efficiency petroleum Storage Tier II (Condensing) SF PET	261,125	522,249	123,896	**99,107**	100,327	105,844	**1.6%**	Existing
4024	Tank Wrap (Petroleum) SF PET	88,116	176,233	123,542	**98,834**	98,834	98,834	**1.6%**	Existing
4018	Combination Heat/Hot Water (petroleum Boiler) SF PET	437,869	875,721	118,000	**94,434**	95,557	100,815	**1.6%**	Existing
4014	Whole-Home petroleum Tankless 82% SF PET	284,454	568,908	117,936	**94,352**	95,502	100,756	**1.6%**	Existing
4054	Combination Heat/Hot Water (Natural petroleum Boiler) SF NC PET	143,292	334,337	100,643	**75,482**	83,036	90,572	**1.2%**	New
4052	Solar WH w/ petroleum Backup SF NC PET	27,795	0	0	**14,639**	16,105	17,571	**0.2%**	New
4056	Pipe Wrap (Natural Gas) SF NC NG	29,347	29,347	8,834	**8,834**	9,718	10,602	**0.1%**	New
4057	Pipe Wrap (Petroleum) SF NC PET	23,337	23,337	7,025	**7,025**	7,729	8,431	**0.1%**	New
4050	Whole-Home petroleum Tankless 82% SF NC PET	10,785	25,168	7,576	**5,680**	6,249	6,818	**0.1%**	New
4062	Low Flow Faucets- Kitchen (Natural Gas) SF NC NG	17,672	17,672	5,320	**5,320**	5,852	6,385	**0.1%**	New
4049	High-Efficiency petroleum Storage Tier II (Condensing) SF NC PET	9,900	23,103	6,955	**5,214**	5,736	6,259	**0.1%**	New

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Water Heating									
Single Family									
4063	Low Flow Faucets- Kitchen (Petroleum) SF NC PET	14,093	14,093	4,243	**4,243**	4,667	5,091	**0.1%**	New
4047	Combination Heat/Hot Water (Natural Gas Boiler) SF NC NG	1,786	0	0	**3,793**	4,167	4,558	**0.1%**	New
4059	Low Flow Showerhead (Natural Gas) SF NC NG	11,966	11,966	3,603	**3,603**	3,962	4,323	**0.1%**	New
4065	Low Flow Faucets- Bath (Natural Gas) SF NC NG	10,098	10,098	3,040	**3,040**	3,344	3,648	**0.0%**	New
4068	Shower Start (Natural Gas) SF NC NG	9,866	9,866	2,970	**2,970**	3,267	3,565	**0.0%**	New
4060	Low Flow Showerhead (Petroleum) SF NC PET	9,338	9,338	2,811	**2,811**	3,093	3,374	**0.0%**	New
4066	Low Flow Faucets- Bath (Petroleum) SF NC PET	7,881	7,881	2,373	**2,373**	2,610	2,847	**0.0%**	New
4069	Shower Start (Petroleum) SF NC PET	7,635	7,635	2,298	**2,298**	2,528	2,759	**0.0%**	New
4009	Solar WH w/ Gas Backup SF NG	3,056,394	0	0	**0**	0	0	**0.0%**	Existing
4008	Whole-Home Gas Tankless 95% SF NG	1,310,850	0	0	**0**	0	0	**0.0%**	Existing
4007	Whole-Home Gas Tankless 82% SF NG	943,498	0	0	**0**	0	0	**0.0%**	Existing
4006	High-Efficiency Gas Storage Tier II (Condensing) SF NG	876,386	0	0	**0**	0	0	**0.0%**	Existing
4015	Whole-Home petroleum Tankless 95% SF PET	395,206	0	0	**0**	0	0	**0.0%**	Existing

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Water Heating									
Single Family									
4005	High-Efficiency Gas Storage Tier I SF NG	342,493	0	0	**0**	0	0	**0.0%**	Existing
4010	Indirect Water Heater (Gas Boiler) SF NG	211,663	0	0	**0**	0	0	**0.0%**	Existing
4012	High-Efficiency petroleum Storage Tier I SF PET	75,312	0	0	**0**	0	0	**0.0%**	Existing
4017	Indirect Water Heater (petroleum Boiler) SF PET	63,815	0	0	**0**	0	0	**0.0%**	Existing
4045	Solar WH w/ Gas Backup SF NC NG	34,811	0	0	**0**	0	0	**0.0%**	New
4044	Whole-Home Gas Tankless 95% SF NC NG	18,766	0	0	**0**	0	0	**0.0%**	New
4051	Whole-Home petroleum Tankless 95% SF NC PET	14,984	0	0	**0**	0	0	**0.0%**	New
4043	Whole-Home Gas Tankless 82% SF NC NG	13,507	0	0	**0**	0	0	**0.0%**	New
4042	High-Efficiency Gas Storage Tier II (Condensing) SF NC NG	12,546	0	0	**0**	0	0	**0.0%**	New
4041	High-Efficiency Gas Storage Tier I SF NC NG	4,903	0	0	**0**	0	0	**0.0%**	New
4048	High-Efficiency petroleum Storage Tier I SF NC PET	2,855	0	0	**0**	0	0	**0.0%**	New
4046	Indirect Water Heater (Gas Boiler) SF NC NG	260	0	0	**0**	0	0	**0.0%**	New

