2005 MEASURE COST STUDY
FINAL REPORT

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EXECUTIVE SUMMARY

This report presents the results and findings from the 2005 Measure Cost Study (MCS). The measure cost data are summarized in this report and are available online at the Database for Energy Efficiency Resources (DEER) website (http://eega.cpuc.ca.gov/deer/). The MCS results provide cost information on the complete list of non-weather sensitive and weather-sensitive residential and non-residential measures, and refrigeration measures as included in the 2004-05 DEER Update conducted by Itron. This study was completed under contract to Pacific Gas & Electric Company (PG&E) on behalf of California's investor owned utilities, the California Public Utilities Commission (CPUC) Energy Division, the California Energy Commission (CEC), and the CPUC Office of Ratepayer Advocates. The study was funded with Public Goods Charge (PGC) monies.

ES.1 PROCESS OVERVIEW

In the 2005 MCS, an important improvement over the previous measure cost updates was the coordination and synchronization of the energy savings and measure cost data in the DEER Update. The DEER Update project was conducted by Itron. The Summit Blue team and the Itron team coordinated throughout the course of the two projects on a number of issues. The specific measures to be included in the DEER Update were defined by the Itron team and a list of these measures with their descriptions was provided to the Summit Blue team. In addition to coordination on the measures to be examined, the two teams coordinated on technical definitions of each measure and collaborated on how the cost data would be presented in the database.

A critical component of the coordination effort was to obtain clarification of the measure specifications used in the savings analysis for the DEER Update and link those specifications to the range of available products for pricing in any given measure category. In some respects, measure definitions for savings analysis purposes can be different than measure definition for pricing purposes. The primary difference lies in the fact that the measure specifications for savings analysis, in general, are intended to portray representative or average performance characteristics for a given technology or application, while specifications for pricing purposes are necessarily linked to discrete product and system features, and for levels of products and services that are actually available in the market. For example, the savings estimated for residential AC systems are based on assumptions about home construction characteristics, climate zone, and typical baseline and energy efficient equipment efficiencies by vintage. Costing on the other hand has little to do with home characteristics and is entirely related to size (tons), efficiency, manufacturer, and product features (e.g., type of expansion valve). The teams corresponded frequently to ensure that the measure specifications used in the savings and cost analyses were as closely coordinated as possible. In addition, the project required that the cost data be submitted in a format that facilitated the update to the online DEER database. In order to ensure that the cost data were consistent with the savings data, it was necessary to coordinate on measure lists, data presentation format, data elements to be reported, and the normalization units used.

Throughout the course of the project, the project team strived to develop a systematic approach to the cost data collection and analysis. Data collection instruments were prepared as one of the first tasks in the project. The instruments were pre-tested for a few select measures and revised to provide consistency of data elements and flexibility across measure categories in terms of specific performance variables needed to identify the product or system to be priced. The data collection methods employed in the study were generally similar to those developed and utilized for the 2001 Measure Cost Study with the exception that extensive use was made of the Internet for mass market and product oriented measures such as appliances and commodity items.

Several different data collection strategies were employed to meet the unique data collection and analysis needs associated with each type of technology or measure. Data sources included:

- Website and on-site cost surveys of retailers
- Cost quotes from manufacturers, manufacturer sales representatives, and distributors
- Cost surveys of contractors and design professionals
- Cost data from California DSM program files, particularly local programs
- Secondary sources and reports

Data to support the development of measure costs were collected from the above wide range of sources. A total of over 12,100 cost observations were collected in the preparation of the results presented in this report. The cost observations include over 145 observations on actual equipment and installation data on residential furnace systems from contractors through a California local energy efficiency program.

The raw cost data were entered into and organized in a series of Cost Analysis Workbooks; a separate workbook was created for each end use and measure category. The Cost Analysis Workbooks also include the technical specifications pertinent to each measure and are structured to provide the ability to capture all cost elements in one form. The Cost Analysis Workbooks are comprised of six information or data components :

1. **Contact log** – Each of the contacts from which data were obtained were noted including contact name, company, contact information and website URL

2. **Raw cost data** – All of the cost data for each measure category and measure ID are recorded in this workbook.

3. **Data sorted for analysis** – The raw cost data sorted and organized for the purpose of analyzing each measure ID.

4. **Analysis** – Analysis of the raw cost data of each measure was completed with the appropriate method.

5. **Results** – The final results to be reported and posted on the website were compiled in this section of the workbook.

6. **Statistical summary** – A basic statistical summary of the cost data for each measure was prepared, including range, confidence, and standard deviation of the data.

The Cost Analysis Workbooks were submitted electronically to the PG&E project manager as a separate deliverable to this report. Because of confidentiality considerations, these workbooks do not include the contact log. This log will be maintained by Summit Blue.

In the preparation of the cost data, the raw cost data were processed through one of four different analytic methods which are summarized below. The analytic approaches are embedded in the Cost Analysis Workbooks.

- **Simple average** – The simple average method takes all cost observations for a particular measure and averages them – discarding outliers in some cases where a particular observation appeared drastically out of line.

- **Weighted average** – The weighted average uses one or more observed market variables (market share of a particular model, cost based on specific volume purchase, etc.) to derive the average cost.

- **Regression cost model** – Regression modeling was employed for many measures. Relevant performance factors were incorporated as independent variables in the cost model for each measure.

- **Custom cost estimates** –This approach was typical of "engineered" and/or technically complex types of measure. Custom cost estimates were employed where a unique equipment or system configuration needed to be defined by the project team and a cost estimate "built up" for the specific technical details of the measure.

ES.2 RESULTS AND FINDINGS

Measure Cost Data are available in three different forms. First, the data are available as part of the measure savings data available on the DEER website. These data are specifically linked to each measure configuration used by the savings data on the website. Second, the data are available as a supplemental downloadable file titled "Cost Data" under Supporting Documents on the website. These data contain more detail and measure variations than the pricing included in the measure savings data detail. Finally, the measure cost data are provided as a hard copy in this final project report.

The measure cost data include full installed and incremental equipment cost estimates as deemed appropriate for each of the measures included in the DEER Update. Cost estimates are provided for three hundred and forty-one (341) non-weather sensitive and weather sensitive, residential and non-residential measures and refrigeration measures/technologies. All of the costs are presented in 2005 dollars. It is also important to note that the costs are first costs only and *do not include life cycle or ongoing operations and maintenance (O&M) costs or cost savings.* In addition to the pricing values, the presentation includes descriptive factors for each measure including measure and base case descriptions, application, cost basis, cost units, and other attributes as defined in this report.

In addition to the measure cost data, this report and the detail provided in the cost analysis includes detailed statistics and values on the cost data collected during the data analysis phase of the project. These data include factors such as mean, minimum and maximum costs, standard deviation, precision and a variety of other statistical indicators related to the cost data. These data are useful for assessing the statistical validity of the cost data, and understanding the identifying extreme price points and the range of costs for a given measure

There are five data elements to the cost reporting of measures:

1. Measure equipment cost – the cost of the energy-efficient technology
2. Base equipment cost – the cost of the baseline efficiency technology
3. Incremental cost – the difference between the measure equipment cost and the base equipment cost
4. Labor cost – the installation cost of the measure including contractor overhead & profit
5. Installed cost – the sum of the incremental measure equipment cost and labor cost

For a measure, the cost reporting may include all of these cost elements or only a subset depending on the characteristics of the measure. Application and Cost Basis factors were used to determine which cost

elements are reported. These two factors are linked in the sense that the application typically leads to the determination of the cost basis. The application identifies the types of projects where the measure is expected to be applied. There are three application scenarios that have been used. Each scenario is also designated by a three letter code as indicated in the parentheses below:

- **Retrofit (RET)** – replacing an existing, working technology with a new energy efficient technology or installing an energy efficient technology that was not there before in lieu of a standard technology. This application basis is also known as "early replacement".

- **Replace-on-burnout (ROB)** – replacing an existing technology at the end of its useful life with a new energy efficient technology in lieu of a standard technology

- **New construction (NEW)** – installing an energy efficient technology in a new construction or a major renovation project in lieu of a standard technology

The cost basis is used to define for each measure whether the appropriate cost is the incremental equipment or full installed cost. The cost basis is determined by: a) the application (RET, ROB, or NEW); and b) whether it is displacing an existing technology, installed in the absence of an existing technology, or is an alternative to a competing technology. The cost basis designation is used to define whether the cost is:

- **Incremental (INCR)** – the differential cost between a base technology and an energy-efficient technology

- **Installed (FULL)** – the full or installed cost of the measure including incremental equipment cost , labor, overhead & profit (OH&P)

Note that each cost basis is also designated by a four letter code as indicated in the parentheses above.

There are two types of normalization or common units (e.g., square foot, tons, horsepower, etc.) used in DEER: savings common units and cost common units. In many cases the units for savings and cost are the same. For some measures, however, the common units differ. In the presentation of the data, this is indicated by the cost common unit field in the downloadable supporting cost data. The cost common unit codes are also indicated under the cost basis field in the measure savings data details on the website.

The cost data compiled for the 2005 MCS differs from the 2001 DEER Update measure cost data in several substantive ways. First, several measures have been eliminated. Most notably, most T8 systems have been eliminated with the exception of premium efficiency and dimming T8 ballasts. In other cases, new measures and measure categories have been added. For example, agriculture measures, vending machine occupancy sensor controls, high-efficiency office copiers, high-efficiency commercial cooking equipment, and premium-efficiency motors have been added, and the list of non-residential HVAC measures has been expanded. In addition, equipment efficiencies for packaged air conditioners and other HVAC equipment have been increased to account for the 2005 Title 20/24 code changes. A summary comparison of 2001 and 2005 cost data is provided in Section 4 of this report. In terms of new data sources, the project team was able to utilize the Internet much more extensively for cost observations than was possible for previous updates.

ES.3 RECOMMENDATIONS FOR FUTURE STUDIES

The experience of the MCS team indicates that the cost analysis process is best served by a systematic approach to pricing that is consistent with industry practices. Every attempt was made by the project team

to systematize the process and bring as much rigor to the cost research as possible. The project team believes that future DEER cost studies will benefit from this type of approach and can further refine and enhance the process. Below are several specific recommendations for conducting future measure cost studies.

1. **Develop a clear specification for each measure, and make sure the measure specifications are coordinated between the savings analysis and the pricing.** In many cases, the definitions and parameters used in savings analysis need to be translated into equipment specifications that are actually being offered in the market. This is an important first step in developing a set of technology specifications that can be priced. It is recommended that measure specifications include the following details for both the base and energy-efficient technology or application:
    - Technology or application description
    - Size or capacity – for example, 150 tons, 18 Watts, 25 horsepower. This may not always be known in advance but a representative range can almost always be identified.
    - Efficiency – for example, 13 SEER, 10 EER, 85%.
    - Other performance characteristics – for example, two-speed, variable speed, dimming.
    - Application – new construction, retrofit, replace-on-burnout.
    - Normalization units – for example, square foot, horsepower, ton.
    - Cost basis – incremental cost, installed cost.

2. **Systematize the pricing process to the extent possible.** The pricing process should be systematized so that it is transparent to the user, reproducible, transferable to the next analyst, consistent with industry pricing practices, and sufficiently well documented so that reviewers can retrace the data sources and analytic process.

3. **Index certain costing elements to industry recognized pricing methods and resources.** Referring to industry recognized sources for some aspects of the research allows the analyst to minimize the need for original research from hard-to-access resources (e.g., contractors), and provides consistency with other accepted methods.

4. **Conduct more frequent, targeted, and less expansive updates.** While the periodic comprehensive update approach certainly has merit, some costs have a short shelf life and need to be updated more frequently while others are more stable over time. It may be advisable to conduct limited annual updates to keep in touch with the market and be on top of market dynamics for selected measures, to research new measures as they become mature in the market, and to account for changes in the focus of California's DSM programs.

5. **Integrate cost data collection and reporting into program implementation if possible.** There is potentially a wealth of data available through the program implementation process. Clearly, integrating cost data collection and reporting into existing programs where data and fulfillment processes are already in place is easier said than done. However, for future programs, this integrated approach could be adopted. It may be most useful for specific types of applications such as HVAC system installations or new construction applications, where pricing is relative to and dependent on other aspects of the project and often hard to get on a systematic basis from busy contractors and trade professionals.

1. INTRODUCTION

This report presents the results of the 2005 Measure Cost Study (MCS). The results of the cost analysis are presented in this report and available on the Database of Energy Efficiency Resources (DEER) website (http://eega.cpuc.ca.gov/deer/) as part of the measure savings data details and in a more expansive form as a downloadable supplemental dataset. This report provides an overview of the MCS project, a discussion of the coordination of the cost research with the work of the DEER Update project team, a review of the data collection and cost analysis process, and a summary of the measure cost data. This study was completed under contract to Pacific Gas & Electric Company (PG&E) on behalf of California's investor owned utilities, the California Public Utilities Commission (CPUC) Energy Division, the California Energy Commission (CEC), and the CPUC Office of Ratepayer Advocates. The study was funded with Public Goods Charge (PGC) monies.

1.1 Background

The Database of Energy Efficiency Resources (DEER) provides measure savings and cost data that are used by energy efficiency program planners in California to estimate the potential demand and energy savings and costs attributable to specific energy-efficient measures (EEMs) that may be included in demand-side management (DSM) programs. A comprehensive update of DEER was initiated in 2003 to update the savings data in DEER. The DEER Update was managed by Itron. During the 2004-05 phase of the DEER Update, a separate contract was awarded to Summit Blue to conduct parallel research on cost updates to be incorporated into the DEER Update. This was a necessary aspect of the DEER Update because cost data is essential in assessing the cost-effectiveness of programs designed to achieve demand and energy savings in residential and non-residential sector applications. The cost data contained in this deliverable are pertinent to current planning efforts underway at utilities and other program implementers in the state for the 2006-08 program cycle.

The MCS results presented herein provide cost information on the complete list of non-weather sensitive and weather sensitive measures included in the 2004-05 DEER Update. An interim MCS report presenting the results of the cost analysis of the non-weather sensitive and high priority weather sensitive measures was submitted on March 15, 2005. This report includes the measures submitted for the March 15 deadline as well as the balance of the measures analyzed in the intervening time period. It should be noted that the results for some of the measures submitted for the March 15 deadline have been refined and adjusted for this deliverable. For all its intended purposes, this final report and the final cost data supersede all previous deliverables of the 2005 MCS project.

The measure cost study was initiated at the kick-off meeting at PG&E's San Francisco offices on January 5, 2005. Development of the research plan, data collection protocols, and data collection instruments began shortly after project kick-off. As part of the project initiation process, the project team attempted to access data collection instruments and contact information from the prior study in order to "quick start" the data collection process and make sure that the current study built upon and was as consistent as possible with prior work. Other than those documents that are available publicly through CALMAC or the CEC website, however, we were not able to access electronic documentation on the prior efforts, and thus the project team developed its own data collection systems. Throughout the course of the project, the project team developed a systematic approach to cost data collection and analysis, and worked to index data collection and data reduction procedures to commonly accepted cost estimating methods and standards.

1.2 Project Coordination

In the 2005 MCS, an important improvement over the previous measure cost updates was the coordination and synchronization of the savings and measure cost data in the DEER Update. The Summit Blue team and the Itron team coordinated throughout the course of the two projects on a number of issues. The specific measures to be included in the DEER Update were defined by the Itron team and a list of these measures with their descriptions was provided to the Summit Blue team. . In addition to coordination on the measures to be examined, the two teams coordinated on technical definitions of each measure and collaborated on how the cost data would be presented in the database.

Measure definition for savings analysis purposes can be different than measure definition for pricing purposes in some respects. The primary difference lies in the fact that measure specification for the savings analysis is intended to portray representative or average performance characteristics for a given technology or application, while specification for pricing purposes is necessarily linked to discrete product and system features and products and services that are actually available in the market. An important overall aspect of the coordination effort was to obtain clarification of the specifications used in the savings analysis for the DEER update and link those specifications to the range of available products for pricing in any given measure category. The clarification process was executed through a series of discussions and email correspondence with the Itron team.

The project required that cost data be submitted in a format that facilitated the cost data incorporation into the online DEER. In order to assure that the cost data were consistent with the savings data, it was necessary to coordinate on measure lists, data presentation format, data elements to be reported, and the normalization units to be used.

In addition to coordination with the Itron team, the project team communicated regularly with the PG&E project manager through emails, as-needed telephone calls, a regularly scheduled biweekly project status call, and monthly status reports.

1.3 Overview of Differences Between 2001 and 2005 Measure Cost Data

The cost data compiled for the 2005 MCS differs from the 2001 DEER Update measure cost data in several substantive ways. First, several measures have been eliminated. Most notably, most T8 systems have been eliminated with the exception of premium efficiency and dimming T8 ballasts. The primary reason for this is that T8's are now considered the baseline technology for lighting retrofits and new construction in California. In other cases, new measures and measure categories have been added. For example, agriculture measures, vending machine occupancy sensor controls, high-efficiency office copiers, high-efficiency commercial cooking equipment, and premium-efficiency motors have been added, and the list of non-residential HVAC measures has been expanded. In addition, equipment efficiencies for packaged air conditioners and other HVAC equipment have been increased to account for the 2005 Title 20/24 code changes.