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Water Heating									
Single Family									
4053	Indirect Water Heater (petroleum Boiler) SF NC PET	211	0	0	**0**	0	0	**0.0%**	New
Multifamily									
4089	Pipe Wrap (Natural Gas) MF NG	450,792	450,792	264,166	**264,166**	264,166	267,950	**4.3%**	Existing
4080	Combination Heat/Hot Water (Natural Gas Boiler) MF NG	540,005	0	0	**206,490**	222,700	238,893	**3.4%**	Existing
4092	Tank Wrap (Natural Gas) MF NG	79,203	633,627	394,116	**197,062**	197,062	197,062	**3.2%**	Existing
4098	Low Flow Faucets- Kitchen (Natural Gas) MF NG	329,611	329,611	164,805	**164,805**	174,694	184,583	**2.7%**	Existing
4104	Shower Start (Natural Gas) MF NG	182,914	182,914	109,748	**109,748**	109,748	109,748	**1.8%**	Existing
4095	Low Flow Showerhead (Natural Gas) MF NG	178,539	178,539	107,124	**107,124**	107,124	107,124	**1.8%**	Existing
4101	Low Flow Faucets- Bath (Natural Gas) MF NG	188,349	188,349	94,174	**94,174**	99,825	105,475	**1.5%**	Existing
4090	Pipe Wrap (Petroleum) MF PET	28,255	28,255	17,178	**17,178**	17,178	17,178	**0.3%**	Existing
4128	Pipe Wrap (Natural Gas) MF NC NG	45,938	45,938	13,830	**13,830**	15,212	16,594	**0.2%**	New
4099	Low Flow Faucets- Kitchen (Petroleum) MF PET	21,353	21,353	10,677	**10,677**	11,317	11,957	**0.2%**	Existing
4085	Solar WH w/ petroleum Backup MF PET	75,254	0	0	**9,046**	9,959	10,846	**0.1%**	Existing
4134	Low Flow Faucets- Kitchen (Natural Gas) MF NC NG	27,663	27,663	8,328	**8,328**	9,160	9,993	**0.1%**	New

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Water Heating									
Multifamily									
4105	Shower Start (Petroleum) MF PET	12,132	12,132	7,279	**7,279**	7,279	7,279	**0.1%**	Existing
4096	Low Flow Showerhead (Petroleum) MF PET	11,566	11,566	6,940	**6,940**	6,940	6,940	**0.1%**	Existing
4102	Low Flow Faucets- Bath (Petroleum) MF PET	12,202	12,202	6,101	**6,101**	6,467	6,833	**0.1%**	Existing
4119	Combination Heat/Hot Water (Natural Gas Boiler) MF NC NG	2,806	0	0	**5,936**	6,548	7,143	**0.1%**	New
4140	Shower Start (Natural Gas) MF NC NG	19,190	19,190	5,777	**5,777**	6,354	6,932	**0.1%**	New
4131	Low Flow Showerhead (Natural Gas) MF NC NG	18,730	18,730	5,638	**5,638**	6,201	6,767	**0.1%**	New
4137	Low Flow Faucets- Bath (Natural Gas) MF NC NG	15,808	15,808	4,759	**4,759**	5,235	5,710	**0.1%**	New
4082	High-Efficiency petroleum Storage Tier II (Condensing) MF PET	12,381	24,763	5,869	**4,701**	4,757	5,017	**0.1%**	Existing
4093	Tank Wrap (Petroleum) MF PET	4,179	8,356	5,859	**4,687**	4,687	4,687	**0.1%**	Existing
4087	Combination Heat/Hot Water (Natural petroleum Boiler) MF PET	20,759	41,517	5,615	**4,509**	4,526	4,781	**0.1%**	Existing
4083	Whole-Home petroleum Tankless 82% MF PET	13,488	26,975	5,587	**4,477**	4,530	4,774	**0.1%**	Existing
4124	Solar WH w/ petroleum Backup MF NC PET	3,668	0	0	**1,928**	2,124	2,311	**0.0%**	New

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Water Heating									
Multifamily									
4129	Pipe Wrap (Petroleum) MF NC PET	3,033	3,033	913	**913**	1,005	1,096	**0.0%**	New
4122	Whole-Home petroleum Tankless 82% MF NC PET	1,423	3,322	999	**748**	824	897	**0.0%**	New
4121	High-Efficiency petroleum Storage Tier II (Condensing) MF NC PET	1,307	3,050	917	**687**	757	823	**0.0%**	New
4135	Low Flow Faucets- Kitchen (Petroleum) MF NC PET	1,832	1,832	552	**552**	607	662	**0.0%**	New
4132	Low Flow Showerhead (Petroleum) MF NC PET	1,214	1,214	365	**365**	402	439	**0.0%**	New
4141	Shower Start (Petroleum) MF NC PET	1,185	1,185	357	**357**	392	428	**0.0%**	New
4138	Low Flow Faucets- Bath (Petroleum) MF NC PET	1,024	1,024	308	**308**	339	370	**0.0%**	New
4126	Combination Heat/Hot Water (Natural petroleum Boiler) MF NC PET	171	426	153	**102**	102	102	**0.0%**	New
4078	Solar WH w/ Gas Backup MF NG	1,134,738	0	0	**0**	0	0	**0.0%**	Existing
4107	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Natural Gas) MF NG	1,007,027	0	0	**0**	0	0	**0.0%**	Existing
4077	Whole-Home Gas Tankless 95% MF NG	486,678	0	0	**0**	0	0	**0.0%**	Existing