In addition to the elimination or modification of the specifications of some measures, other measures have become more widely available and accepted by the market. For example, the 2001 DEER Update included only low income direct evaporative coolers. The 2004-05 DEER Update includes both direct coolers as well as direct/indirect coolers. These latter units provide better comfort at high temperatures, and therefore are applicable in many parts of California that previously did not utilize evaporative coolers. In terms of data sources, the project team was able to utilize the Internet much more extensively for cost observations than was possible for previous updates. Many more retailers, for example, make a wide

range of product prices available online today than did four years ago. Observations on market factors and cost trends from 2001 to 2005 measure cost data for selected technologies are presented in Section 4.

1.4 Issues and Recommendations for Future Studies

As noted above, the project team attempted early on to review the methodologies and resources used in the prior study. We believe that the cost analysis process is best served by a systematic approach to pricing that is consistent with industry practices, and the project team has made every attempt to systematize the process and bring as much rigor to the cost research as possible. Going forward, we believe that future DEER cost analyses will benefit from this type of approach and can further refine and enhance the process. Below are several specific recommendations for conducting future measure cost studies.

1. **Develop a clear measure specification for each measure, and make sure the measures specifications are synchronized between the savings analysis and the pricing.** Most measures that are promoted by DSM programs are discrete technologies or applications with fairly clear boundary conditions. A clear and complete measure description forms the basis for both the savings and cost analyses. Formulating the measure description should take into account how the measure is defined in the marketplace. For example, commercial windows were defined as a percentage improvement in energy efficiency. While this may be a program-needed formulation for defining the measure and determining energy savings through modeling, it is less straightforward as a basis for obtaining costs. In this case, the project team had to determine a range of window types which would fit into the measure specification in order to collect costs. Similarly, normalization units need to reflect how the measure is priced. For example, the energy savings for residential evaporative coolers were calculated per 1000 square feet of house floor area. For the cost analysis, it is difficult to determine cost per square foot since cooling area per unit depends on variety of factors. Measure specifications should also account for any location or building type factors that could significantly impact pricing.

   We recommend that the measure descriptions be completed and that the coordination process between the savings and cost teams be started as early as possible, preferably before research has begun. In the view of the MCS team, the measure specifications should have the following details for both the base and energy-efficient technology or application:

   - Technology or application description
   - Size or capacity – for example, 150 tons, 18 Watts, 25 horsepower. This may not always be known in advance but a representative range can almost always be identified.
   - Efficiency – for example, 13 SEER, 10 EER, 85%.
   - Other performance characteristics – for example, two-speed, variable speed, dimming.
   - Application – new construction, retrofit, replace-on-burnout.
   - Normalization units – for example, square foot, horsepower, ton.
   - Cost basis – incremental cost, installed cost.

   The measure specifications could be developed in a form such as that shown in Exhibit 1-1.

Exhibit 1-1. Sample Measure Specification Layout

Measure ID	Energy-efficient Case				Base Case				Application	Cost Basis	Cost Units
	Measure Description	Size	Efficiency	Performance Characteristics	Baseline Description	Size	Efficiency	Performance Characteristics			
1											
2											
…											

It should be noted that much of this information was included in the descriptions of the measures included in the DEER Update. However, in many cases the measure descriptions required significant interpretation and the MCS team had to detail the measure specifications according to the types of information indicated in Exhibit 1-1 for costing purposes. The difficulty with this approach is the occasional asymmetry between the savings and cost analyses that results from independent interpretations. Using a format similar to that shown in Exhibit 1-1 would help to minimize this difficulty. This does not necessarily need to be a daunting task and a nominal investment in developing these specifications would pay off in terms of less ambiguity and interpretation on the part of both researchers and users.

2. **Systematize the pricing process to the extent possible.** The pricing process should be systematized so that it is transparent to the user, reproducible, transferable to the next analyst, consistent with industry pricing practices, and sufficiently well documented so that reviewers can retrace the data sources and analytic process. To this end, the cost team has developed a set of data collection and analysis tools designed to systematize the pricing process to the extent possible. In addition to providing for greater transparency, consistency, and reproducibility in the final product, this has the additional advantage that future analysts will have a rigorous and well defined starting point for their work and be able to build upon the results of prior measure cost studies. The MCS team has developed a data collection and analytic template in Microsoft Excel that includes the raw dataset, analytic method, final results, and a statistical summary of the data. We recommend that this template or a next generation variant be used for pricing purposes for future studies.

3. **Index certain costing elements to industry-recognized pricing methods and resources.** Referring to industry recognized sources for some aspects of the research allows an analyst to minimize the need for original research from hard-to-access resources (e.g., contractors). We believe that it is both useful and necessary to index to and refer to industry benchmark pricing resources and processes such as R.S. Means. This brings the ability to leverage the substantial data mine of these resources and bring greater analytic consistency with established, recognized, and well developing pricing processes. This may be most applicable in the case of defining installation costs.

4. **Conduct more frequent, targeted, and less expansive updates.** While the periodic comprehensive update approach certainly has merit, some costs have a short shelf life and need to be updated more frequently or in response to market dynamics while others are more stable over time. It may be advisable to conduct limited annual updates to keep in touch with the market and be on top of market dynamics for selected measures, to research new measures as they become mature in the market, and to account for changes in the focus of California's DSM programs.

As noted in the previous measure cost studies, limiting measure cost research to major periodic studies results in an important limitation. Incremental measure costs are a critical input to tests that are used in energy-efficiency planning process to determine program cost effectiveness. Because measure costs change over time, they should not be unnecessarily static. To the extent that measure costs are used as part of the program planning and regulatory approval process, a process should be put in place that allows these benchmark costs to be "refreshed" between major study efforts as new information warrants.

5. **Integrate cost data collection and reporting into program implementation if possible.** There is potentially a wealth of data available through the program implementation process. For example, in the current cost update the cost team was able to get actual contractor equipment and installed cost data for some HVAC measures through one of the local efficiency program implementation contractors. This is among the best quality data because it reflects what a customer actually paid a contractor for the equipment and installation. Program data collection systems could be put in place specifically to collect cost data as part of an integrated data collection process. We recognize that this is easier said than done, particularly for existing programs where data and fulfillment processes are already in place. However, for future programs, this integrated approach could be adopted. It may be most useful for specific types of applications such as HVAC system installations or new construction applications where pricing is relative to and dependent on other aspects of the project and often hard to get on a systematic basis from busy contractors and trade professionals.

1.5 Organization of the Report

A discussion of data collection methodology and data sources is contained in Chapter 2, a discussion of cost analysis methodologies is provided in Chapter 3, and a discussion of the measure cost data and a guide to interpreting the cost data is provided in Chapter 4. A cost data user's guide for inclusion on the DEER website was also provided as a separate deliverable. The appendices contain the following information including a print listing of the measure cost data:

Appendix A: Measure Technical Specifications for Pricing

Appendix B: Measure Cost Data

Appendix C: Analytic Methods, Observations, and Measure Statistics

In addition to this report, project deliverables include:

- A cost data user's guide for inclusion on the DEER website.
- A supplemental downloadable cost data file in Microsoft Excel for inclusion on the DEER website.
- A 3-page summary of the salient findings of the project.
- A set of Cost Analysis Workbooks in Microsoft Excel provided electronically to the PG&E project manager.

2. DATA COLLECTION METHODOLOGY AND DATA SOURCES

2.1 Introduction

This section provides an overview of the methods and data sources used to collect the measure cost information developed for the 2005 Measure Cost Study. The methods employed are generally similar to those developed and utilized for the 2001 DEER Update measure cost data with one very notable exception. The boom of the Internet as an information resource has enabled a great deal of cost research, particularly for mass market and product oriented measures such as appliances. For those measures which are more custom or engineered in nature, the Internet is not quite as useful directly for pricing, but is a powerful tool for measure research and understanding of technical features and options and for contact information.

One of the first tasks undertaken by the project team was to clarify which measures were to be researched and what the technical specifications (e.g., capacity/size, efficiency, performance parameters) were for each measure. As noted above, Itron provided lists of measures to the project team and a copy of the October 2004 draft DEER phase 1 report on non-weather sensitive measures. While the lists and the October report provided basic details on each measure, the project team requested clarification on several occasions on technology performance characteristics and sizes for costing purposes. From these communications, the project team compiled a set of performance specifications for cost purposes for each measure. A data collection process was designed to capture cost data according to these specifications.

2.2 Data Collection Methods and Sources

Data to support development of the measure costs provided in this report were collected from a wide range of sources. A total of over 12,100 cost observations were collected in the preparation of the results presented in this report. These data included over 145 observations on actual equipment and installation cost data on residential furnace systems from contractors through a California local energy efficiency program. Appendix C provides information on the number of observations by measure.

Data collection instruments were prepared as one of the first tasks in the project. The instruments were pre-tested for a few select measures and revised to provide consistency of data elements and flexibility across measure categories in terms of specific performance variables needed to identify the product or system to be priced.

To accommodate the large number and variety of technologies and measures for which cost estimates were developed on this project, several different data collection strategies were employed to meet the unique data collection and analysis needs associated with each type of technology or measure. The resulting portfolio of sources consisted of:

- Website searches and on-site cost surveys of retailers
- Cost quotes from manufacturers, manufacturer sales representatives, and distributors
- Cost surveys of contractors and design professionals
- Cost data from California DSM program files, particularly local programs
- Secondary sources and reports

The data collected generally fell into three categories: 1) wholesale data, 2) retail data, and 3) Manufacturers Suggested Retail Prices (MSRP). The goal of the cost data analysis was to portray the

cost that would be experienced by the end use customer, so various adjustment factors were applied to these different data types to compute values that represented retail costs at the customer level.

A mapping of data collection sources to technology types is provided in Exhibit 2-1 for Non-Weather Sensitive, Residential Weather Sensitive, Non-Residential Weather Sensitive and Refrigeration measures. Each of the source types is described in more detail in the subsections that follow.

Exhibit 2-1: Summary of Data Sources

Measure Category	Website Searches and On-Site Retail Surveys	Manufacturers, Manufacturer Representatives, and Distributors	Contractors and Design Professionals	Utility and Local Program Implementator Data	Secondary Sources
Non-Weather Sensitive Measures					
Appliances	X	X			
Commercial Cooking	X	X			
Copiers	X	X			
Domestic Hot Water	X	X			
Lighting	X	X			X
Lighting Controls	X	X			X
Motors	X	X			X
Pool Pumps	X	X			X
Vending Machine Occupancy Controls	X	X			
Residential Weather Sensitive Measures					
HVAC	X	X		X	X
HVAC Diagnostics and Tuneup			X		X
Insulation	X	X	X		X
Windows	X	X			X
Sunscreens	X	X			X
Window Films	X	X			X
Non-Residential Weather Sensitive Meaures					
HVAC	X	X	X		X
Domestic Hot Water	X	X			X
HVAC Motors		X			X
Cool Roof		X	X		
Windows		X			X
Lighting Controls		X	X		X
Skylights		X	X		
HVAC Diagnostics and Tuneup			X		X
Time Clocks	X	X			
Duct Insulation	X	X			
Energy Management Systems		X	X		
Refrigeration Measures					
Supermarket Refrigeration		X	X		
Warehouse Refrigeration		X	X		

2.2.1 Web Search and Retail Data Collection

As noted above, the maturity of the Internet as an information resource has enabled a great deal of online research including technical information on measure performance and price information. As a pricing tool, the Internet is primarily useful in researching the costs of mass market or product oriented measures. The advantages of Internet price research include the ability to research a large number of cost sources and measure variations for a relatively low cost, transparency of pricing as the price quotations are publicly posted and directly available to all potential purchasers, and ease of refreshing the cost data for future updates. In addition, for those measures which do not lend themselves to direct pricing over the Internet, web research still serves as a valuable tool for technical research on measure features and performance variables that impact pricing. Internet research was used extensively for this measure cost update.

The technologies and measures relying substantially on Internet and retail outlet cost data collection included:

- Compact fluorescent lamps, metal halide and high pressure sodium lamps, fluorescent ballasts, and exit signs
- Office copiers
- Refrigerators, clothes washers, clothes dryers, and dish washers
- Room air conditioners, package terminal air conditioners, and water-source heat pumps
- Water heaters, tank insulation, duct insulation, low-flow showerheads and faucet aerators
- Pool pumps

Many of the mass market or product oriented technologies within the scope of this study are normally purchased directly by end users from retail stores, and on-site surveys at retail outlets were also utilized for data collection for this class of measures. The on-site surveys were concentrated in the San Francisco Bay and Central Valley areas. Research at Southern California outlets was conducted by phone or over the Internet via location specific websites. Surveys were conducted at hardware stores, department stores, and home improvement outlets.

2.2.2 Manufacturers, Manufacturer Sales Representatives, and Wholesale Data Collection

Much of the cost data collected for this study was derived directly from manufacturers, manufacturer sales representatives, and wholesale distributors. This is a particularly important research path for products such as non-residential air conditioning, some commercial building products such as high performance commercial glazing, and refrigeration measures. Some of the unique considerations in approaching manufacturers about pricing are: a) manufacturers often supply their products through a distributed network of sales representatives and wholesale or vendor outlets, and b) pricing for certain types of products such as air conditioning is quite competitive and sources often require management approval and assurances of confidentiality to release price information.

It is important to recognize and note the nature of the price information received from these sources. Generally, price quotations can be grouped into wholesale pricing (the price to vendor outlets), Manufacturers Suggested Retail Pricing (pricing available for public consumption and the price that manufacturers suggest that contractors charge), and retail pricing (the actual consumer price for the product). With regard to retail pricing, exceptional conditions such as sales or promotional events were excluded from the research. As a general guide, the pricing presented in the 2005 MCS represents end-use level pricing with the distinction that some measures lend themselves to price discounts for volume purchases. Thus, pricing for some measures distinguishes between low and high volume purchases. When working with wholesale pricing, it is typically required to apply a contractor mark-up in order to arrive at end-user pricing. This method is important for technologies that are typically purchased and installed for end-users by contractors.

The technologies for which manufacturers and wholesale costs were most important for this update include:

- Non-residential HVAC equipment and systems
- Residential HVAC equipment
- Non-residential refrigeration and systems

- Non-residential high performance glazing
- Premium-efficiency motors
- Vending machine occupancy sensor controls
- Commercial cooking equipment

2.2.3 Contractor and Design Professional Data Collection

It is quite difficult in practice to obtain large numbers of price quotes by surveying contractors directly. Nonetheless, important information can be obtained from this level of the product distribution chain. In this study, we chose to focus our contractor surveys on information that could be provided easily, with a minimal effort by contractors, but that would be useful to us in developing the final cost values. Contractors can be a particularly important source of information on field installed types of measures (as opposed to over-the-counter purchases) where the practicalities of field installation are an important consideration and may have little to do with the cost of the product itself. Contractors with specialized knowledge of the HVAC, refrigeration, and building construction practices provided information on installation times, competitive product pricing, hourly rates, equipment markup percentages, and high volume discount percentages.

Information provided by contractors was used to develop prices for measures such as:

- System oriented measures such as refrigerant charging and duct leakage sealing
- Furnaces
- Air conditioning
- Whole house fans

Design professionals such as mechanical engineers, were also consulted on pricing for more complex, system-oriented engineered types of measures such as waterside economizers.

2.2.4 Cost Data from Utility Program Files and Databases

Another valuable source of cost data for this project has been utility program records. For the 2005 MCS, a local partnership program was a particularly fruitful source where the project team was able to gather over 145 data points for the installation of high-efficiency furnaces and air conditioning units.

2.2.5 Secondary Sources

The final sources of cost data included in this study came from several secondary sources. Most notably, the following resources were drawn upon as a resource for cost data:

- MotorMaster for motor cost data. This resource was supplemented by contacts with motor manufacturers.
- RS Means CostWorks 2005. RS Means is the preeminent costing resource for construction cost estimating. This resource was used to determine equipment and installation costs for selected measures.
- Vaughens motor rewind cost data.

2.3 Measure Technical Specifications

The measure lists and measure descriptions provided by the Itron team included basic information on the base case and energy-efficient technologies. It was necessary for the MCS team to expand upon the measure definitions and developed more detailed specifications in terms of equipment size, efficiency, and features. Measure specifications were developed for each measure as part of the data collection effort. The types of data included in the specifications for each measure include:

- Baseline measure/technology size or capacity
- Energy-efficient measure/technology size or capacity
- Baseline measure/technology efficiency
- Energy-efficient measure/technology efficiency
- Performance features such as speed, flow rate, insulating value, and electrical characteristics

Appendix A summarizes the measure specifications identified for each measure in each measure/technology category.