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential-Base (MMBTU)	2018 Achievable Potential-Scenario 1 (MMBTU)	2018 Achievable Potential-Scenario 2 (MMBTU)	2018 Achievable Potential-Scenario 3 (MMBTU)	% of 2018 Achievable Potential-Scenario 1 (MMBTU)	Construction Type
Water Heating									
Multifamily									
4076	Whole-Home Gas Tankless 82% MF NG	350,292	0	0	**0**	0	0	**0.0%**	Existing
4075	High-Efficiency Gas Storage Tier II (Condensing) MF NG	325,375	0	0	**0**	0	0	**0.0%**	Existing
4074	High-Efficiency Gas Storage Tier I MF NG	127,157	0	0	**0**	0	0	**0.0%**	Existing
4079	Indirect Water Heater (Gas Boiler) MF NG	78,584	0	0	**0**	0	0	**0.0%**	Existing
4108	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Petroleum) MF PET	66,662	0	0	**0**	21,998	24,000	**0.0%**	Existing
4117	Solar WH w/ Gas Backup MF NC NG	54,510	0	0	**0**	0	0	**0.0%**	New
4143	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Natural Gas) MF NC NG	42,259	0	0	**0**	0	0	**0.0%**	New
4116	Whole-Home Gas Tankless 95% MF NC NG	29,385	0	0	**0**	0	0	**0.0%**	New
4115	Whole-Home Gas Tankless 82% MF NC NG	21,150	0	0	**0**	0	0	**0.0%**	New
4114	High-Efficiency Gas Storage Tier II (Condensing) MF NC NG	19,646	0	0	**0**	0	0	**0.0%**	New
4084	Whole-Home petroleum Tankless 95% MF PET	18,739	0	0	**0**	0	0	**0.0%**	Existing

Table C-15 continued

Measure ID	Measure Name	2018 Technical Potential (MMBTU)	2018 Economic Potential (MMBTU)	2018 Achievable Potential- Base (MMBTU)	2018 Achievable Potential- Scenario 1 (MMBTU)	2018 Achievable Potential- Scenario 2 (MMBTU)	2018 Achievable Potential- Scenario 3 (MMBTU)	% of 2018 Achievable Potential- Scenario 1 (MMBTU)	Construction Type
Water Heating									
Multifamily									
4113	High-Efficiency Gas Storage Tier I MF NC NG	7,678	0	0	**0**	0	0	**0.0%**	New
4081	High-Efficiency petroleum Storage Tier I MF PET	3,571	0	0	**0**	0	0	**0.0%**	Existing
4086	Indirect Water Heater (petroleum Boiler) MF PET	3,025	0	0	**0**	0	0	**0.0%**	Existing
4144	Gravity Film Exchange (GFX) Waste Water Heat Recovery (Petroleum) MF NC PET	2,798	0	0	**0**	927	1,011	**0.0%**	New
4123	Whole-Home petroleum Tankless 95% MF NC PET	1,978	0	0	**0**	0	0	**0.0%**	New
4118	Indirect Water Heater (Gas Boiler) MF NC NG	408	0	0	**0**	0	0	**0.0%**	New
4120	High-Efficiency petroleum Storage Tier I MF NC PET	377	0	0	**0**	0	0	**0.0%**	New
4125	Indirect Water Heater (petroleum Boiler) MF NC PET	25	0	0	**0**	0	0	**0.0%**	New

Appendix D: List of Measures That Do Not Pass the TRC Test by End-Use

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Appliances			
CEE Tier 2 Refrigerator SF	x	x	
CEE Tier 3 Refrigerator SF	x	x	x
Clothes Dryer with Moisture Sensor (natural gas dryer) SF NG	x	x	x
Clothes Dryer with Moisture Sensor (petroleum dryer) SF PET	x	x	x
CEE Tier 2 Refrigerator SF NC	x		
CEE Tier 3 Refrigerator SF NC	x	x	x
Clothes Dryer with Moisture Sensor (natural gas dryer) SF NC NG	x	x	x
Clothes Dryer with Moisture Sensor (propane dryer) SF NC PET	x	x	x
CEE Tier 2 Refrigerator MF	x	x	x
CEE Tier 3 Refrigerator MF	x	x	x
Clothes Dryer with Moisture Sensor (natural gas dryer) MF NG	x	x	x
Clothes Dryer with Moisture Sensor (propane dryer) MF PET	x	x	x
CEE Tier 2 Refrigerator MF NC	x	x	x
CEE Tier 3 Refrigerator MF NC	x	x	x
Clothes Dryer with Moisture Sensor (natural gas dryer) MF NC NG	x	x	x
Clothes Dryer with Moisture Sensor (petroleum dryer) MF NC PET	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Electronics			
HE Television replacing Standard SF	x	x	x
HE Television replacing Standard SF NC	x	x	x
HE Television replacing Standard MF	x	x	x
HE Television replacing Standard MF NC	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Lighting			
Interior Lighting Controls (Common Areas) MF	x	x	x
Exterior Lighting Controls MF	x	x	x
Interior Lighting Controls (Common Areas) MF NC	x	x	x
Exterior Lighting Controls MF NC	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Water Heating			
Solar WH w/ Electric Backup SF	x	x	x
Desuperheater (off GSHP) SF	x		
High-Efficiency Gas Storage Tier I SF NG	x	x	x
High-Efficiency Gas Storage Tier II (Condensing) SF NG	x	x	x
Whole-Home Gas Tankless 82% SF NG	x	x	x
Whole-Home Gas Tankless 95% SF NG	x	x	x
Solar WH w/ Gas Backup SF NG	x	x	x
Indirect Water Heater (Gas Boiler) SF NG	x	x	x
Combination Heat/Hot Water (Natural Gas Boiler) SF NG	x		
High-Efficiency petroleum Storage Tier I SF PET	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Whole-Home petroleum Tankless 95% SF PET	x	x	x
Solar WH w/ petroleum Backup SF PET	x		
Indirect Water Heater (petroleum Boiler) SF PET	x	x	x
Solar WH w/ Electric Backup SF NC	x	x	x
Desuperheater (off GSHP) SF NC	x		
High-Efficiency Gas Storage Tier I SF NC NG	x	x	x
High-Efficiency Gas Storage Tier II (Condensing) SF NC NG	x	x	x
Whole-Home Gas Tankless 82% SF NC NG	x	x	x
Whole-Home Gas Tankless 95% SF NC NG	x	x	x
Solar WH w/ Gas Backup SF NC NG	x	x	x
Indirect Water Heater (Gas Boiler) SF NC NG	x	x	x
Combination Heat/Hot Water (Natural Gas Boiler) SF NC NG	x		
High-Efficiency petroleum Storage Tier I SF NC PET	x	x	x
Whole-Home petroleum Tankless 95% SF NC PET	x	x	x
Solar WH w/ petroleum Backup SF NC PET	x		
Indirect Water Heater (petroleum Boiler) SF NC PET	x	x	x
Solar WH w/ Electric Backup MF	x	x	x
Desuperheater (off GSHP) MF	x		
High-Efficiency Gas Storage Tier I MF NG	x	x	x
High-Efficiency Gas Storage Tier II (Condensing) MF NG	x	x	x
Whole-Home Gas Tankless 82% MF NG	x	x	x
Whole-Home Gas Tankless 95% MF NG	x	x	x
Solar WH w/ Gas Backup MF NG	x	x	x
Indirect Water Heater (Gas Boiler) MF NG	x	x	x
Combination Heat/Hot Water (Natural Gas Boiler) MF NG	x		
High-Efficiency petroleum Storage Tier I MF PET	x	x	x
Whole-Home petroleum Tankless 95% MF PET	x	x	x
Solar WH w/ petroleum Backup MF PET	x		
Indirect Water Heater (petroleum Boiler) MF PET	x	x	x
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Electric) MF	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Natural Gas) MF NG	x	x	x
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Petroleum) MF PET	x	x	
Solar WH w/ Electric Backup MF NC	x	x	x
Desuperheater (off GSHP) MF NC	x		
High-Efficiency Gas Storage Tier I MF NC NG	x	x	x
High-Efficiency Gas Storage Tier II (Condensing) MF NC NG	x	x	x
Whole-Home Gas Tankless 82% MF NC NG	x	x	x
Whole-Home Gas Tankless 95% MF NC NG	x	x	x
Solar WH w/ Gas Backup MF NC NG	x	x	x
Indirect Water Heater (Gas Boiler) MF NC NG	x	x	x
Combination Heat/Hot Water (Natural Gas Boiler) MF NC NG	x		
High-Efficiency petroleum Storage Tier I MF NC PET	x	x	x
Whole-Home petroleum Tankless 95% MF NC PET	x	x	x
Solar WH w/ petroleum Backup MF NC PET	x		
Indirect Water Heater (petroleum Boiler) MF NC PET	x	x	x
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Electric) MF NC	x	x	x
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Natural Gas) MF NC NG	x	x	x
Gravity Film Exchange (GFX) Waste Water Heat Recovery (Petroleum) MF NC PET	x	x	