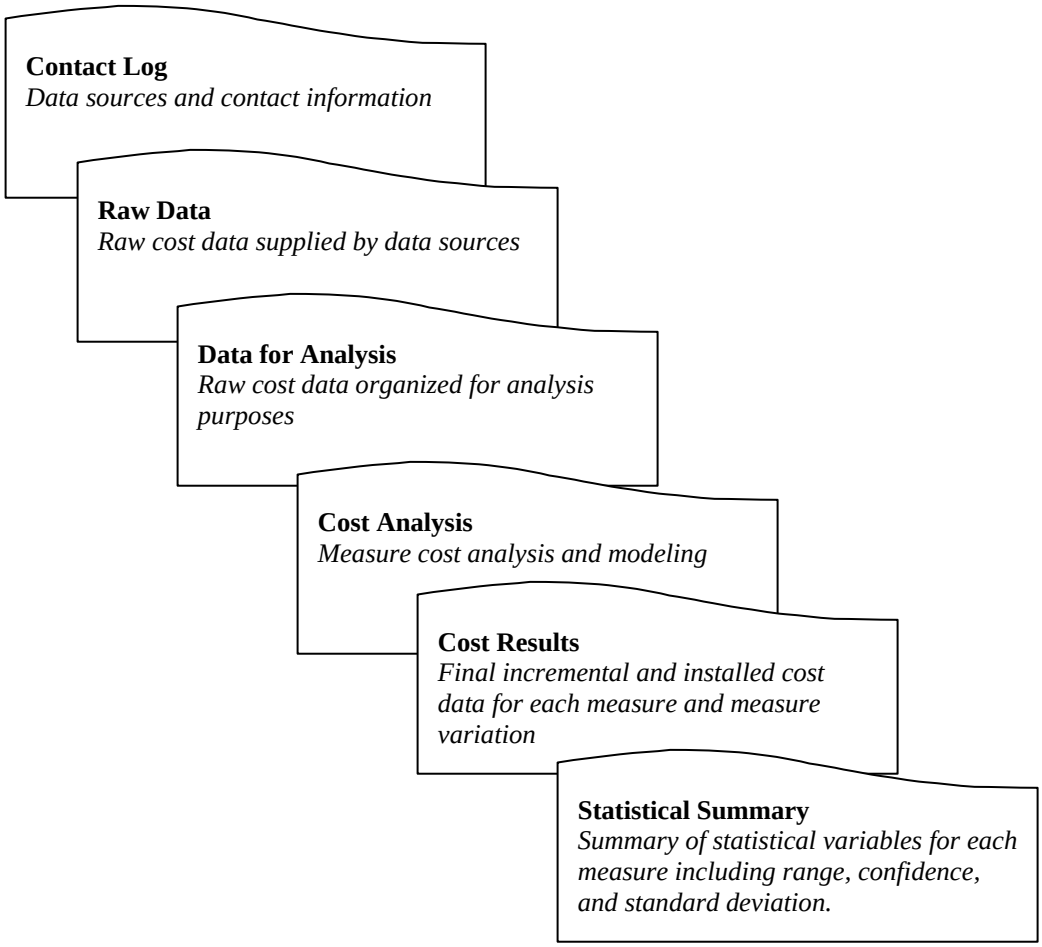
2.4 Data Management

The raw cost data were then entered into and organized in a series of Cost Analysis Workbooks; a separate workbook was created for each different end use and measure category. The cost data, analysis approach, and final results were compiled in the Cost Analysis Workbooks. The workbooks were segmented by end use category so as to allow each researcher in the MCS team to have their own data recording and analysis tool. The Cost Analysis Workbooks are comprised of six information or data components:

1. **Contact log** – Each of the contacts from which data were obtained were noted including contact name, company, contact information, and website URL
2. **Raw cost data** – All of the cost data for each measure category and measure ID were recorded in the workbook.
3. **Data sorted for analysis** – The raw cost data were sorted and organized for the purpose of analyzing each measure ID.
4. **Analysis** – Analysis of the cost data took one of four different forms: 1) simple averaging, 2) weighted averaging, 3) regression modeling, or 4) custom cost estimate. Each of these methods is discussed below.
5. **Results** – The final results to be reported and posted on the website were compiled in this section of the workbook.
6. **Statistical summary** – A basis statistical summary of the cost data for each measure was prepared including range, confidence and standard deviation of the data.

Exhibit 2-2 provides a description of the organization of the Cost Analysis Workbooks.

Exhibit 2-2: Organization of Cost Analysis Workbooks



The same format for the Cost Analysis Workbook was used by each researcher on the MCS team to provide uniformity in process across the different measure categories. The Cost Analysis Workbooks also include the technical specifications pertinent to the specific measure and are structured to provide the ability to capture all cost elements in one form.

There are two types of common units in use on the DEER website: 1) savings units and 2) cost units. In most cases the common units are the same. However, for certain measures the cost common unit is different than the savings unit. In the presentation of the data, this is indicated by the cost common unit field in the downloadable supporting cost data. The cost common unit codes are also indicated under the cost basis field in the measure savings data details on the website. The cost units and presentation of the cost data are discussed in more detail in Section 4 below.

3. COST ANALYSIS METHODOLOGY

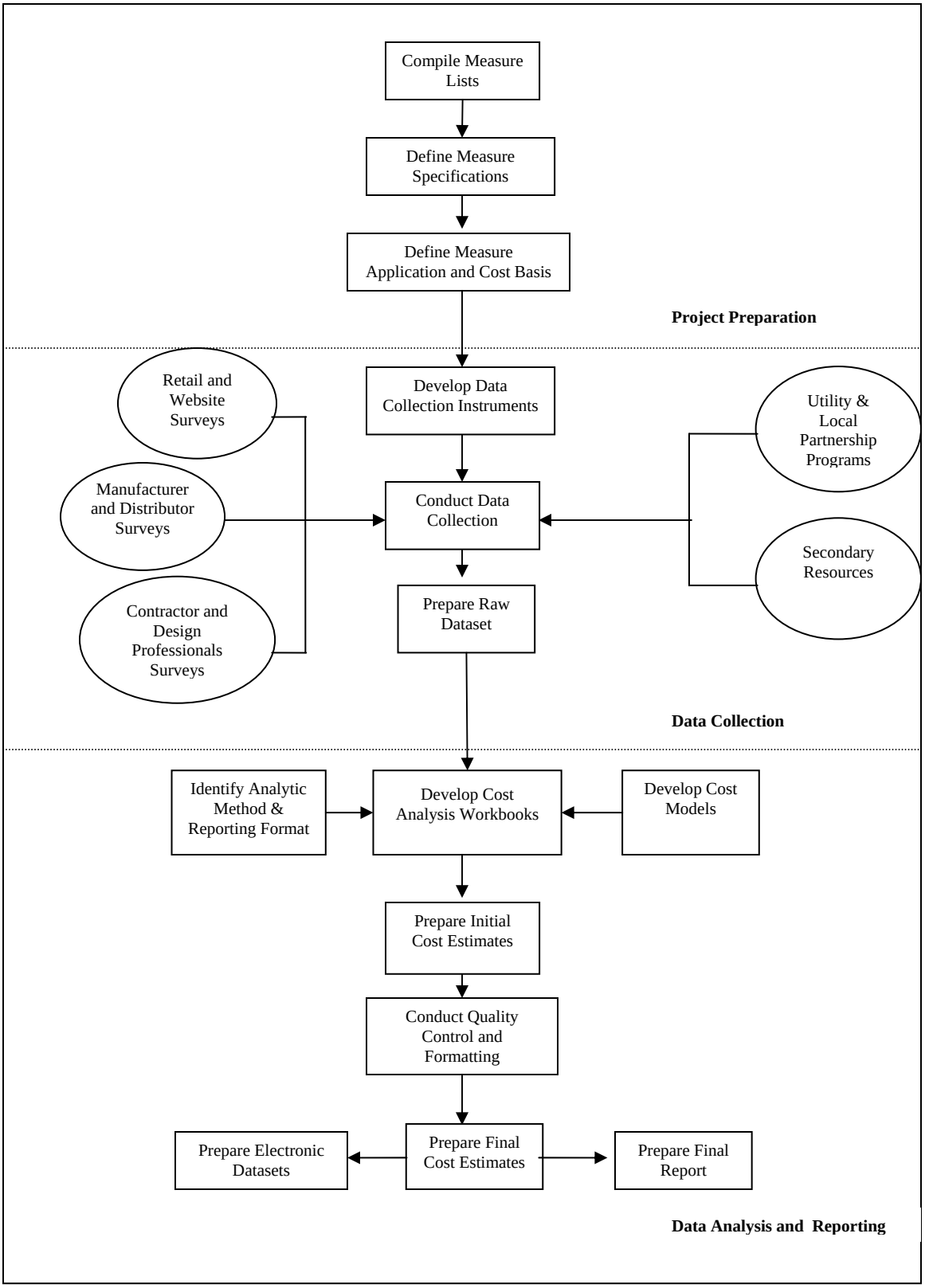
3.1 Cost Analysis Process Overview

As the collection of the raw cost data was completed, the data were subjected to several different types of analyses, depending on the technology, to develop the cost estimates. In some cases, simple averages provided the best estimates of costs, while in other cases other techniques were employed to control for variations in the data and differences between base case and high-efficiency technologies. In addition, where sample sizes were small, using the average price could result in significant bias from outliers. Another problem with comparing the average "base" technology price to the average "high-efficiency" technology price has to do with whether the sample of sources is identical for both cases. That is, if there is not a matched pair of costs for the base case and high-efficiency option from every source, the difference in the averages could be significantly biased due to differences in prices between the sources having nothing to do with efficiency.

To minimize the effects of such potential biases, the project team conducted individualized cost analyses for every technology in the study. Where large enough samples were available, regression models were developed in which prices were predicted as a function of several technology attributes. In cases where such models could not be developed, we analyzed the raw data directly to determine the most appropriate analytic technique for the measure.

The overall process was completed in three phases: a) the project preparation and planning, b) data collection instrument development, data collection and management, and c) data analysis and reporting. Exhibit 3-1 presents an overview of the process.

Exhibit 3-1. Measure Cost Analysis Process



3.2 Analytic Methods

In the preparation of the cost data, the raw cost data were processed through one of four different analytic methods, which are summarized below. The analytic approaches are embedded in the Cost Analysis Workbooks and a summary of the analytic method employed for each measure is provided in Appendix C. The analytic methods used in arriving at cost estimates are:

- **Simple average** – The simple average method takes all cost observations for a particular measure and averages them, discarding outliers in some cases where a particular observation appeared drastically out of line. An example of a measure that received simple average treatment is a faucet aerator (Measure ID: D03-412). The cost basis is FULL or installed, and the project team gathered 112 cost observations, averaging those observations to arrive at an equipment cost of $6.28 per aerator.

- **Weighted average** – The weighted average uses one or more observed market variables (market share of a particular model, cost based on specific volume purchase, etc.) to derive a weighted average cost estimate. An example of a measure where a weighted average is used for cost estimate is Vending Machine Controls where market distribution by product sales volume and product type were used to weight the cost estimate.

- **Regression cost model** – Regression modeling was employed for many measures including residential refrigerators, residential and non-residential air conditioning, furnaces, and non-residential cooking measures. The regression modeling involved a multi-variate linear regression analysis of cost data. Relevant performance factors were incorporated as independent variables in the cost model for each measure. For example, the capacity (kBtuh) and Annual Fuel Utilization Efficiency (AFUE) were utilized as independent variables in the furnace cost model, while SEER and equipment tonnage were used for residential air conditioning equipment.

- **Custom cost estimates** –This approach was typical of "engineered" and/or technically complex types of measures. Custom cost estimates were employed where a unique equipment or system configuration needed to be defined by the project team and a cost estimate "built up" for the specific technical details of the measure. Refrigeration measures and some of the non-residential HVAC measures fell into this category.

An issue that impacts some measures is the need to distinguish between whether the technology is a self-contained system or a component in a larger system. A component typically requires combination with other components to form a useful system. In many cases, it is necessary to include other components in order to develop a reasonable cost estimate. For example, packaged air conditioning equipment is a self-contained system that can be priced without much concern for ancillary components. On the other hand, adding a waterside economizer to an air conditioning system requires the consideration of additional pump, pipe and fittings, heat exchanger, site preparation, and engineering costs. Engineered measures of this type typically indicate the need to "build up" a custom cost estimate.

Exhibit 3-2 presents an example of one of the regression models developed as part of the 2005 MCS study. The example case is for residential batt insulation. Using a spreadsheet multivariable linear regression tool, the results shown in Exhibit 3-2 were produced. The general form of the algorithm used to compute costs from the regression model is shown in equation 1. The algorithm used to obtain costs for batt insulation for any R-value within the range of raw data used in the study is shown in equations 2 and 3.

Exhibit 3-2. Regression Model for Residential Batt Insulation

Regression Statistics	
Multiple R	0.896160803
R Square	0.803104185
Adjusted R Square	0.793259395
Standard Error	0.083935723
Observations	22

ANOVA

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.5747237	0.5747237	81.57656233	1.70315E-08
Residual	20	0.1409041	0.0070452		
Total	21	0.7156278			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.05046414	0.0500739	1.0077937	0.325591585	-0.053988095	0.154916374	-0.053988095	0.154916374
R Value	0.017145338	0.0018983	9.0319744	1.70315E-08	0.013185569	0.021105107	0.013185569	0.021105107

$$\textbf{Cost} = I + X_1 \times C_1 + \ldots + X_n \times C_n \qquad \textbf{Eq. 1}$$

Where:

I = intercept

X = regression variable

C = regression variable coefficient

In the case of the model presented above for batt insulation, the regression equation takes the form shown in Equations 2 and 3:

$$\textbf{Cost}_{\textbf{batt insulation}} = \textbf{Intercept} + \textbf{R-Value} \times \textbf{R-Value coefficient} \qquad \textbf{Eq. 2}$$

$$\textbf{Cost}_{\textbf{batt insulation}} = \$0.505 + \textbf{R-Value} \times \$0.017 \qquad \textbf{Eq.3}$$

The analytic method along with the number of observations and basic statistical information for each measure included in the 2005 MCS is summarized in Appendix C for non-weather sensitive and weather sensitive residential and non-residential measures, and refrigeration measures.

4. MEASURE COST RESULTS

In this section, we provide a summary of the cost estimates developed for the 2004-05 DEER Update. The key results of the 2005 MCS are contained in the tables presented below, as part of the detailed measure savings data available on the DEER website, and as a supplemental download from the website.

4.1 Guide to the Measure Cost Data

The measure cost data below provide installed and incremental cost estimates for each of the measures included in the 2004-05 DEER Update and present cost detail for a range of sizes, efficiencies, and features. Cost estimates are provided for three hundred and forty-one (341) non-weather sensitive and weather sensitive residential and non-residential measures, and refrigeration measures.. All of the costs are presented in 2005 dollars. In addition to the pricing values, the presentation includes descriptive factors for each table including measure and base case descriptions, application, cost basis, cost units, and other attributes.

It is also important to note that the costs provided in this report are for *first costs only and do not include lifecycle or operations and maintenance (O&M) costs or cost savings.* Although analysts did encounter and uncover ongoing O&M or lifecycle costs as part of the research, systematic documentation of these costs was not a part of this study. Examples of measures where lifecycle or O&M costs may be an important factor in program planning and measure analysis activities include:

- Reduced lamp replacement costs with compact fluorescent lamps. CFLs have a lamp life that is 5 to 10 times longer than an incandescent lamp. Assuming a CFL lamp life of 10,000 hours compared 2000 for long-life incandescent lamps and 5 incandescent replacements over the life of the CFL, the resulting lifecycle materials and labor cost savings are approximately 5 x ($0.61 + $3.77) = $21.90.

- Water treatment cost for water-cooled air conditioning systems. While water-cooled air conditioning systems are attractive because of their greater operating and peak load efficiencies, they do result in additional water use and water treatment costs compared to air cooled equipment. One vendor estimated water treatment costs for non-residential water-cooled systems at $20/ton/year.

- Reduced fluorescent lamp life with no occupancy sensors. Some reports state that the useful life of compact fluorescent lamps and some fluorescent lamp-ballast combinations can be shortened due to more frequent switching, causing increased replacement costs. For example, Osram Sylvania estimates the T8 lamp life can be reduced from 24,000 hours to 7000 hours when the switch cycle is reduced from 12 hours to 30 minutes.[1]

The following discussion section provides a guide to using the Measure Cost Data. The guide is organized into the following sections:

1. Organization of the Cost Data
2. Using the Cost Data
3. Application and Cost Basis

[1] Osram Sylvania, *Ballast-Lamp Technology Update FAQ*, 2000.

4. Cost Units
5. Definitions

4.1.1 Organization of the Cost Data

There are five elements to the cost reporting of measures:

1. Measure equipment cost – the cost of the energy-efficient technology
2. Base equipment cost – the cost of the baseline efficiency technology
3. Incremental cost – the difference between the measure equipment cost and the base equipment cost
4. Labor cost – the installation cost of the measure including contractor overhead & profit
5. Installed cost – the sum of the measure equipment cost and the labor cost

A measure may include all of these cost elements or only a subset depending on the characteristics of the measure. The "application" and "cost basis" designators discussed below are used to determine which cost elements are reported for each measure.

The cost data are reported on the website both in the measure details and as a supplemental downloadable Excel workbook from the Supporting Documents. For many measures, the downloadable file contains additional detail in the cost data. In all cases the data are reported as discussed in the users guide.

In addition to the measure cost data, this report and the detail provided in the Cost Analysis Workbooks and results summaries includes detailed statistics and values on the cost data collected during the research phase of the project. These data include factors such as mean, minimum and maximum costs, standard deviation, precision and a variety of other statistical indicators related to the cost data. These data are useful for assessing the statistical validity of the cost data, and understanding the identifying extreme price points and the range of costs for a given measure.

4.1.2 Using the Cost Data

Measure Cost Data are available in three different forms. First, the data are available as part of the measure detail from the DEER website. These data are specific to each measure configuration on the website. Second, the data are available as a downloadable file under Supporting Documents from the website. These data contain more detail and measure variations than the pricing included in the measure detail. Finally, the measure cost data are provided in hard copy below as part of this report.

When interpreting the cost data, there are several important points to remember:

- **Discrete vs. representative prices.** Some of the measure cost values are discrete prices for a specific technology, while some of the cost values are representative prices for a range of product sizes and/or efficiencies. For example, incremental costs are provided for specific motor horsepowers for non-weather sensitive motor measures. On the other hand, the pricing for non-residential HVAC motor measures is representative of a range of horsepowers.
- **First cost only.** The pricing contained in the measure cost data is for first cost only and does not include O&M or life cycle cost data. For example, it is well known that compact

fluorescent lamps last 5-10 times longer than an incandescent lamp, thus saving on lamp replacement costs. No systematic attempt was made to capture these types of life cycle cost factors.