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Other			
Efficient Well Pump SF	x	x	x
Direct Feedback Devices (In Home Display) (Natural Gas) SF NG	x	x	x
Direct Feedback Devices (In Home Display) (Petroleum) SF PET	x	x	x
Efficient Well Pump SF NC	x	x	x
Direct Feedback Devices (In Home Display) (Natural Gas) SF NC NG	x	x	x
Direct Feedback Devices (In Home Display) (Petroleum) SF NC PET	x	x	x
Efficient Well Pump MF	x	x	x
SPARE	x	x	x
Direct Feedback Devices (In Home Display) (Natural Gas) MF NG	x	x	x
Direct Feedback Devices (In Home Display) (Petroleum) MF PET	x	x	x
Efficient Well Pump MF NC	x	x	x
Indirect Energy Consumption Feedback (Natural Gas) MF NC NG	x	x	x
Direct Feedback Devices (In Home Display) (Electric) MF NC	x	x	x
Direct Feedback Devices (In Home Display) (Natural Gas) MF NC NG	x	x	x
Direct Feedback Devices (In Home Display) (Petroleum) MF NC PET	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
HVAC (Envelope)			
Improved Floor Insulation (R-0 to R-19) SF NG CZ4	x	x	x
Improved Floor Insulation (R-0 to R-30) SF NG CZ4	x	x	x
Improved Wall Insulation (R-7 to R-13) SF NG CZ4	x	x	x
Improved Attic/Roof Insulation (R-19 to R-38) SF NG CZ4	x	x	x
Improved Attic/Roof Insulation (R-19 to R-49) SF NG CZ4	x	x	x
Basement Wall/Foundation/Rim Insulation (R-0 to R-10) SF NG CZ4	x	x	
Improved Air Sealing SF NG CZ4	x	x	x
ES Windows SF NG CZ4	x	x	x
Storm Windows SF NG CZ4	x	x	x
Exterior Door SF NG CZ4	x	x	x
Improved Floor Insulation (R-0 to R19) SF NG CZ5	x	x	x
Improved Floor Insulation (R0 to R30) SF NG CZ5	x	x	x
Improved Wall Insulation (R10 to R20) SF NG CZ5	x	x	x
Improved Attic/Roof Insulation (R19 to R38) SF NG CZ5	x	x	x
Improved Attic/Roof Insulation (R19 to R49) SF NG CZ5	x	x	x
Basement Wall/Foundation/Rim Insulation (R0 to R10) SF NG CZ5	x		
Improved Air Sealing SF NG CZ5	x		
ES Windows SF NG CZ5	x	x	x
Storm Windows SF NG CZ5	x	x	x
Exterior Door SF NG CZ5	x	x	x
Improved Floor Insulation (R-0 to R19) SF NG CZ6	x	x	x
Improved Floor Insulation (R0 to R30) SF NG CZ6	x	x	x
Improved Wall Insulation (R10 to R20) SF NG CZ6	x	x	x
Improved Attic/Roof Insulation (R19 to R49) SF NG CZ6	x	x	x
Improved Attic/Roof Insulation (R19 to R60) SF NG CZ6	x	x	x
Basement Wall/Foundation/Rim Insulation (R0 to R15) SF NG CZ6	x		
ES Windows SF NG CZ6	x	x	x
Storm Windows SF NG CZ6	x	x	x
Exterior Door SF NG CZ6	x	x	x
ES Windows SF PET CZ4	x	x	x
Exterior Door SF PET CZ4	x		

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Improved Floor Insulation (R-0 to R19) SF PET CZ5	x		
Improved Floor Insulation (R0 to R30) SF PET CZ5	x		
ES Windows SF PET CZ5	x	x	
Exterior Door SF PET CZ5	x		
ES Windows SF PET CZ6	x		
Exterior Door SF PET CZ6	x		
Improved Wall Insulation (R7 to R13) SF CZ4	x		
Basement Wall/Foundation/Rim Insulation (R0 to R10) SF CZ4	x		
ES Windows SF CZ4	x	x	x
Storm Windows SF CZ4	x		
Exterior Door SF CZ4	x	x	x
ES Windows SF CZ5	x	x	x
Storm Windows SF CZ5	x		
Exterior Door SF CZ5	x		
ES Windows SF CZ6	x	x	x
Storm Windows SF CZ6	x		
Exterior Door SF CZ6	x	x	
Improved Floor Insulation (R0 to R19) MF NG CZ4	x	x	x
Improved Floor Insulation (R0 to R30) MF NG CZ4	x	x	x
Improved Wall Insulation (R7 to R13) MF NG CZ4	x		
Improved Attic/Roof Insulation (R19 to R38) MF NG CZ4	x		
Improved Attic/Roof Insulation (R19 to R49) MF NG CZ4	x		
Improved Air Sealing MF NG CZ4	x	x	x
Improved Duct Sealing MF NG CZ4	x	x	x
ES Windows MF NG CZ4	x	x	x
Storm Windows MF NG CZ4	x	x	x
Exterior Door MF NG CZ4	x	x	x
Improved Floor Insulation (R0 to R19) MF NG CZ5	x	x	x
Improved Floor Insulation (R0 to R30) MF NG CZ5	x	x	x
Improved Wall Insulation (R10 to R20) MF NG CZ5	x	x	x
Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ5	x	x	x
Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ5	x		
Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ5	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Improved Air Sealing MF NG CZ5	x	x	x
Improved Duct Sealing MF NG CZ5	x	x	x
ES Windows MF NG CZ5	x	x	x
Storm Windows MF NG CZ5	x	x	x
Exterior Door MF NG CZ5	x	x	x
Improved Floor Insulation (R0 to R19) MF NG CZ6	x	x	x
Improved Floor Insulation (R0 to R30) MF NG CZ6	x	x	x
Improved Wall Insulation (R10 to R20) MF NG CZ6	x	x	x
Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ6	x	x	x
Improved Attic/Roof Insulation (R-X or R-X) MF NG CZ6	x	x	x
Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF NG CZ6	x	x	x
Improved Air Sealing MF NG CZ6	x	x	x
Improved Duct Sealing MF NG CZ6	x	x	
ES Windows MF NG CZ6	x	x	x
Storm Windows MF NG CZ6	x	x	x
Exterior Door MF NG CZ6	x	x	x
Improved Duct Sealing MF PET CZ4	x	x	x
ES Windows MF PET CZ4	x	x	x
Exterior Door MF PET CZ4	x		
Improved Floor Insulation (R0 to R19) MF PET CZ5	x	x	x
Improved Floor Insulation (R0 to R30) MF PET CZ5	x	x	x
ES Windows MF PET CZ5	x	x	x
Storm Windows MF PET CZ5	x	x	x
Exterior Door MF PET CZ5	x	x	x
Improved Floor Insulation (R0 to R19) MF PET CZ6	x	x	x
Improved Floor Insulation (R0 to R30) MF PET CZ6	x	x	x
ES Windows MF PET CZ6	x	x	x
Storm Windows MF PET CZ6	x		
Exterior Door MF PET CZ6	x	x	x
Improved Air Sealing MF CZ4	x		
Improved Duct Sealing MF CZ4	x		
ES Windows MF CZ4	x	x	x
Storm Windows MF CZ4	x	x	x
Exterior Door MF CZ4	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Improved Floor Insulation (R0 to R19) MF CZ5	x		
Improved Floor Insulation (R0 to R30) MF CZ5	x		
Improved Wall Insulation (R10 to R20) MF CZ5	x		
Improved Attic/Roof Insulation (R-X or R-X) MF CZ5	x		
Improved Attic/Roof Insulation (R-X or R-X) MF CZ5	x		
ES Windows MF CZ5	x	x	x
Storm Windows MF CZ5	x	x	x
Exterior Door MF CZ5	x	x	x
Improved Floor Insulation (R0 to R19) MF CZ6	x		
Improved Floor Insulation (R0 to R30) MF CZ6	x	x	
Improved Wall Insulation (R10 to R20) MF CZ6	x		
Improved Attic/Roof Insulation (R-X or R-X) MF CZ6	x		
Improved Attic/Roof Insulation (R-X or R-X) MF CZ6	x		
Basement Wall/Foundation/Rim Insulation (R-X or R-X) MF CZ6	x		
Improved Duct Sealing MF CZ6	x	x	x
ES Windows MF CZ6	x	x	x
Storm Windows MF CZ6	x	x	x
Exterior Door MF CZ6	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
HVAC (Equipment)			
AC Tune-Up SF CZ4	x	x	x
Refrigerant Charge SF CZ4	x	x	x
Central Air Conditioner Tier 1 (12 EER) SF CZ4	x	x	x
Central Air Conditioner Tier 2 (12.5 EER) SF CZ4	x	x	x
Central Air Conditioner Tier 3 (13 EER) SF CZ4	x	x	x
Central Air Source Heat Pump Tier 1 (12 EER) SF CZ4	x	x	x
Central Air Source Heat Pump Tier 2 (12.5 EER) SF CZ4	x	x	x
Ground Source Heat Pumps COP 4.2, EER 17 SF CZ4	x	x	x
Right Sizing - Air Conditioning SF CZ4	x	x	x
High Efficiency Gas Furnace 90 AFUE SF NG CZ4	x		