- **Scalability of cost units.** Each measure cost is associated with a "cost unit" which means that the cost data have been normalized to some common unit of measure. For example, motor cost data are normalized to a per horsepower value and air conditioning equipment is normalized to a per ton value. However, there are limits to the amount that a single normalized cost variable can be scaled to compute a price for units with a broad size range. In those instances where an analyst is examining a measure with a wide range of sizes, it is advisable to review the more detailed costs in the downloadable file to see if there are cost data for sizes that are more consistent with those being analyzed.

- **Refrigeration measure costs.** Incremental and installed costs for refrigeration measures can vary depending on the application and cost basis. The values reported in the measure details from the website are for one application and cost basis configuration. Users of the refrigeration cost data are advised to consult the supplemental downloadable cost file for additional variation in refrigeration measure cost information relative to different applications.

4.1.3 Application and Cost Basis

Application and cost basis are used to determine what kind of cost is reported. The two designators are linked and the application typically leads to the determination of the cost basis. Each of these designators is discussed below.

Application

The application designation is important because it helps to define what type of cost estimate is needed by identifying the types of projects where the measure is expected to be applied. There are three application codes that have been used to identify how the measure is expected to be applied:

- **Retrofit (RET)** – replacing a working system with a new technology or installing a technology that was not there before

- **Replace-on-burnout (ROB)** – replacing a technology at the end of its useful life

- **New construction (NEW)** – installing a technology in a new construction or major renovation project

In general, new construction (NEW) and replace-on-burnout (ROB) applications are associated with incremental costs because a customer's analysis of efficiency alternatives is typically made when an equipment purchase must be made anyway. Note that labor costs are usually a wash in such cases; that is, there is often no incremental labor cost associated with installing the high-efficiency option. For example, the labor cost for installing a high-efficiency fluorescent fixture in a new office building is no greater than for installing a standard-efficiency fixture. Similarly, most decisions to install high-efficiency HVAC equipment are made when a customer's existing system has reached the end of its useful life; thus, the replace-on-burnout costs are calculated on an incremental basis.

Cost Basis

The cost basis designator is used to define for each measure if the appropriate cost is the incremental or installed cost. The cost basis is determined by: a) the application (RET, ROB, or NEW); and b) whether it is displacing an existing technology, installed in the absence of an existing technology, or is an alternative to a competing technology.

The cost basis designation is used to define whether the cost is:

- **Incremental (INCR)** – the differential cost between a base technology and an energy-efficient technology

  Incremental cost (INCR) = Measure cost - base case cost

- **Installed (FULL)** – the full or installed cost of the measure including equipment, labor, overhead & profit (OH&P)

  Installed cost (FULL) = measure equipment cost + labor including OH&P

The application and cost basis are defined for each measure. As a general guide, retrofit (RET) applications typically means that the cost basis is FULL or installed cost. In these cases, a customer is replacing a working system with a new technology or is installing a technology that was not there before, thus bearing the full cost of the installation. Examples include replacing incandescent exit signs in existing buildings with LED, replacing incandescent lamps before the end of their useful life with CFLs, and installing ceiling insulation in a home that did not formerly have any insulation.

Replace-on-burnout (ROB) and new construction (NEW) applications typically have a cost basis of incremental cost (INCR). In these applications, a customer is choosing between a standard or less efficient technology and more efficient option. Incremental cost usually means incremental equipment cost with no labor cost; that is, there is no labor cost or it is the same in both cases thus a zero sum. Examples include installing a higher SEER AC unit at the end of its useful life, installing a premium-efficiency motor as opposed to a rewind at the time of burnout, and installing a higher efficiency chiller in a new construction application.

These are not hard and fast rules and there are exceptions. For example, occupancy sensors have been designated as retrofit and new construction applications, yet their cost bases are considered to be FULL or installed in both cases since there is a cost to the installation beyond that of normal on/off switching in both applications. Similarly, installing a heat recovery system is considered to be a retrofit and new construction application, yet the cost basis is defined as FULL or installed in both cases because it is an addition or option to a conventional system. Therefore, each measure needs to be examined individually with respect to application and cost basis.

FULL or installed cost typically uses the measure equipment cost of the technology, not an incremental cost. In most cases, there is no "incremental cost". For example, occupancy sensors are assumed to have a cost basis of FULL and use the cost of the sensor (measure equipment cost) plus the labor to install it. There is no incremental cost in this case because the baseline is the absence of a sensor or an existing conventional on/off switch that is being displaced.

The cost calculations follow the formulas for each cost basis designation as described in Exhibit 4-1.

Exhibit 4-1. Calculation of Costs According to Cost Basis

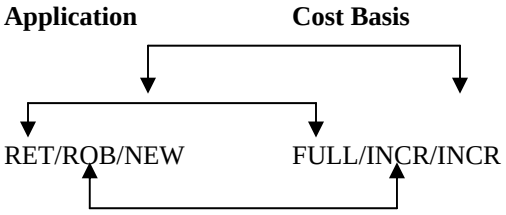
Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Cost	Labor Cost	Installed Cost
Incremental (INCR)	a	b	b – a		
Installed (FULL)		b		c	b + c

Most measures have more than one application code and many have all three. In these cases, the appropriate cost basis is identified for each measure application designator. For example, CFL replacements are considered to be applicable to all three designations. Examples of this method and how the cost data are organized are presented in Exhibit 4-2.

Exhibit 4-2. Examples of Measure Cost Calculations

Measure	Application	Cost Basis	Base Equip Cost	Measure Equip Cost	Incremental Cost	Labor Cost	Installed Cost
H.E. Packaged AC	RET/ROB/NEW	FULL/INCR/INCR - tons	a	b	b – a		
LED Exit Signs	RET	FULL - Sign		b		c	b + c
Integral CFLs	RET/ROB/NEW	FULL/INCR/INCR - lamp	a	b	b – a	c	b + c

It should be noted that the layout of the application and the cost basis designators is linked; the first designator in the application is related to the first designator in the cost basis. For measures with multiple applications and cost bases, the designators may be interpreted as follows:



The application and cost basis for each measure are identified in the measure cost data in Appendix B. Some measures have multiple cost bases reported, for example, when both the equipment cost and the installed cost are specified by the DEER update, and the measure may commonly be priced from multiple bases.

4.1.4 Cost Units

There are two types of units (e.g., square foot, tons, horsepower) in use in the database: savings units and cost units. In many cases the units for savings and the units for cost are the same. For some measures, however, the units differ. For example, for Energy Management Systems the normalization unit is per building for energy savings estimates, while the cost unit is per control point. The presentation of the data accounts for this by appending the cost units to the cost basis designators in the measure details, and indicating the cost units as a distinct field in the presentation of the data in the supplemental downloadable file. As a general guide, the cost units are presented as follows:

FULL – Cost Units

INCR/INCR – Cost Units

FULL/INCR/INCR – Cost Units

For example, high efficiency packaged air conditioning equipment is considered to be a RET/ROB/NEW application with a FULL/INCR/INCR cost basis. The cost units are per ton. The cost units will then be presented as shown in Exhibit 4-2 above.

The cost units used for reporting purposes for each measure are included in the measure cost data in Appendix C.

4.1.5 Data Definitions

For the purposes of both data collection and analysis, it was important to define key variables related to the cost research. Working definitions of key variables that cut across measures are summarized in Exhibit 4-3.

Exhibit 4-3. MCS Study Data Definitions

Name	Definition
Measure ID Number	The unique measure ID number for each measure as defined by Itron.
Application	Three application codes are used to identify how the measure is expected to be applied: ▪ Retrofit (RET) – replacing a working system prior to failure with a new technology or installing a technology that was not there before ▪ Replace-on-burnout (ROB) – replacing a technology at the end of its useful life ▪ New construction (NEW) – installing a technology in a new construction or major renovation project
Cost Value	Cost values are the estimated incremental or installed cost and are defined as what a program participant would pay to implement the measure. *Note: The costs provided in this report are for first costs only and do not include differences in ongoing operations and maintenance (O&M) costs.*
Cost Unit	The cost units of the values shown, e.g., SqFt, Ton, HP, etc. Measure cost units are indicated on the website in the cost basis field and separately identified for each measure in the downloadable supplemental cost data.
Cost Basis	Defines whether the cost is: ▪ Incremental (INCR) – the differential cost between a base technology and an energy-efficient technology. ▪ Installed (FULL) – the full or installed cost of the measure including equipment, labor, overhead & profit
Volume	Defines the volume or bulk purchase levels associated with the cost estimate. ▪ High – A quantity purchase that may result in a discount on the price. ▪ Low – A single or lowest volume tier purchase.
Cost Type	Defines whether the cost is: ▪ Wholesale ▪ Retail ▪ Manufacturer's Suggested Retail Price (MSRP)
Measure Equipment Cost	The cost of the energy efficient technology or equipment.
Base Equipment Cost	The cost of the less efficient base case technology or equipment.
Incremental Cost	The differential cost between the energy efficient and base case or less efficient alternative.
Labor Cost	The cost associated with labor to install the technology or measure.
Installed Cost	The installed cost of technology or measure including equipment and labor including contractor overhead and profit. The equipment cost component is typically the measure equipment cost.
Cost Observation	A single price point for an individual measure or measure configuration.
Number of Observations	The number of raw cost observations available for analysis. This count of observations is done at the individual technology or technology configuration level.
Sector	Identifies if the sector where the measure is applied is: ▪ Res – residential ▪ NonRes – non-residential
Delivery Channel	The market distribution channel by which a program participant would access or acquire the measure: ▪ Contractor ▪ Retail

4.2 Market Factors Affecting Measure Costs

This section provides observations on market factors effecting measure costs and cost trends for selected technologies. The market factors are intended to provide insight into variations in measures costs that

may be observed in field applications, such as the incremental cost of replacing the refrigerant coil when upgrading from a 10 SEER to a 13 SEER residential AC condenser.

Cost trends are based on comparisons to the 2001 DEER Update measure cost data. As with the 2001 measure cost data, the robustness of the comparisons of incremental costs over time is limited somewhat by the relatively small sample sizes available for many of the technologies, and also changes in measures definitions since the 2001 report. Based on the cost comparisons made to date, it is clear that some measure costs have changed significantly over time, such as integral CFL lamps. Trends in the costs of many other measures are less certain.

The following technologies are discussed below:

- Appliances
  - Refrigerators
  - Gas tank-type water heaters
- Building Shell
  - New commercial and residential windows
  - Window film
  - Residential insulation
  - Light colored roofs
- Lighting
  - Integral CFL Lamps
  - Fluorescent Ballasts
  - Lighting Controls
  - Skylights
- Residential HVAC
  - Residential AC

4.2.1 Appliances

Refrigerators

Compared to the 2001 DEER Update measure cost data, the incremental costs for all high-efficiency residential refrigerators (all configurations) remained fairly constant at $218 / unit, though significant variations were noted depending upon freezer configuration. In general, refrigerators with top mounted and side-by-side freezers tend to be the most commonly available. Those with side-by-side freezers tend toward the larger size capacities making price comparisons in the smaller size ranges a challenge. Similarly, refrigerators with bottom mounted freezers are less commonly available but generally more energy efficient complicating the pricing of less efficient baseline models. In general, units with side mounted freezers with 'through-the-door ice' tended to be the most common configuration offered by manufacturers. Refrigerators with side mounted freezers without through the door ice dispensers are specialty item and the incremental costs for this configuration are high due to limited manufacturer availability.

Gas tank-type water heaters

Although the measure definition lists the efficient case as having an energy factor of 0.64, in reality there were very few units on the market that met this criteria. For 30 and 65 gallon sizes, the highest EF listed on the ACEEE site is 0.62 energy factor. For the 40 and 50 gallon sizes, a 0.63 energy factor could be priced. The average price for an efficient gas hot water heater in the 2005 DEER is $107, for all

configurations except 50 gallon units for which pricing data was limited. This indicates that prices may have increased from the 2001 incremental costs range of between $50 and $100 per unit.

4.2.2 Building Shell

Insulation

Insulation specifications were determined by current building code requirements for newly constructed buildings. Insulation requirements (R-value) are given for four representative climate zones. However, the same R-Value is specified for three out of the four climate zones. In general, the cost of the insulation material is the same regardless of application so incremental material costs tended to be consistent amongst the various installation configurations (ceiling, floor, etc). The labor costs varied, however, as the application changes between floor, wall or ceiling installations. The main variable in determining the cost of the insulation is the R value, whether or not the material is faced and the thickness of the batts. For one of the most common insulation configurations, R-30 ceiling installations, prices tended to be consistent with the 2001 DEER study, showing a slight decrease form $0.79 to $0.76 per square foot. Differences in measure definitions did not allow for a meaningful comparison with other 2001 insulation cost configurations.

Light Colored Roof

This measure is based on a roof absorptivity of 0.7. To achieve this level, a variety of roofing materials could be used which vary substantially in labor and expense. For the purpose of this analysis, only costs of elastomeric roof coatings were collected as it is the most common type of cool roof product in the market. For future DEER updates, it may be advisable to increase the number of cool roof measures to include a broader sample of the various types of roofing materials available.

Windows

The residential windows measures were defined in the DEER study by U-Factor (UF) and solar heat gain coefficient (SHGC). However, in the market, residential windows are characterized beyond performance specifications. Variables that influence cost include framing material, size, glazing type and number of panes, and construction (i.e. double hung, single hung, casement). The majority of windows sold are constructed in vinyl framing materials. Very few distributors offered metal windows. Wood and composite were also less prevalent. The base specification for the study was a lowest performing clear double pane window allowed by the building code. Costs models for the residential windows were developed for various configurations based on finished product delivered and installed, and performance characteristics such as the U-Factor and SHGC. The average cost of all double pane windows (regardless of frame type with U-Factor between 0.25 and 0.50 and SHGC between 0.22 and 0.65) for the 2005 DEER update was $2.50 per square foot. This is relatively consistent with the 2001 average value of approximately $2.60 for coated low E^2 coated windows.

Commercial glazing systems are often site-built and the most common frame type is metal. Double pane glass is the most commonly used. Many different special options are available, such as grids, frames, tints and coatings, and some of these options tended to influence price to a greater degree than SHGC and UF.

Window Films

Window films were collected based on three measure descriptions: standard film, reflective film and spectrally selective film. For the residential market, standard film was still the least costly and the most

widely available. Spectrally selective window film was considered to be a high-end product with an increasing market share due to its greater ability to lower the solar heat gain co-efficient without affecting the aesthetic of the window. Reflective films are more likely to be used in commercial buildings and are thus a more mass produced film than spectrally selective films. Costs for standard window film showed some decrease from the 2001 to 2005. Residential projects with spectrally selective or reflective window film was approximately $2.41 per square foot (installed) compared $3.30 per square in the 2001 DEER update.

4.2.3 Lighting

Fluorescent Ballasts

The cost for electronic ballasts for the T-8/EB system has stayed fairly constant since the 2001 update. The 2005 study indicates that the average cost for an electronic ballast ranges from $19 to $23, depending on purchase volume, while the previous study indicates an average price of approximately $20 per ballast.

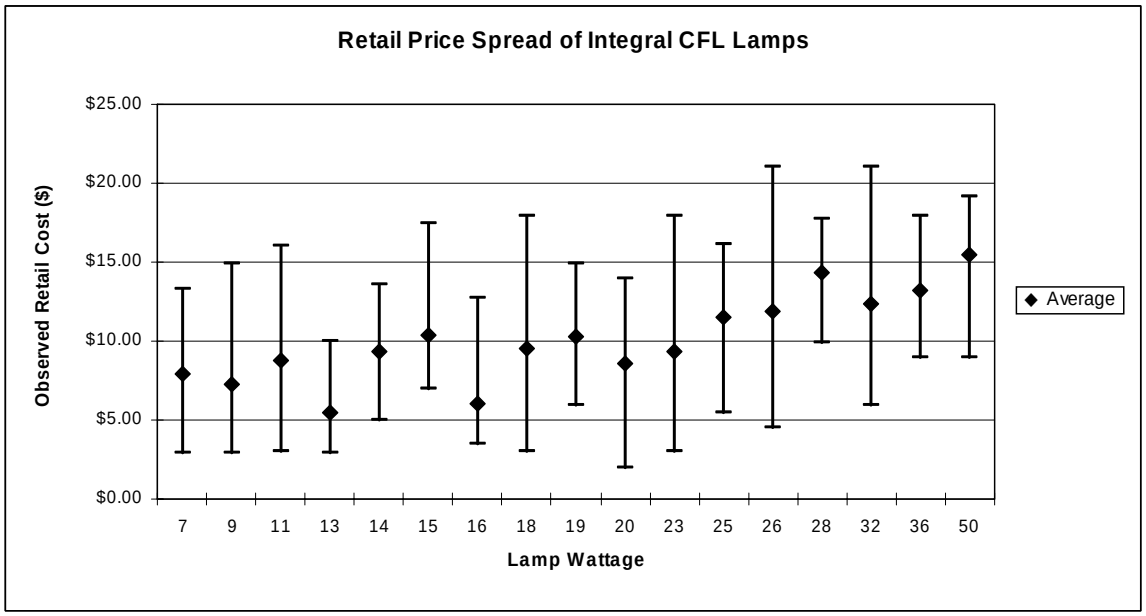
Integral CFL Lamps

The price of integral CFL lamps continues to decrease, though the range of prices available for any single lamp configuration remains quite broad. Exhibit 4-4 shows the spread between retail prices observed for various lamp wattages. The narrowest price spread existed for 13 Watt lamps, while 26Watt units had the largest spread between high and low price. This spread may be due to several factors

- The large number of retailers who offer CFL lamps online
- The large number of manufacturers in the market
- The potential for variations in lamp quality among various producers.

While a full market characterization study was beyond the scope of this report, it was observed that name brand products frequently commanded a higher price, and that quality issues do persist among some manufacturers. It is also likely that the range of products offered will narrow as some wattages become standard and others lose market share. For example, the market may not support 7 different wattages in the 13 to 20 watt range.

Exhibit 4-4: Retail price spread for integral CFL lamps



On average the price of integral CFL lamps has decreased by approximately 30% since the 2001 DEER update as shown in Exhibit 4-5. This decrease was consistent among all wattages.

Exhibit 4-5: Retail price trends for integral CFL lamps

Wattage	Volume	2001 DEER	2005* DEER	Average price decrease
13 W and less	High	$5.90	$4.17	29.3%
	Low	$6.90	$4.98	27.8%
14 W to 26 W	High	$8.80	$5.81	34.0%
	Low	$10.00	$7.16	28.4%
* Average price for 9 wattages within this range				

Lighting Controls

Lighting controls can be complex and there are great differences in systems configurations. These variations include differences in each manufacturer's fundamental control technology and communication interface. The pricing model developed for this study used the following "daylight controller type" variables to establish consistent pricing metrics among various technologies:

- Fixture integrated, i.e. the ballast has a photocell built in to it, which either protrudes from the bottom of a suspended fixture, or from the ceiling next to a recessed fixture
- Standalone controller, i.e. a controller placed in the ceiling void that sends out one to three separate 1-10V dimming signals, each of which can control up to 50 fixtures
- Central controller, i.e. a controller placed in a circuit panel that takes its input from one or more photocells (one of which may be outside the building), and separately controls many channels of dimming fixtures either with 1-10V analogue of a digital signal

- Addressable ballasts, i.e. a DALI-like system in which a digital bus allows each ballast to be separately addressed and controlled by any combination of input devices including photocells.

In addition to the daylight controller type, four typical buildings were used so that all the manufacturers' quotes would be comparable. The cost for providing a lighting control system varies greatly between one building type and another. This is typically because the controllers are capable of controlling many fixtures in a large building, but in buildings with small zones each controller is only connected to a few fixtures, thus increasing its per-kW cost. Small offices are significantly more costly than other building types of comparable physical size due to the diversity of space types.

Skylights

The largest unknown in the cost of skylights is the cost of modifications to the roof of the building to accommodate the skylight curbs or purlines, and the cost of finishing the roofing material around the skylight. These costs were not included in this research effort because they could not be quantified; the cost is highly dependent on what type of roof is used, and how it's designed. The cost of finishing the roof depends on whether or not a self-flashing skylight is used, and several manufacturers said these did not differ in cost from regular skylights.

Manufacturers indicated that the labor cost for installing the skylights themselves is very low, since they are simple to attach to the curbs. Two manufacturers (Bristolite and Sunoptics) account for a very large proportion of the market, and also for the highest-performing products.

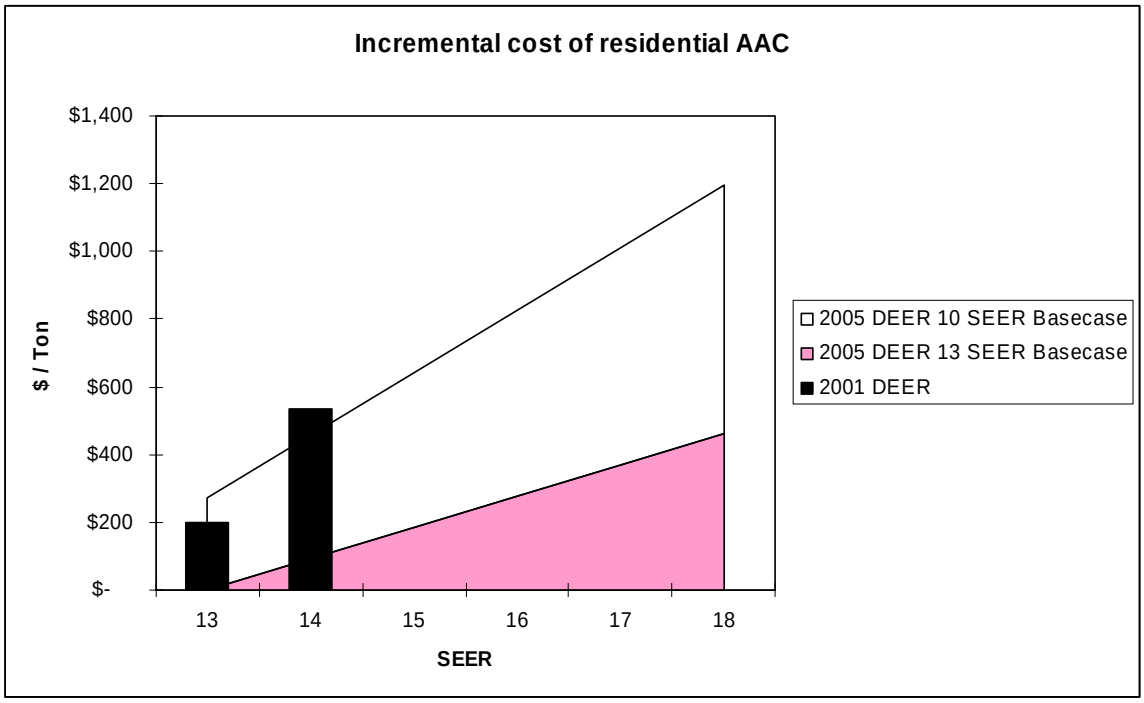
4.2.4 Residential HVAC

Residential Air Conditioning Equipment

Cost data was gathered for a range of residential air-cooled split AC systems based on SEER, tonnage, and baseline efficiency variations. Baseline efficiency variations included both 10 SEER and13 SEER costs baselines. Exhibit 4-6 shows that the incremental price (above 10 SEER baseline) for this equipment ranges from $270 per ton for a 13 SEER unit to $730 per ton for an 18 SEER system. The incremental equipment costs in upgrading from a 10 SEER system to a 13 or higher SEER system include the cost of replacing the condenser coil. Incremental costs in increasing from a 13 SEER baseline are smaller because it is assumed that the refrigerant coil will not be replaced.

Also shown in Exhibit 4-6 are the incremental values for 13 and 14 SEER equipment provided in the 2001 DEER study. The higher incremental cost of the 13 SEER unit shown in the 2005 MCS may be due to the inclusion of the AC coil as part of the equipment costs. In general, this comparison would indicate that the cost of residential AC systems is staying relatively constant for 13 SEER systems, but may be dropping as the system efficiency increases.

Exhibit 4-6: Incremental costs of residential AC equipment



4.3 Measure Cost Data

A print listing of the costs for all measures included in this submittal is provided in Appendix B for Non-Weather Sensitive, Residential Weather Sensitive, Non-Residential Weather Sensitive and Refrigeration measures. Appendix C contains basic statistical information on each measure including mean, minimum, maximum, precision and R-square for measures employing regression-based analytic methods. Measure cost data are included in the detailed measure summaries on the DEER website and in a downloadable supplemental file in Microsoft Excel workbook format under Supporting Documents directly from the DEER website. The cost data in the supplemental downloadable file contains additional details and measure variations that the data provided in the measure details. The cost data provided in Appendix B includes the following descriptors and cost values:

- Measure ID number
- Measure category
- Measure name
- Measure description
- Base description
- Delivery channel
- Application
- Whether the technology is Energy Star rated or not
- Purchase volume related to the cost value
- Cost basis
- Base equipment cost

- Measure equipment cost
- Incremental cost
- Labor cost
- Installed cost
- Cost units

APPENDIX A: MEASURE TECHNICAL SPECIFICATIONS FOR COST RESEARCH

Non-Residential Weather Sensitive Measure Technical Specifications

Residential Weather Sensitive Measure Technical Specifications

Non-Residential and Residential Non-Weather Sensitive Measure Technical Specifications

Refrigeration Measure Technical Specifications

Appendix A. Non-Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7	Tech Spec 8
D03-003	Occupancy Sensor Pack-200 SF	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-004	Occupancy Sensor Pack-1000 SF	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-005	DayLtg Controls, Side Ltg, Cont. Ctrl	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-006	DayLtg Controls, Side Ltg, 2-step Ctrl	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-007	DayLtg Controls, Top Ltg, Cont. Ctrl	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-008	DayLtg Controls, Top Ltg, 1-step Ctrl	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-009	DayLtg Controls, Top Ltg, 2-step Ctrl	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-010	Timeclock for Lighting	Interface type	controller type	Ballast type	Occupancy sensor type	Building type			
D03-013	Ceiling/Roof Insulation	Size	R Value	Batts or Blown	Location	faced or unfaced			
D03-014	Tank Insulation-Fiber Blanket	R-value	Gal						
D03-016	Light Colored Roof	Coverage Area	Color	Solar Reflectance	Thermal Emmittance				
D03-017	Low SHGC Windows -15% - North	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-018	Low SHGC Windows -20% - East	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-019	Low SHGC Windows -20% - South	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-020	Low SHGC Windows -20% - West	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-021	Low SHGC Windows -20% - North	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-022	Low SHGC Windows -30% - East	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-023	Low SHGC Windows -30% - South	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-024	Low SHGC Windows -30% - West	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-025	Hi Perf. Glass, PI=1.15, Side Ltg, Cont. Ctrl	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-026	Hi Perf. Glass, PI=1.26, Side Ltg, Cont. Ctrl	Square	SHGC	U Factor	T-Vis	Frame	# of	construction	Coatings

Appendix A. Non-Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7	Tech Spec 8
		Feet				Material	Panes		
D03-027	Hi Perf. Glass, PI=1.38, Side Ltg, Cont. Ctrl	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-028	Hi Perf. Glass, PI=1.15, Side Ltg, 2-Step Ctrl	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-029	Hi Perf. Glass, PI=1.26, Side Ltg, 2-Step Ctrl	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-030	Hi Perf. Glass, PI=1.38, Side Ltg, 2-Step Ctrl	Square Feet	SHGC	U Factor	T-Vis	Frame Material	# of Panes	construction	Coatings
D03-031	Hi Perf. Glass, PI=0.81, Top Ltg, Cont. Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-032	Hi Perf. Glass, PI=0.92, Top Ltg, Cont. Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-033	Hi Perf. Glass, PI=1.03, Top Ltg, Cont. Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-034	Hi Perf. Glass, PI=0.81, Top Ltg, 1-Step Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-035	Hi Perf. Glass, PI=0.92, Top Ltg, 1-Step Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-036	Hi Perf. Glass, PI=1.03, Top Ltg, 1-Step Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-037	Hi Perf. Glass, PI=0.81, Top Ltg, 2-Step Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-038	Hi Perf. Glass, PI=0.92, Top Ltg, 2-Step Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-039	Hi Perf. Glass, PI=1.03, Top Ltg, 2-Step Ctrl	Square Feet	SHGC	Tvis	U Factor	Performance Index			
D03-040	High Efficiency Centrifugal Chillers < 150 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-041	High Efficiency Air-Cooled Recip Packaged Chillers	tons	full-load kW/ton	IPLV kW/ton					
D03-042	High Efficiency VSD Centrifugal Chillers < 150 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-043	Gas Absorption Chiller	tons	full-load kW/ton	IPLV kW/ton					
D03-044	Chilled Water Reset								
D03-045	Hot Water Reset								
D03-046	Variable Flow Chilled Water Loop	GPM							
D03-047	VSD Chilled Water Loop Pump	HP							

Appendix A. Non-Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7	Tech Spec 8
D03-048	Variable Flow Hot Water Loop	GPM							
D03-049	VSD Hot Water Loop Pump	HP							
D03-050	Variable Air Volume Box	CFM							
D03-051	VSD Supply Fan Motors	HP							
D03-052	Fan Powered Mixing Boxes	CFM							
D03-053	Evap Cool Indirect - Central System	CFM	EER	Pressure drop	System Effectiveness				
D03-054	Evap Cool Indirect - Packaged Sys	CFM	EER	Pressure drop	System Effectiveness				
D03-055	Reducing Overventilation	Size							
D03-056	Air To Air Heat Exchanger	CFM	Efficiency						
D03-057	Rotary Heat Recovery	CFM	Efficiency						
D03-058	Economizer - Packaged System	tons	CFM						
D03-060	Economizer Maintenance	tons							
D03-061	Clean Condenser Coils	tons							
D03-062	Cooling Tower for Packaged System	CT type	tons	Total fan HP					
D03-063	Two-Speed Cooling Tower Fans	CT type	tons	Total fan HP					
D03-064	VSD Cooling Tower Fans	CT type	tons	Total Fan HP					
D03-065	Efficient Gas Furnace	kBtuh	AFUE						
D03-066	High Efficiency Large Boilers	kBtuh	Eff	HW or Steam					
D03-067	High Efficiency Small HW Boilers	kBtuh	Eff	HW or Steam					
D03-068	High Efficiency Small Steam Boilers	kBtuh	Eff	HW or Steam					
D03-069	Efficient Water Source Heat Pump	Tons	EER	Cond					
D03-070	Hydronic Heat Pump Var Flow Valve	HP							
D03-071	Time Clocks (heating/cooling)	Volts	Amps	No. of Poles	No. Channels				
D03-072	Energy Management System	Functions	No. Points	Zone Per Points	Area Per Zone				
D03-073	Setback Programmable Thermostats	---							
D03-075	Duct Insulation Material	R-value	Square Feet	Thickness (inch)					
D03-076	H.E. Air-Cooled Split A/C < 65k (single phase)	Tons	SEER	EER					

Appendix A. Non-Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7	Tech Spec 8
D03-077	H.E. Air-Cooled Split HP < 65k (single phase)	Tons	SEER	EER					
D03-078	H.E. Air-Cooled Package A/C < 65k (single phase)	Tons	SEER	EER					
D03-079	H.E. Air-Cooled Split/Package A/C 65k-134k	Tons	EER	AFUE					
D03-080	H.E. Air-Cooled Package HP < 65k (single phase)	Tons	SEER	EER					
D03-081	H.E. Air-Cooled Split/Package HP 65k-134k	Tons	EER						
D03-082	H.E. Evap/Water-Cooled Pkg A/C < 65k	Tons	EER	Cond					
D03-083	H.E. Evap/Water-Cooled Pkg A/C >=65k	Tons	EER	Cond					
D03-084	H.E. Package Terminal A/C < 7k	Type	Btuh	EER					
D03-085	H.E. Package Terminal HP < 7k	Type	Btuh	EER					
D03-086	Efficient HVAC Motors - Supply Fans	Enclosure	HP	RPM	Eff	Voltage			
D03-087	Efficient HVAC Motors - Return Fans	Enclosure	HP	RPM	Eff	Voltage			
D03-088	Efficient HVAC Motors - Clg Tower Fans	Enclosure	HP	RPM	Eff	Voltage			
D03-089	Effic. Motors - Chilled Water Loop Pumps	Enclosure	HP	RPM	Eff	Voltage			
D03-090	Effic. Motors - Hot Water Loop Pumps	Enclosure	HP	RPM	Eff	Voltage			
D03-091	Effic. Motors - Cond. Water Loop Pumps	Enclosure	HP	RPM	Eff	Voltage			
D03-092	High Efficiency Gas Water Heater	Gal.	Eff	Btuh					
D03-093	Gas Tankless Water Heating	Eff	Btuh/kW	Eff					
D03-094	Point of Use Water Heating	KW							
D03-095	Circulation Pump Timeclock Retrofit	---							
D03-096	High Eff Large Size Gas Water Heater	kBtuh	Eff	HW or Steam					
D03-097	High Eff Med Size Gas Water Heater	kBtuh	Eff	HW or Steam					
D03-098	Water Side Economizer	tons	GPM						
D03-099	H.E. Package Terminal A/C 7k-15k	Type	Btu	SEER	EER	AFUE			
D03-100	H.E. Package Terminal A/C > 15k	Type	Btu	SEER	EER	AFUE			
D03-101	H.E. Package Terminal HP 7k-15k	Type	Btu	SEER	EER	AFUE			
D03-102	H.E. Package Terminal HP > 15k	Type	Btu	SEER	EER	AFUE			
D03-103	H.E. Air-Cooled Split/Package A/C 135-239k	Tons	SEER	EER	AFUE				
D03-104	H.E. Air-Cooled Split/Package A/C 240-759k	Tons	SEER	EER	AFUE				
D03-105	H.E. Air-Cooled Split/Package A/C >= 760k	Tons	SEER	EER	AFUE				
D03-106	H.E. Air-Cooled Split/Package HP 135-239k	Tons	SEER	EER					
D03-107	H.E. Air-Cooled Split/Package HP 240-759k	Tons	SEER	EER					