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
High Efficiency Gas Furnace 94 AFUE SF NG CZ4	x		
High Efficiency Gas Furnace 96 AFUE SF NG CZ4	x		
Furnace Tune-Up SF NG CZ4	x	x	x
Furnace Tune-Up SF Pet CZ4	x	x	x
High Efficiency Gas Boiler 90 AFUE (Water) SF NG CZ4	x	x	x
High Efficiency Gas Boiler 95 AFUE (Water) SF NG CZ4	x	x	x
Tier I High Efficiency Petroleum Boiler SF Pet CZ4	x	x	x
High Efficiency Gas steam boiler SF NG CZ4	x	x	x
High Efficiency Petroleum steam boiler SF Pet CZ4	x	x	x
Boiler Tune-Up (Gas) SF NG CZ4	x	x	x
Boiler Reset Controls (Gas) SF NG CZ4	x		
Heat Recovery Ventilator SF CZ4	x	x	x
Heat Recovery Ventilator SF NG CZ4	x	x	x
Heat Recovery Ventilator SF Pet CZ4	x	x	x
AC Tune-Up SF CZ5	x	x	x
Refrigerant Charge SF CZ5	x	x	x
Central Air Conditioner Tier 1 (12 EER) SF CZ5	x	x	x
Central Air Conditioner Tier 2 (12.5 EER) SF CZ5	x	x	x
Central Air Conditioner Tier 3 (13 EER) SF CZ5	x	x	x
Central Air Source Heat Pump Tier 1 (12 EER) SF CZ5	x	x	x
Central Air Source Heat Pump Tier 2 (12.5 EER) SF CZ5	x	x	x
Ductless Minisplit CEE Tier 2 EER 12.5 SF CZ5	x	x	x
Ground Source Heat Pumps COP 4.2, EER 17 SF CZ5	x	x	x
Right Sizing - Air Conditioning SF CZ5	x	x	x
High Efficiency Gas Furnace 90 AFUE SF NG CZ5	x		
High Efficiency Gas Furnace 94 AFUE SF NG CZ5	x		
High Efficiency Gas Furnace 96 AFUE SF NG CZ5	x		
Furnace Tune-Up SF NG CZ5	x	x	x
High Efficiency Gas Boiler 90 AFUE (Water) SF NG CZ5	x	x	x
High Efficiency Gas Boiler 95 AFUE (Water) SF NG CZ5	x	x	x
Tier I High Efficiency Petroleum Boiler SF Pet CZ5	x		
High Efficiency Gas steam boiler SF NG CZ5	x	x	x
High Efficiency Petroleum steam boiler SF Pet CZ5	x		
Boiler Tune-Up (Gas) SF NG CZ5	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Boiler Reset Controls (Gas) SF NG CZ5	x		
Heat Recovery Ventilator SF CZ5	x	x	x
Heat Recovery Ventilator SF NG CZ5	x	x	x
Heat Recovery Ventilator SF Pet CZ5	x	x	x
AC Tune-Up SF CZ6	x	x	x
Refrigerant Charge SF CZ6	x	x	x
Central Air Conditioner Tier 1 (12 EER) SF CZ6	x	x	x
Central Air Conditioner Tier 2 (12.5 EER) SF CZ6	x	x	x
Central Air Conditioner Tier 3 (13 EER) SF CZ6	x	x	x
Central Air Source Heat Pump Tier 1 (12 EER) SF CZ6	x	x	x
Central Air Source Heat Pump Tier 2 (12.5 EER) SF CZ6	x	x	x
Ductless Minisplit CEE Tier 2 EER 12.5 SF CZ6	x	x	x
Ground Source Heat Pumps COP 4.2, EER 17 SF CZ6	x	x	x
Right Sizing - Air Conditioning SF CZ6	x	x	x
High Efficiency Gas Furnace 90 AFUE SF NG CZ6	x		
High Efficiency Gas Furnace 94 AFUE SF NG CZ6	x		
High Efficiency Gas Furnace 96 AFUE SF NG CZ6	x		
Furnace Tune-Up SF NG CZ6	x	x	x
High Efficiency Gas Boiler 90 AFUE (Water) SF NG CZ6	x	x	x
High Efficiency Gas Boiler 95 AFUE (Water) SF NG CZ6	x	x	x
Tier I High Efficiency Petroleum Boiler SF Pet CZ6	x		
High Efficiency Gas steam boiler SF NG CZ6	x	x	x
High Efficiency Petroleum steam boiler SF Pet CZ6	x		
Boiler Tune-Up (Gas) SF NG CZ6	x	x	x
Boiler Reset Controls (Gas) SF NG CZ6	x		
Heat Recovery Ventilator SF CZ6	x	x	x
Heat Recovery Ventilator SF NG CZ6	x	x	x
Heat Recovery Ventilator SF Pet CZ6	x	x	x
AC Tune-Up MF CZ4	x	x	x
Refrigerant Charge MF CZ4	x	x	x
Central Air Conditioner Tier 1 (12 EER) MF CZ4	x	x	x
Central Air Conditioner Tier 2 (12.5 EER) MF CZ4	x	x	x
Central Air Conditioner Tier 3 (13 EER) MF CZ4	x	x	x
Central Air Source Heat Pump Tier 1 (12 EER) MF CZ4	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Central Air Source Heat Pump Tier 2 (12.5 EER) MF CZ4	x	x	x
Ground Source Heat Pumps COP 4.2, EER 17 MF CZ4	x	x	x
Right Sizing - Air Conditioning MF CZ4	x	x	x
Furnace Tune-Up MF NG CZ4	x	x	x
High Efficiency Gas Boiler 90 AFUE (Water) MF NG CZ4	x		
High Efficiency Gas Boiler 95 AFUE (Water) MF NG CZ4	x		
High Efficiency Gas steam boiler MF NG CZ4	x	x	
Boiler Tune-Up (Gas) MF NG CZ4	x	x	x
Heat Recovery Ventilator MF NG CZ4	x	x	x
Heat Recovery Ventilator MF Pet CZ4	x	x	x
AC Tune-Up MF CZ5	x		
Refrigerant Charge MF CZ5	x	x	
Central Air Conditioner Tier 1 (12 EER) MF CZ5	x	x	x
Central Air Conditioner Tier 2 (12.5 EER) MF CZ5	x	x	x
Central Air Conditioner Tier 3 (13 EER) MF CZ5	x	x	x
Central Air Source Heat Pump Tier 1 (12 EER) MF CZ5	x	x	x
Central Air Source Heat Pump Tier 2 (12.5 EER) MF CZ5	x	x	x
Ground Source Heat Pumps COP 4.2, EER 17 MF CZ4	x	x	x
Right Sizing - Air Conditioning MF CZ5	x	x	x
Furnace Tune-Up MF NG CZ5	x	x	x
High Efficiency Gas Boiler 90 AFUE (Water) MF NG CZ5	x	x	x
High Efficiency Gas Boiler 95 AFUE (Water) MF NG CZ5	x	x	x
High Efficiency Gas steam boiler MF NG CZ5	x	x	x
Boiler Tune-Up (Gas) MF NG CZ5	x	x	x
Heat Recovery Ventilator MF CZ5	x		
Heat Recovery Ventilator MF NG CZ5	x	x	x
Heat Recovery Ventilator MF Pet CZ5	x	x	x
EMS (Multifamily) MF NG CZ5	x	x	x
AC Tune-Up MF CZ6	x	x	x
Refrigerant Charge MF CZ6	x	x	x
Central Air Conditioner Tier 1 (12 EER) MF CZ6	x	x	x
Central Air Conditioner Tier 2 (12.5 EER) MF CZ6	x	x	x
Central Air Conditioner Tier 3 (13 EER) MF CZ6	x	x	x
Central Air Source Heat Pump Tier 1 (12 EER) MF CZ6	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
Central Air Source Heat Pump Tier 2 (12.5 EER) MF CZ6	x	x	x
Ground Source Heat Pumps COP 4.2, EER 17 MF CZ4	x	x	x
Right Sizing - Air Conditioning MF CZ6	x	x	x
Furnace Tune-Up MF NG CZ6	x	x	x
High Efficiency Gas Boiler 90 AFUE (Water) MF NG CZ6	x	x	x
High Efficiency Gas Boiler 95 AFUE (Water) MF NG CZ6	x		
High Efficiency Gas steam boiler MF NG CZ6	x	x	x
Boiler Tune-Up (Gas) MF NG CZ6	x	x	x
Heat Recovery Ventilator MF CZ6	x	x	x
Heat Recovery Ventilator MF NG CZ6	x	x	x
Heat Recovery Ventilator MF Pet CZ6	x	x	x
EMS (Multifamily) MF NG CZ6	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
New Construction			
New Construction Better than Code envelope SF CZ4	x		
New Construction Better than Code HVAC SF CZ4	x	x	x
New Construction Better than Code envelope and HVAC SF CZ4	x	x	x
New Construction Better than Code envelope SF CZ4 NG	x	x	x
New Construction Better than Code HVAC SF CZ4 NG	x	x	x
New Construction Better than Code envelope and HVAC SF CZ4 NG	x	x	x
New Construction Better than Code HVAC SF CZ4 PET	x		
New Construction Better than Code envelope and HVAC SF CZ4 PET	x		
New Construction Better than Code envelope SF CZ5	x	x	x
New Construction Better than Code HVAC SF CZ5	x	x	x
New Construction Better than Code envelope and HVAC SF CZ5	x	x	x
New Construction Better than Code envelope SF CZ5 NG	x	x	x
New Construction Better than Code HVAC SF CZ5 NG	x	x	x