Appendix A. Non-Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7	Tech Spec 8
D03-108	H.E. Air-Cooled Split A/C < 65k (3 phase before 2008)	Type	Tons	SEER					
D03-109	H.E. Air-Cooled Package A/C < 65k (12 SEER, 3 phase before 2008)	Tons	SEER	EER	AFUE				
D03-110	H.E. Air-Cooled Package A/C < 65k (13 SEER, 3 phase before 2008)	Tons	SEER	EER	AFUE				
D03-111	H.E. Air-Cooled Split HP < 65k (3 phase before 2008)	Phase	Tons	SEER					
D03-112	H.E. Air-Cooled Package HP < 65k (12 SEER, 3 phase before 2008)	Tons	SEER	EER					
D03-113	H.E. Air-Cooled Package HP < 65k (13 SEER, 3 phase before 2008)	Tons	SEER	EER					
D03-114	High Efficiency Air-Cooled Screw Packaged Chillers	tons	full-load kW/ton	IPLV kW/ton					
D03-115	High Efficiency Water-Cooled Recip Chillers	tons	full-load kW/ton	IPLV kW/ton					
D03-116	High Efficiency Centrifugal Chillers 150-299 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-117	High Efficiency Centrifugal Chillers >= 300 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-118	High Efficiency Screw Chillers < 150 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-119	High Efficiency Screw Chillers 150-299 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-120	High Efficiency Screw Chillers >= 300 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-121	High Efficiency VSD Centrifugal Chillers 150-299 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-122	High Efficiency VSD Centrifugal Chillers >= 300 Tons	tons	full-load kW/ton	IPLV kW/ton					
D03-123	Floor Insulation	---							
D03-124	H.E. Air-Cooled Split/Package HP >= 760k	Tons	SEER	EER					

Appendix A. Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7
D03-401	Programmable Thermostat	-	-	-	-	-		
D03-402	13 SEER(11.09 EER) Split System Air Conditioner	type	tons	SEER	EER			
D03-403	14 SEER(12.15 EER) Split-System Air Conditioner	type	tons	SEER	EER			
D03-404	15 SEER(12.72 EER) Split-System Air Conditioner	type	tons	SEER	EER			
D03-463	16 SEER (11.61 EER) Split System Air Conditioner	type	tons	SEER	EER			
D03-464	17 SEER (12.28 EER) Split-System Air Conditioner	type	tons	SEER	EER			
D03-465	18 SEER (13.37 EER) Split-System Air Conditioner	type	tons	SEER	EER			
D03-405	Direct Evaporative Cooler	Rated CFM	HP	Pad Size				
D03-406	Indirect Evaporative Cooler	Rated CFM	HP	Pad Size				
D03-407	Direct-Indirect Evaporative Cooler	Rated CFM	HP	Pad Size				
D03-408	Refrigerant charge - typical charge adjustment	tons						
D03-409	Refrigerant charge - high charge adjustment	tons						
D03-410	Condensing 90 AFUE(1.11 HIR) Furnace	kBtuh	AFUE					
D03-411	Condensing 92 AFUE(1.08 HIR) Furnace	kBtuh	AFUE					
D03-412	Condensing 94 AFUE(1.06 HIR) Furnace	kBtuh	AFUE					
D03-413	Condensing 96 AFUE(1.03 HIR) Furnace	kBtuh	AFUE					
D03-414	13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	type	tons	SEER	EER			
D03-415	14 SEER(12.19 EER)/8.6 HSPF(3.52 COP) A/C Heat Pump	type	tons	SEER	EER			
D03-416	15 SEER(12.70 EER)/8.8 HSPF(3.74 COP) A/C Heat Pump	type	tons	SEER	EER			
D03-466	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	type	tons	SEER	EER			
D03-467	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	type	tons	SEER	EER			
D03-417	18 SEER(12.8 EER)/9.2 HSPF(3.66 COP) A/C Heat Pump	type	tons	SEER	EER			
D03-418	Duct Sealing (Total Leakage Reduction 28% of AHU flow)	tons						
D03-420	Ceiling R-0 to R-30 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-421	Ceiling R-0 to R-38 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-422	R-30 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-423	R-38 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-424	R-49 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		

Appendix A. Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7
D03-426	Floor R-0 to R-19 Insulation Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-427	Floor R-0 to R-30 Insulation Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-428	Floor R-19 to R-30 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-429	Wall 2x4 R-15 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-430	Wall 2x6 R-19 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-431	Wall 2x6 R-21 Insulation-Batts	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-435	Wall 2x4 R-13 Batts + R-5 Rigid	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-436	Wall 2x6 R-19 Batts + R-5 Rigid	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-437	Wall 2x6 R-21 Batts + R-5 Rigid	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-438	Wall Blow-In R-0 to R-13 Insulation	Square Feet	R Value	Batts or Blown	Location	faced or unfaced		
D03-441	Whole House Fans	CFM	Amps	Watts	Drive			
D03-442	Default Window With Sunscreen	Width	Length					
D03-443	Single Pane Clear Glass With Reflective Film	Shading Coefficient	SHGC	Solar Energy Rejected	UV Transmission			
D03-444	Single Pane Clear Glass With Spectrally Selective Film	Shading Coefficient	SHGC	Solar Energy Rejected	UV Transmission			
D03-445	Single Pane Clear Glass With Standard Film	Shading Coefficient	SHGC	Solar Energy Rejected	UV Transmission			
D03-446	U-0.50/SHGC-0.65 (clear) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-447	U-0.40/SHGC-0.65 (clear) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-448	U-0.35/SHGC-0.55 (clear) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-449	U-0.25/SHGC-0.35 (clear) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction

Appendix A. Residential Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5	Tech Spec 6	Tech Spec 7
D03-450	U-0.50/SHGC-0.40 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-451	U-0.40/SHGC-0.40 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-452	U-0.35/SHGC-0.32 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-453	U-0.25/SHGC-0.22 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-454	U-0.50 / SHGC-0.40 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-455	U-0.40 / SHGC-0.40 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-456	U-0.35 / SHGC-0.32 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-457	U-0.25 / SHGC-0.22 (tint) Window	Square Feet	SHGC	U Factor	Glass Type	Frame Material	Number of Panes	Construction
D03-458	Duct Sealing (Total Leakage Reduction 12% of AHU flow)	tons						
D03-459	Refrigerant charge - typical charge adjustment & duct sealing	tons						
D03-460	Refrigerant charge - high charge adjustment & duct sealing	tons						

Appendix A. Non-Residential and Residential Non-Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5
D03-801	13 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-802	13 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-803	14 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-804	15 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-805	16 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-806	18 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-807	18 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-808	19 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-809	20 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-810	23 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-811	25 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-812	25 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-813	26 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-814	26 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-815	28 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-816	30 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-817	36 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-818	40 Watt Integral CFL	Watts	Type/ Life	Lumens		
D03-819	13 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-820	13 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-821	14 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-822	15 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-823	16 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-824	18 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-825	18 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-826	19 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-827	20 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-828	23 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-829	25 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-830	25 Watt Modular CFL	Watts	Type/ Life	Lumens		

Appendix A. Non-Residential and Residential Non-Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5
D03-831	26 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-832	26 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-833	28 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-834	30 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-835	40 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-836	55 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-837	65 Watt Modular CFL	Watts	Type/ Life	Lumens		
D03-838	20W CFL Table Lamp	Watts	Type/ Life	Lumens		
D03-839	25W CFL Table Lamp	Watts	Type/ Life	Lumens		
D03-840	32W CFL Table Lamp	Watts	Type/ Life	Lumens		
D03-841	50W CFL Table Lamp	Watts	Type/ Life	Lumens		
D03-842	55W CFL Torchiere	Watts				
D03-843	70W CFL Torchiere (two bulbs)	Watts				
D03-844	50W Metal Halide	Watts				
D03-845	75W Metal Halide	Watts				
D03-846	100W Metal Halide	Watts				
D03-847	175W PS Metal Halide	Watts				
D03-848	175W PS Metal Halide	Watts				
D03-849	250W PS Metal Halide	Watts				
D03-850	200W HPS	Watts				
D03-851	180W LPS	Watts				
D03-852	Premium T8 El Ballast	No. lamps	Ballast type	Lamp type		
D03-853	T8 32W Dimming El Ballast	No. lamps	Ballast type	Lamp type		
D03-854	De-lamp from 4', 4 lamp/fixture	---				
D03-855	De-lamp from 8', 4 lamp/fixture	---				
D03-856	Occ-Sensor - Wall box	Sensor type	Fixtures controlled			
D03-857	Occ-Sensor - Plug loads	Sensor type	Load controlled			
D03-858	Timeclock	Volts	Amps	No. of poles		
D03-859	Photocell	Fixtures controlled				
D03-860	LED Exit Sign (New)	Sign type	Watts			
D03-861	LED Exit Sign Retrofit Kit	Sign type	Watts			
D03-862	Electroluminescent Exit Sign (New)	Sign type	Watts			

Appendix A. Non-Residential and Residential Non-Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5
D03-863	Electroluminescent Exit Sign Retrofit Kit	Sign type	Watts			
D03-901	High Efficiency Copier	Size (CPM)	Energy Star?	Color?	Fax?	Printer?
D03-902	High Efficiency Copier	Size (CPM)	Energy Star?	Color?	Fax?	Printer?
D03-903	High Efficiency Copier	Size (CPM)	Energy Star?	Color?	Fax?	Printer?
D03-904	High Efficiency Gas Fryer	Size	Btuh/kW			
D03-905	High Efficiency Gas Griddle	Size	Btuh/kW			
D03-906	High Efficiency Electric Fryer	Size	Btuh/kW			
D03-907	Hot Food Holding Cabinet	Size	Btuh/kW			
D03-908	Connectionless Steamer	Size	Btuh/kW			
D03-909	Point of Use Water Heat	Gal.	Eff	Btuh		
D03-910	Circulation Pump Timeclock					
D03-911	High Eff. Water Heater, EF=0.64	Gal.	Eff	Btuh		
D03-912	Vending Machine Controller	Control type				
D03-913	Vending Machine Controller	Control type				
D03-914	Premium Efficiency Motor - 1 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-915	Premium Efficiency Motor - 5 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-916	Premium Efficiency Motor - 10 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-917	Premium Efficiency Motor - 15 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-918	Premium Efficiency Motor - 20 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-919	Premium Efficiency Motor - 25 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-920	Premium Efficiency Motor - 50 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-921	Premium Efficiency Motor - 100 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-922	Premium Efficiency Motor - 150 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-923	Premium Efficiency Motor - 200 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-924	Premium Efficiency Motor - 1 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-925	Premium Efficiency Motor - 5 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-926	Premium Efficiency Motor - 10 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-927	Premium Efficiency Motor - 15 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-928	Premium Efficiency Motor - 20 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-929	Premium Efficiency Motor - 25 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-930	Premium Efficiency Motor - 50 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-931	Premium Efficiency Motor - 100 HP	Enclosure	HP	RPM	Eff.	Voltage

Appendix A. Non-Residential and Residential Non-Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5
D03-932	Premium Efficiency Motor - 150 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-933	Premium Efficiency Motor - 200 HP	Enclosure	HP	RPM	Eff.	Voltage
D03-934	Faucet Aerators	GPM				
D03-935	Heat Pump Water Heater	Gal.	Eff			
D03-936	Pipe Wrap	Linear Feet	R-value			
D03-937	Low Flow Showerhead	GPM				
D03-938	High Efficiency Water Heater	Gal.	Eff	Btuh		
D03-939	High Efficiency Water Heater	Gal.	Eff	kW		
D03-940	Point of Use Water Heat	Gal.	Eff	Btuh		
D03-941	Efficient Clothes Dryer	Cubic Feet	kWh/year	Moist, sens	Volts	
D03-942	Efficient Clothes Dryer	Cubic Feet	kWh/year	Moist, sens	Volts	
D03-943	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-944	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-945	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-946	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-947	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-948	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-949	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-950	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-951	Energy Star Clothes Washer	Cubic Feet	MEF	Volts		
D03-952	Energy Star Dish Washer	EF				
D03-953	Energy Star Dish Washer	EF				
D03-954	Refrigerator: Bottom Mount Freezer without through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-955	Refrigerator: Bottom Mount Freezer without through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-956	Refrigerator: Top Mount Freezer without through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-957	Refrigerator: Top Mount Freezer without through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-958	Refrigerator: Top Mount Freezer without through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-959	Refrigerator: Side Mount Freezer without through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-960	Refrigerator: Side Mount Freezer without	Cubic Feet	Freezer loc.	w/wo ice		

Appendix A. Non-Residential and Residential Non-Weather Sensitive Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1	Tech Spec 2	Tech Spec 3	Tech Spec 4	Tech Spec 5
	through-the-door ice					
D03-961	Refrigerator: Side Mount Freezer with through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-962	Refrigerator: Side Mount Freezer with through-the-door ice	Cubic Feet	Freezer loc.	w/wo ice		
D03-964	Refrigerator Recycling	---				
D03-965	Freezer Recycling	---				
D03-966	Efficient Single Speed Pool Pump	HP	Speed			
D03-967	Efficient Two Speed Pool Pump	HP	Speed			

Appendix A. Refrigeration Measure Technical Specifications for Cost Research

Measure ID	Measure Name	Tech Spec 1
D03-201	Retrocommissioning	tons
D03-202	High Efficiency Walk-in Fan Motors	type
D03-203	High Efficiency Display Fan Motors	type
D03-204	Heat Recovery from Central Refrigeration System	square feet
D03-205	Night Covers for Display Cases (medium temp)	linear feet
D03-206	Medium Temp Glass Doors (open display cases)	linear feet
D03-207	New Medium Temp Refrig Display Case with Doors	linear feet
D03-208	Auto-Closers on Main Cooler Doors	---
D03-209	Auto-Closers on Main Freezer Doors	---
D03-210	Evaporator Fan Control on Walk-in Coolers & Freezers	---
D03-211	Air-Cooled Condenser to Evaporative Condenser	tons
D03-212	Energy Efficient Air-Cooled Condenser	tons
D03-213	Energy Efficient Evap-Cooled Condenser	tons
D03-214	Multiplex System with Mech Subcooling (air-cooled)	tons
D03-215	Multiplex System with Mech Subcooling (evap-cooled)	tons
D03-216	Multiplex System with Mech Subcooling (high eff air-cooled)	tons
D03-217	Multiplex System with Mech Subcooling (high eff evap-cooled)	tons
D03-218	Low Temperature Mechanical Subcooling	tons
D03-219	Low and Medium Temp Mechanical Subcooling	tons
D03-220	Floating Suction Pressure	tons
D03-221	Floating Head Pressure, Fixed Setpoint (air-cooled)	tons
D03-222	Floating Head Pressure, Fixed Setpoint (evap-cooled)	tons
D03-223	Floating Head Pressure, Variable Setpoint (air-cooled)	tons
D03-224	Floating Head Pressure, Variable Setpoint (evap-cooled)	tons
D03-225	Floating Head Pressure, Variable Setpt & Speed (air-cooled)	tons
D03-226	Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	tons
D03-227	Display Case Lighting Control	linear feet
D03-228	Zero Heat Reach-in Glass Doors	---
D03-301	Retrocommissioning	tons
D03-302	Oversized Evaporative Condenser	tons
D03-303	Oversized Evaporative Condenser & Floating Head	tons
D03-304	Variable-Speed Compressors	tons
D03-305	Low-Temperature Subcooling	tons
D03-306	Floating Suction Pressure	tons
D03-307	Floating Head Pressure, Fixed Setpoint (evap-cooled)	tons
D03-308	Floating Head Pressure, Variable Setpoint (evap-cooled)	tons
D03-309	Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	tons

APPENDIX B: MEASURE COST DATA

Appendix B: Measure Cost Data

APPLIANCES

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-943	Appliances	Energy Star Clothes Washer - 1.5 cf	CEE Tier 1: MEF=1.42, 1.5 cf Capacity	clothes washer (small capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$565.08	no data available	$0.00	$0.00	$0.00	CWasher
D03-944	Appliances	Energy Star Clothes Washer - 1.5 cf	CEE Tier 2: MEF=1.60, 1.5 cf capacity	clothes washer (small capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$565.08	$946.40	$381.32	$0.00	$0.00	CWasher
D03-945	Appliances	Energy Star Clothes Washer - 1.5 cf	CEE Tier 3: MEF=1.80, 1.5 cf capacity	clothes washer (small capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$565.08	$1,349.87	$784.78	$0.00	$0.00	CWasher
D03-946	Appliances	Energy Star Clothes Washer - 2.65 cf	CEE Tier 1: MEF=1.42, 2.65 cf capacity	clothes washer (med. capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$588.39	$769.17	$180.78	$0.00	$0.00	CWasher
D03-947	Appliances	Energy Star Clothes Washer - 2.65 cf	CEE Tier 2: MEF=1.60, 2.65 cf capacity	clothes washer (med. capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$588.39	$1,137.38	$548.99	$0.00	$0.00	CWasher
D03-948	Appliances	Energy Star Clothes Washer - 2.65 cf	CEE Tier 3: MEF=1.80, 2.65 cf capacity	clothes washer (med. capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$588.39	$1,181.16	$592.77	$0.00	$0.00	CWasher
D03-949	Appliances	Energy Star Clothes Washer - 3.5 cf	CEE Tier 1: MEF=1.42, 3.5 cf capacity	clothes washer (large capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$515.54	$761.68	$246.14	$0.00	$0.00	CWasher
D03-950	Appliances	Energy Star Clothes Washer - 3.5 cf	CEE Tier 2: MEF=1.60, 3.5 cf Capacity	clothes washer (large capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$515.54	$1,368.54	$853.00	$0.00	$0.00	CWasher
D03-951	Appliances	Energy Star Clothes Washer - 3.5 cf	CEE Tier 3: MEF=1.80, 3.5 cf Capacity	clothes washer (large capacity)	Retail	ROB/NEW	Yes	Low	INCR/INCR	$515.54	$1,280.46	$764.92	$0.00	$0.00	CWasher
D03-941	Appliances	Efficient Clothes Dryer	High Efficiency Electric Clothes Dryer with Moisture Sensor.	Electric Clothes Dryer EF=3.01. Single Family, 416 dry cycles	Retail	ROB/NEW	No	low	INCR/INCR	$319.02	$557.25	$238.24	$0.00	$0.00	Dryer
D03-941	Appliances	Efficient Clothes Dryer	High Efficiency Electric Clothes Dryer with Moisture Sensor.	Electric Clothes Dryer EF=3.01. Single Family, 200 dry cycles	Retail	ROB/NEW	No	low	INCR/INCR	$319.02	$557.25	$238.24	$0.00	$0.00	Dryer
D03-942	Appliances	Efficient Clothes Dryer	High Efficiency Gas Clothes Dryer with Moisture Sensor.	Gas Clothes Dryer EF=2.67. Single Family, 416 dry cycles	Retail	ROB/NEW	No	low	INCR/INCR	$362.65	$604.91	$242.26	$0.00	$0.00	Dryer
D03-942	Appliances	Efficient Clothes Dryer	High Efficiency Gas Clothes Dryer with Moisture Sensor.	Gas Clothes Dryer EF=2.67. Single Family, 200 dry cycles	Retail	ROB/NEW	No	low	INCR/INCR	$362.65	$604.91	$242.26	$0.00	$0.00	Dryer
D03-952	Appliances	Energy Star Dish Washer	Energy Star Dish Washer, EF=0.58	EF=0.46, 160 wash cycles, electric water heat	Retail	ROB/NEW	Yes	low	INCR/INCR	$292.65	$426.30	$133.64	$0.00	$0.00	Dwasher
D03-952	Appliances	Energy Star Dish Washer	Energy Star Dish Washer, EF=0.61	EF=0.46, 160 wash cycles, electric water heat	Retail	ROB/NEW	Yes	low	INCR/INCR	$292.65	$426.30	$133.64	$0.00	$0.00	Dwasher
D03-952	Appliances	Energy Star Dish Washer	Energy Star Dish Washer, EF=0.64	EF=0.46, 160 wash cycles, electric water heat	Retail	ROB/NEW	Yes	low	INCR/INCR	$292.65	$426.30	$133.64	$0.00	$0.00	Dwasher
D03-953	Appliances	Energy Star Dish Washer	Energy Star Dish Washer, EF=0.58	EF=0.46, 215 wash cycles, electric water heat	Retail	ROB/NEW	Yes	low	INCR/INCR	$292.65	$426.30	$133.64	$0.00	$0.00	Dwasher
D03-953	Appliances	Energy Star Dish Washer	Energy Star Dish Washer, EF=0.61	EF=0.46, 215 wash cycles, electric water heat	Retail	ROB/NEW	Yes	low	INCR/INCR	$292.65	$426.30	$133.64	$0.00	$0.00	Dwasher
D03-953	Appliances	Energy Star Dish Washer	Energy Star Dish Washer, EF=0.64	EF=0.46, 215 wash cycles, electric water heat	Retail	ROB/NEW	Yes	low	INCR/INCR	$292.65	$426.30	$133.64	$0.00	$0.00	Dwasher
D03-954	Appliances	Refrigerator: Bottom Mount Freezer	Refrigerator: Bottom Mount Freezer without through-the-door ice	Bottom Mount Freezer without through-the-door ice: 16.1 - 20 cf total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$880.00	$894.66	$14.66	$0.00	$0.00	Refrigerator
D03-955	Appliances	Refrigerator: Bottom Mount Freezer	Refrigerator: Bottom Mount Freezer without through-the-door ice	Bottom Mount Freezer without through-the-door ice: 20.1 - 25 cf total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$945.00	$1,086.81	$141.81	$0.00	$0.00	Refrigerator
D03-956	Appliances	Refrigerator: Top Mount Freezer	Refrigerator: Top Mount Freezer without through-the-door ice	Top Mount Freezer without through-the-door ice: <16.1cf total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$507.14	$450.75	($56.39)	$0.00	$0.00	Refrigerator
D03-957	Appliances	Refrigerator: Top Mount Freezer	Refrigerator: Top Mount Freezer without through-the-door ice	Top Mount Freezer without through-the-door ice: 16.1 - 20 cf total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$448.64	$590.00	$141.36	$0.00	$0.00	Refrigerator
D03-958	Appliances	Refrigerator: Top Mount Freezer	Refrigerator: Top Mount Freezer without through-the-door ice	Top Mount Freezer without through-the-door ice: 20.1 - 25 cf total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$537.75	$698.67	$160.92	$0.00	$0.00	Refrigerator
D03-959	Appliances	Refrigerator: Side Mount Freezer	Refrigerator: Side Mount Freezer without through-the-door ice	Side Mount Freezer without through-the-door ice: up to 25 cf total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$939.60	$1,890.41	$950.81	$0.00	$0.00	Refrigerator
D03-960	Appliances	Refrigerator: Side Mount Freezer	Refrigerator: Side Mount Freezer without through-the-door ice	Side Mount Freezer without through-the-door ice: 25 cf and higher total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$1,052.10	$1,150.48	$98.37	$0.00	$0.00	Refrigerator
D03-961	Appliances	Refrigerator: Side Mount Freezer	Refrigerator: Side Mount Freezer with through-the-door ice	Side Mount Freezer with through the-door ice: up to 25 cf total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$983.30	$1,153.52	$170.22	$0.00	$0.00	Refrigerator

Appendix B: Measure Cost Data

D03-962	Appliances	Refrigerator: Side Mount Freezer	Refrigerator: Side Mount Freezer with through-the-door ice	Side Mount Freezer with through the-door ice: 25 cf and higher total volume	Retail	ROB/NEW	Yes	low	INCR/INCR	$928.74	$1,064.50	$135.76	$0.00	$0.00	Refrigerator
D03-964	Appliances	Refrigerator Recycling	Refrigerator Recycling	Old extra refrigerator	Utility	RET	No	low	FULL	$0.00		$0.00	$0.00	$97.75	Refrigerator
D03-965	Appliances	Freezer Recycling	Freezer removed	Old extra freezer	Utility	RET	No	low	FULL	$0.00		$0.00	$0.00	$97.75	Freezer

BOILERS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-066	HVAC Non-Residential	High efficiency Large boiler (>300 kBTU/hr)	Central boiler with efficiency of 85%	Central boiler with efficiency of 80%	retail/contractor	ROB/NEW	Yes	Low	INCR/INCR	$11.37	$14.94	$3.57	$0.00	$0.00	kBtuh
D03-067	HVAC Non-Residential	High efficiency Small boiler (<300 kBTU/hr)	Central boiler with efficiency of 84.5%	Central hot water boiler with efficiency of 80%	retail/contractor	ROB/NEW	Yes	Low	INCR/INCR	$11.80	$24.11	$12.31	$0.00	$0.00	kBtuh
D03-068	HVAC Non-Residential	High efficiency Steam boiler (<300 kBTU/hr)	Central steam boiler with efficiency of 84%	Central steam boiler with efficiency of 80%	retail/contractor	ROB/NEW	Yes	Low	INCR/INCR	$10.54	$37.87	$27.32	$0.00	$0.00	kBtuh

COMMERCIAL COOKING

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-904	Cooking	High Efficiency Gas Fryer	30-50 lbs cap; Base use = 25 kBtu/hour; Eff use = 15 kBtu/hour	30-50 lbs cap; Normal Fryer	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$1,520.61	$4,103.15	$2,582.54	$0.00	$0.00	Fryer
D03-905	Cooking	High Efficiency Gas Griddle	Base use = 25 kBtu/hour; Eff use = 20 kBtu/hour	Normal Griddle	Retail	ROB/NEW	No	Low	INCR/INCR	$1,758.36	$3,860.67	$2,102.31	$0.00	$0.00	Griddle
D03-906	Cooking	High Efficiency Elec Fryer	45-65 lbs cap; Base use = 2.8 kW/hour; Eff use = 2.4 kW/hour	45-65 lbs cap; Normal Fryer	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$3,326.73	$12,088.62	$8,761.89	$0.00	$0.00	Fryer
D03-907	Cooking	Hot Food Holding Cabinet	Base use = 1.35 kW/hour; Eff use = 0.43 kW/hour	Normal Holding Cabinet	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$1,545.67	$2,589.81	$1,044.13	$0.00	$0.00	Cabinet
D03-908	Cooking	Connectionless Steamer	Base use = 1.0 kW/hour; Eff use = 0.5 kW/hour	Connected Steamer	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$5,128.24	$3,206.64	$0.00	$0.00	$0.00	Steamer

CONTROLS - MISCELLANEOUS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-011	Controls	Plug Loads reduced by 5%	all plug loads reduced by 5%	all plug loads reduced by 5%	Not priced						Not priced				
D03-012	Controls	Plug Loads reduced by 10%	all plug loads reduced by 10%	all plug loads reduced by 10%	Not priced						Not priced				
D03-857	Controls	Occ-Sensor - Plug loads	Assume control 50W of task lighting and a computer monitor	No occupancy sensor	Retail/Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$82.25	$0.00	$35.00	$117.25	Sensor
D03-857	Controls	Occ-Sensor - Plug loads	Assume control 50W of task lighting and a computer monitor	No occupancy sensor	Retail/Contractor	RET/NEW	No	High	FULL/FULL	$0.00	$74.67	$0.00	$26.25	$100.92	Sensor

COOL ROOF

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-016	Cool Roof	Light Colored Roof	Roof absorptivity = 0.45	Roof absorptivity = 0.7	retail/contractor	RET/NEW	Yes	High	FULL/FULL	$0.00	$664.88	$0.00	$7,789.79	$8,454.67	1000 SqFt

COPIERS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-901	Copiers	High Efficiency Copier	5 copies/minute, copy only; Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$404.09	$443.28	$39.19	$0.00	$0.00	copier
D03-901	Copiers	High Efficiency Copier	10 copies/minute, copy only; Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$808.19	$886.57	$78.38	$0.00	$0.00	copier
D03-901	Copiers	High Efficiency Copier	15 copies/minute, copy only; Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$1,212.28	$1,329.85	$117.57	$0.00	$0.00	copier
D03-901	Copiers	High Efficiency Copier	20 copies/minute, copy only; Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$1,616.38	$1,773.14	$156.76	$0.00	$0.00	copier
D03-902	Copiers	High Efficiency Copier	25 copies/min, b/w, copy only, Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$2,928.75	$4,784.18	$1,855.43	$0.00	$0.00	copier
D03-902	Copiers	High Efficiency Copier	30 copies/min, b/w, copy only, Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$3,514.50	$5,741.02	$2,226.52	$0.00	$0.00	copier
D03-902	Copiers	High Efficiency Copier	35 copies/min, b/w, copy only, Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$4,100.25	$6,697.85	$2,597.60	$0.00	$0.00	copier

D03-902	Copiers	High Efficiency Copier	40 copies/min, b/w, copy only, Energy Star	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$4,686.00	$7,654.69	$2,968.69	$0.00	$0.00	copier
D03-903	Copiers	High Efficiency Copier	Over 45 copies/min; copy only	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	no data available	$10,924.63	no data available	$0.00	$0.00	copier
D03-903	Copiers	High Efficiency Copier	Over 45 copies/min; copy & printer	No idle-off control	Retail/Contractor	ROB/NEW	Yes	Low	INCR/INCR	$0.00	$13,027.06	$0.00	$0.00	$0.00	copier

DOMESTIC HOT WATER

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-092	DHW	Improved gas water heater EF	Improved EF of 0.53 (based on tank size/vintage), Gas, 30-75 gal tank; EF>=0.63	Gas, 30-75 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$474.18	$631.41	$157.22	$0.00	$0.00	WtrHtr
D03-092	DHW	Improved gas water heater EF	Improved EF of 0.53 (based on tank size/vintage), Gas, 30-75 gal tank; EF>=0.62	Gas, 30-75 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$474.18	$495.72	$21.54	$0.00	$0.00	WtrHtr
D03-092	DHW	Improved gas water heater EF	Improved EF of 0.53 (based on tank size/vintage), Gas, 40 gal tank; EF>=0.63	Gas, 40 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$550.95	$175.30	$0.00	$0.00	WtrHtr
D03-092	DHW	Improved gas water heater EF	Improved EF of 0.53 (based on tank size/vintage), Gas, 50 gal tank; EF>=0.63	Gas, 50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$455.73	$765.51	$309.77	$0.00	$0.00	WtrHtr
D03-092	DHW	Improved gas water heater EF	Improved EF of 0.53 (based on tank size/vintage), Gas, 40 gal tank; EF>=0.62	Gas, 40 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$482.72	$107.07	$0.00	$0.00	WtrHtr
D03-092	DHW	Improved gas water heater EF	Improved EF of 0.53 (based on tank size/vintage), Gas, 50 gal tank; EF>=0.62	Gas, 50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$455.73	$534.44	$78.71	$0.00	$0.00	WtrHtr
D03-092	DHW	Improved gas water heater EF	Improved EF of 0.53 (based on tank size/vintage), Gas, 40-50 gal tank; EF>=0.62	Gas, 40-50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$479.89	$104.24	$0.00	$0.00	WtrHtr
D03-093	DHW	tankless gas water heater used	zero tank loss, improved EF of 0.67, Gas Tankless, Elec Ignition; 250kBtu/h	Gas Tank; EF<=0.60	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$1,844.19	$1,517.24	($326.95)	$250.90	$1,768.14	WtrHtr
D03-094	DHW	tankless electric hot water system	zero tank loss	electric water heater with EF based on tank size	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$292.33	$789.30	$496.97	$270.75	$1,060.05	WtrHtr
D03-095	DHW	DHW circulation pump contolled by timeclock	DHW circulation pump turns off during low operation hours	DHW circulation pump runs continuously	retail/contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$59.00	$0.00	$165.28	$224.27	Timeclock
D03-096	DHW	Improved eff. large water heater (> 155k BTU/hr)	Same tank size/capacity with improved efficiency burner (90%)	Tank size and burner capacity a function of building type, 80% effr	retail/contractor	ROB/NEW	Yes	Low	INCR/INCR	$2,033.91	$3,695.60	$1,661.69	$0.00	$0.00	WtrHtr
D03-097	DHW	Improved eff. medium water heater (> 75k BTU/hr)	Same tank size/capacity with improved efficiency burner (90%)	Tank size and burner capacity a function of building type, 80% effr	retail/contractor	ROB/NEW	Yes	Low	INCR/INCR	$2,258.17	$3,919.86	$1,661.69	$0.00	$0.00	WtrHtr
D03-909	DHW	Point of Use Water Heat	Point of Use Water Heat, Gas Tankless, Elec Ignition; 150kBtu/h	Gas Tank; EF<=0.60	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$492.96	$863.60	$370.64	$250.90	$1,114.50	WtrHtr
D03-910	DHW	Circulation Pump Timeclock	Circulation Pump Timeclock	DHW circulation pump runs continuously	retail/contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$59.00	$0.00	$165.28	$224.27	Timeclock
D03-911	DHW	High Eff. Water Heater, EF=0.64	High Eff. Water Heater,Gas, 30-75 gal tank; EF>=0.63	Gas, 30-75 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$474.18	$631.41	$157.22	$0.00	$0.00	WtrHtr
D03-911	DHW	High Eff. Water Heater, EF=0.64	High Eff. Water Heater,Gas, 30-75 gal tank; EF>=0.62	Gas, 30-75 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$474.18	$495.72	$21.54	$0.00	$0.00	WtrHtr
D03-911	DHW	High Eff. Water Heater, EF=0.64	High Eff. Water Heater, Gas, 40 gal tank; EF>=0.63	Gas, 40 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$550.95	$175.30	$0.00	$0.00	WtrHtr
D03-911	DHW	High Eff. Water Heater, EF=0.64	High Eff. Water Heater, Gas, 50 gal tank; EF>=0.63	Gas, 50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$455.73	$765.51	$309.77	$0.00	$0.00	WtrHtr
D03-911	DHW	High Eff. Water Heater, EF=0.64	High Eff. Water Heater, Gas, 40 gal tank; EF>=0.62	Gas, 40 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$482.72	$107.07	$0.00	$0.00	WtrHtr
D03-911	DHW	High Eff. Water Heater, EF=0.64	High Eff. Water Heater, Gas, 50 gal tank; EF>=0.62	Gas, 50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$455.73	$534.44	$78.71	$0.00	$0.00	WtrHtr
D03-911	DHW	High Eff. Water Heater, EF=0.64	High Eff. Water Heater, Gas, 40-50 gal tank; EF>=0.62	Gas, 40-50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$479.89	$104.24	$0.00	$0.00	WtrHtr