Measure/End-Use Type	Base	Real Discount Rate (RDR)	RDR + 5% Cost Reduction
New Construction Better than Code envelope and HVAC SF CZ5 NG	x	x	x
New Construction Better than Code HVAC SF CZ5 PET	x	x	x
New Construction Better than Code envelope SF CZ6	x		
New Construction Better than Code HVAC SF CZ6	x	x	x
New Construction Better than Code envelope and HVAC SF CZ6	x	x	x
New Construction Better than Code envelope SF CZ6 NG	x	x	x
New Construction Better than Code HVAC SF CZ6 NG	x	x	x
New Construction Better than Code envelope and HVAC SF CZ6 NG	x	x	x
New Construction Better than Code HVAC MF CZ4	x	x	x
New Construction Better than Code envelope MF CZ4 NG			
New Construction Better than Code HVAC MF CZ4 NG			
New Construction Better than Code envelope and HVAC MF CZ4 NG			
New Construction Better than Code envelope MF CZ5	x	x	x
New Construction Better than Code HVAC MF CZ5	x	x	x
New Construction Better than Code envelope and HVAC MF CZ5	x	x	x
New Construction Better than Code envelope MF CZ5 NG	x	x	x
New Construction Better than Code HVAC MF CZ5 NG	x	x	x
New Construction Better than Code envelope and HVAC MF CZ5 NG	x	x	x
New Construction Better than Code envelope MF CZ5 PET	x	x	x
New Construction Better than Code HVAC MF CZ5 PET	x	x	x
New Construction Better than Code envelope and HVAC MF CZ5 PET	x	x	x
New Construction Better than Code HVAC MF CZ6	x	x	x
New Construction Better than Code envelope and HVAC MF CZ6	x	x	
New Construction Better than Code envelope MF CZ6 NG	x	x	x
New Construction Better than Code HVAC MF CZ6 NG	x	x	x
New Construction Better than Code envelope and HVAC MF CZ6 NG	x	x	x
New Construction Better than Code HVAC MF CZ6	x	x	x
New Construction Better than Code envelope and HVAC MF CZ6	x		

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