D03-934	DHW	Faucet Aerators	Faucet Aerators	No Faucet Aerators	Retail/Contractor	RET	No	Low	FULL	$0.00	$7.12	$0.00	$5.58	$12.69	Aerator
D03-934	DHW	Faucet Aerators	Faucet Aerators	No Faucet Aerators	Retail/Contractor	RET	No	High	FULL	$0.00	$2.14	$0.00	$5.58	$7.72	Aerator
D03-935	DHW	Heat Pump Water Heater	Heat pump water heater, EF=2.9	Electric water heater, EF=0.88	Retail/Contractor	ROB/NEW	No	Low	INCR/FULL	$251.11	$1,539.13	$1,288.02	$122.83	$1,661.96	WtrHtr
D03-936	DHW	Pipe Wrap	Pipe Wrap	No Pipe Wrap	Retail/Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$0.37	$0.00	$2.44	$2.81	LinFt
D03-936	DHW	Pipe Wrap	Pipe Wrap	No Pipe Wrap	Retail/Contractor	RET/NEW	No	High	FULL/FULL	$0.00	$0.36	$0.00	$2.44	$2.80	LinFt
D03-937	DHW	Low Flow Showerhead	Low Flow Showerhead (<=2.0 gpm)	Standard showerhead (2.5 gpm)	Retail/Contractor	RET	No	Low	FULL	$0.00	$22.95	$0.00	$15.00	$37.95	Showerhead
D03-937	DHW	Low Flow Showerhead	Low Flow Showerhead (<=2.0 gpm)	Standard showerhead (2.5 gpm)	Retail/Contractor	RET	No	High	FULL	$0.00	$8.49	$0.00	$15.00	$23.49	Showerhead
D03-938	DHW	High Efficiency Water Heater	Gas, 30-75 gal tank; EF>=0.63	Gas, 30-75 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$474.18	$631.41	$157.22	$0.00	$0.00	WtrHtr
D03-938	DHW	High Efficiency Water Heater	Gas, 30-75 gal tank; EF>=0.62	Gas, 30-75 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$474.18	$495.72	$21.54	$0.00	$0.00	WtrHtr
D03-938	DHW	High Efficiency Water Heater	Gas, 40 gal tank; EF>=0.63	Gas, 40 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$550.95	$175.30	$0.00	$0.00	WtrHtr
D03-938	DHW	High Efficiency Water Heater	Gas, 50 gal tank; EF>=0.63	Gas, 50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$455.73	$765.51	$309.77	$0.00	$0.00	WtrHtr
D03-938	DHW	High Efficiency Water Heater	Gas, 40 gal tank; EF>=0.62	Gas, 40 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$482.72	$107.07	$0.00	$0.00	WtrHtr
D03-938	DHW	High Efficiency Water Heater	Gas, 50 gal tank; EF>=0.62	Gas, 50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$455.73	$534.44	$78.71	$0.00	$0.00	WtrHtr
D03-938	DHW	High Efficiency Water Heater	Gas, 40-50 gal tank; EF>=0.62	Gas, 40-50 gal tank; EF<=0.594	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$375.65	$479.89	$104.24	$0.00	$0.00	WtrHtr
D03-939	DHW	High Efficiency Electric Water Heater	Elec, 30 gal; EF=0.93	Elec, 30 gal; EF=0.88	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$139.76	$212.06	$72.30	$0.00	$0.00	WtrHtr
D03-939	DHW	High Efficiency Electric Water Heater	Elec, 40 gal; EF=0.93	Elec, 40 gal; EF=0.88	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$195.43	$267.73	$72.30	$0.00	$0.00	WtrHtr
D03-939	DHW	High Efficiency Electric Water Heater	Elec, 50 gal; EF=0.93	Elec, 50 gal; EF=0.88	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$251.11	$323.41	$72.30	$0.00	$0.00	WtrHtr
D03-939	DHW	High Efficiency Electric Water Heater	Elec, 60 gal; EF=0.93	Elec, 60 gal; EF=0.88	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$306.79	$379.09	$72.30	$0.00	$0.00	WtrHtr
D03-939	DHW	High Efficiency Electric Water Heater	Elec, 80 gal; EF=0.93	Elec, 80 gal; EF=0.88	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$418.14	$490.45	$72.30	$0.00	$0.00	WtrHtr
D03-940	DHW	Gas Tankless Water Heater	Point of Use Water Heat,Gas Tankless, Elec Ignition; 150kBtu/h	Gas Tank; EF<=0.60	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$492.96	$863.60	$370.64	$250.90	$1,114.50	WtrHtr

HVAC - CONTROLS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-071	TimeClocks	time clocks control packaged system operation	Supply fan operation matches building operation	NA	retail/contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$162.08	$0.00	$104.02	$266.10	Timeclock
D03-072	EMS	Suite of EMS measures	CHW & HW reset, reduced nighttime lighting levels	Central plant systems with no timeclock in OLD vintage	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$406.22	$0.00	$88.72	$494.94	CtrlPoint
D03-073	HVAC Non-Residential	Install programmable thermostats in older bldgs	unoccupied period has heating setback/cooling setup	Standard building operation, no thermostat setback/setup	Retail/Contractor	RET/NEW	Yes	Low	FULL/INCR	$32.77	$82.48	$49.71	$92.29	$174.76	Thermostat
D03-401	HVAC Residential	Programmable Thermostat	Programmable Thermostat	No night setback/setup	Retail/Contractor	RET/NEW	Yes	Low	FULL/INCR	$32.77	$56.37	$23.60	$16.96	$73.33	Thermostat

HVAC - COOLING TOWERS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-062	HVAC Non-Residential	Convert Air-Cooled Condenser to Water-Cooled	packaged system with water cooled condenser	Packaged system with air-cooled condenser	Contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$406.26	$0.00	$60.29	$466.55	tons
D03-063	HVAC Non-Residential	Two-Speed Tower Fans replace Single-Speed	Two-speed tower fans on all central plants	Single Speed CT fan on all central plants	Contractor	ROB/NEW		0 Low	INCR/INCR	$55.90	$58.25	$2.35	$0.00	$0.00	tons
D03-064	HVAC Non-Residential	Variable-Speed Tower Fans replace Two-Speed	Variable-speed tower fans on all central plants	Two-speed tower fans on all central plants.	Contractor	RET/ROB/NEW		0 Low	FULL/INCR/INCR	$59.44	$67.18	$7.74	$0.00	$17.34	tons

HVAC - LABOR ONLY

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-055	Labor Only	Base ventilation rate 25% higher than required	standard ventilation rate	ventilation rate increased by 25%	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$0.00	$0.00	$39.84	$39.84	Tons
D03-060	Labor Only	Restore degraded economizer performance	ecomizer with Econo-Lockout=NO, DB limit = 68, Max OSA = 100%	degraded base econo performance, DB limit = 55, Max OSA = 60%	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$0.00	$0.00	$41.71	$41.71	Tons
D03-061	Labor Only	Dirty Air-cooled condenser coils are cleaned	standard equipment efficiency	cooling equipment efficiency is degraded by 20%	Contractor	RET	No	Low	FULL	$0.00	$0.00	$0.00	$35.11	$35.11	Tons

HVAC - MOBIL HOME

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-461	Mobile Home	Basic Furnace Upgrade to 81% AFUE	Basic Furnace Upgrade to 81% AFUE	Title 24 minimum furnace AFUE = 78%	Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$17.40	$18.86	$1.46	$14.41	$33.27	kBtuh
D03-462	Mobile Home	Mobile Home Duct Sealing (Supply Leakage Reduced from 35% of AHU flow to 15%)	Mobile Home Duct Sealing (Supply Leakage Reduced from 35% of AHU flow to 15%)	Duct leakage code baseline matches measure baseline	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$21.43	$0.00	$117.31	$138.74	1000 Sq Ft
D03-468	Mobile Home	Mobile Home Duct Sealing (Supply Leakage Reduced from 25% of AHU flow to 15%)	Mobile Home Duct Sealing (Supply Leakage Reduced from 25% of AHU flow to 15%)	Duct leakage code baseline matches measure baseline	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$21.43	$0.00	$117.31	$138.74	1000 Sq Ft

HVAC - MOTORS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 5 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$94.92	$103.07	$8.15	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 10 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$82.02	$89.47	$7.45	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app- 15 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.95	$71.49	$3.54	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 20 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$52.66	$63.93	$11.26	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 25 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$51.07	$62.41	$11.34	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 50 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$35.65	$49.75	$14.10	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 100 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$42.91	$47.82	$4.91	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 5 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$115.67	$127.48	$11.81	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 10 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$92.40	$104.64	$12.24	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 15 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$75.32	$91.35	$16.03	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 20 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$81.03	$86.50	$5.48	$0.00	$0.00	HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 25 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.35	$86.07	$18.72	$0.00	$0.00	HP

D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 50 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$63.25	$77.02	$13.78	$0.00	$0.00 HP
D03-086	HVAC Motors	Efficient HVAC Motor - Supply Fans	Premium Efficient Motor or better for app - 100 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$85.62	$87.75	$2.14	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 5 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$94.92	$103.07	$8.15	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 10 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$82.02	$89.47	$7.45	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app- 15 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.95	$71.49	$3.54	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 20 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$52.66	$63.93	$11.26	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 25 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$51.07	$62.41	$11.34	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 50 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$35.65	$49.75	$14.10	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 100 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$42.91	$47.82	$4.91	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 5 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$115.67	$127.48	$11.81	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 10 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$92.40	$104.64	$12.24	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 15 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$75.32	$91.35	$16.03	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 20 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$81.03	$86.50	$5.48	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 25 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.35	$86.07	$18.72	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 50 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$63.25	$77.02	$13.78	$0.00	$0.00 HP
D03-087	HVAC Motors	Efficient HVAC Motor - Return Fans	Premium Efficient Motor or better for app - 100 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$85.62	$87.75	$2.14	$0.00	$0.00 HP
D03-088	HVAC Motors	Efficient HVAC Motor - Clg Tower Fans	Premium Efficient Motor or better for app - 5 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$115.67	$127.48	$11.81	$0.00	$0.00 HP
D03-088	HVAC Motors	Efficient HVAC Motor - Clg Tower Fans	Premium Efficient Motor or better for app - 10 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$92.40	$104.64	$12.24	$0.00	$0.00 HP
D03-088	HVAC Motors	Efficient HVAC Motor - Clg Tower Fans	Premium Efficient Motor or better for app - 15 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$75.32	$91.35	$16.03	$0.00	$0.00 HP
D03-088	HVAC Motors	Efficient HVAC Motor - Clg Tower Fans	Premium Efficient Motor or better for app - 20 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$81.03	$86.50	$5.48	$0.00	$0.00 HP
D03-088	HVAC Motors	Efficient HVAC Motor - Clg Tower Fans	Premium Efficient Motor or better for app - 25 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.35	$86.07	$18.72	$0.00	$0.00 HP
D03-088	HVAC Motors	Efficient HVAC Motor - Clg Tower Fans	Premium Efficient Motor or better for app - 50 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$63.25	$77.02	$13.78	$0.00	$0.00 HP
D03-088	HVAC Motors	Efficient HVAC Motor - Clg Tower Fans	Premium Efficient Motor or better for app - 100 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$85.62	$87.75	$2.14	$0.00	$0.00 HP

D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 5 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$94.92	$103.07	$8.15	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 10 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$82.02	$89.47	$7.45	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app- 15 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.95	$71.49	$3.54	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 20 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$52.66	$63.93	$11.26	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 25 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$51.07	$62.41	$11.34	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 50 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$35.65	$49.75	$14.10	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 100 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$42.91	$47.82	$4.91	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 5 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$115.67	$127.48	$11.81	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 10 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$92.40	$104.64	$12.24	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 15 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$75.32	$91.35	$16.03	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 20 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$81.03	$86.50	$5.48	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 25 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.35	$86.07	$18.72	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 50 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$63.25	$77.02	$13.78	$0.00	$0.00 HP
D03-089	HVAC Motors	Efficient HVAC Motor - Chilled Water Loop Pumps	Premium Efficient Motor or better for app - 100 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$85.62	$87.75	$2.14	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 5 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$94.92	$103.07	$8.15	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 10 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$82.02	$89.47	$7.45	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app- 15 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.95	$71.49	$3.54	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 20 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$52.66	$63.93	$11.26	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 25 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$51.07	$62.41	$11.34	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 50 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$35.65	$49.75	$14.10	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 100 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$42.91	$47.82	$4.91	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 5 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$115.67	$127.48	$11.81	$0.00	$0.00 HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 10 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$92.40	$104.64	$12.24	$0.00	$0.00 HP

D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 15 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$75.32	$91.35	$16.03	$0.00	$0.00	HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 20 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$81.03	$86.50	$5.48	$0.00	$0.00	HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 25 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.35	$86.07	$18.72	$0.00	$0.00	HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 50 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$63.25	$77.02	$13.78	$0.00	$0.00	HP
D03-090	HVAC Motors	Efficient HVAC Motor - Hot Water Loop Pumps	Premium Efficient Motor or better for app - 100 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$85.62	$87.75	$2.14	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 5 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$94.92	$103.07	$8.15	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 10 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$82.02	$89.47	$7.45	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app- 15 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.95	$71.49	$3.54	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 20 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$52.66	$63.93	$11.26	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 25 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$51.07	$62.41	$11.34	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 50 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$35.65	$49.75	$14.10	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 100 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$42.91	$47.82	$4.91	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 5 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$115.67	$127.48	$11.81	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 10 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$92.40	$104.64	$12.24	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 15 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$75.32	$91.35	$16.03	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 20 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$81.03	$86.50	$5.48	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 25 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$67.35	$86.07	$18.72	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 50 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$63.25	$77.02	$13.78	$0.00	$0.00	HP
D03-091	HVAC Motors	Efficient Motor - Cond. Water Loop Pumps	Premium Efficient Motor or better for app - 100 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$85.62	$87.75	$2.14	$0.00	$0.00	HP

HVAC - NON-RESIDENTIAL - AIR CURTAIN

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-015	HVAC Non-Residential	Air Curtain	Infiltration due to doors reduced by 50%	T24 code baseline for door infiltration matches prototype level	Not priced	RET/NEW			FULL/FULL		Not priced				SqFt

Appendix B: Measure Cost Data

HVAC - NON-RESIDENTIAL - CHILLERS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-040	HVAC Non-Residential	Centrifugal chillers (< 150 tons) with improved kW/ton	Water cooled centrifugal chiller (0.560 kW/ton)	Cent chlr, kW/ton based on vintage, water cooled condenser	Contractor	ROB/NEW		0 Low	INCR/INCR	$468.69	$614.21	$145.52	$0.00	$0.00	tons
D03-041	HVAC Non-Residential	Reciprocating air-cooled chillers with improved kW/ton	Air cooled package reciprocating chiller (1.008 kW/ton)	Air cooled packaged recip chiller, 1.260 kW/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$448.95	$488.89	$39.94	$0.00	$0.00	tons
D03-042	HVAC Non-Residential	VSD Centrifugal Chiller (< 150 tons) w/Load control tower	Water cooled VSD centrifugal chiller (0.560 kW/ton), load control tower	Water cooled VSD cent chiller, 0.700 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$646.16	$712.25	$66.09	$0.00	$0.00	tons
D03-043	HVAC Non-Residential	Gas Absorption Central Chiller (direct fired)	Gas absorption chiller (direct fired) (0.0071 EIR, 1.0 HIR)	Centrifugal chiller 0.576 kW/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$260.33	$637.04	$376.71	$0.00	$0.00	tons
D03-114	HVAC Non-Residential	Air-cooled screw chiller with improved kw/ton	Air cooled screw chiller (1.008 kW/ton)	Air cooled packaged screw chiller, 1.260 kW/tom	Contractor	ROB/NEW		0 Low	INCR/INCR	$445.90	$488.24	$42.34	$0.00	$0.00	tons
D03-115	HVAC Non-Residential	Reciprocating water-cooled chillers with improved kW/ton	Water cooled reciprocating chiller (0.672 kW/ton)	Water Cooled Recip Chiller, 0.837 kW/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$462.59	$478.86	$16.27	$0.00	$0.00	tons

D03-116	HVAC Non-Residential	Centrifugal chillers (150-299 tons) with improved kW/ton	Water cooled centrifugal chiller (0.507 kW/ton)	Water cooled cent chiller, 0.634 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$338.77	$432.61	$93.84	$0.00	$0.00 tons	
D03-117	HVAC Non-Residential	Centrifugal chillers (>= 300 tons) with improved kW/ton	Water cooled centrifugal chiller (0.461 kW/ton)	Water cooled cent chiller, 0.576 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$267.71	$333.29	$65.58	$0.00	$0.00 tons	
D03-118	HVAC Non-Residential	Water-cooled screw chiller (< 150 tons) with improved kw/ton	Water cooled screw chiller (0.632 kW/ton)	Water cooled screw chiller, 0.790 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$443.39	$492.44	$49.05	$0.00	$0.00 tons	
D03-119	HVAC Non-Residential	Water-cooled screw chiller (150-299 tons) with improved kw/ton	Water cooled screw chiller (0.574 kW/ton)	Water cooled screw chiller, 0.718 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$346.94	$372.42	$25.47	$0.00	$0.00 tons	
D03-120	HVAC Non-Residential	Water-cooled screw chiller (>= 300 tons) with improved kw/ton	Water cooled screw chiller (0.511 kW/ton)	Water cooled screw chiller, 0.639 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$275.84	$287.24	$11.40	$0.00	$0.00 tons	
D03-121	HVAC Non-Residential	VSD Centrifugal Chiller (150-299 tons) w/Load control tower	Water cooled VSD centrifugal chiller (0.507 kW/ton), load control tower	Water cooled cent chiller, 0.634 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$416.07	$493.15	$77.07	$0.00	$0.00 tons	
D03-122	HVAC Non-Residential	VSD Centrifugal Chiller (>= 300 tons) w/Load control tower	Water cooled VSD centrifugal chiller (0.461 kW/ton), load control tower	Water cooled cent chiller, 0.576 kw/ton	Contractor	ROB/NEW		0 Low	INCR/INCR	$290.25	$373.33	$83.08	$0.00	$0.00 tons	

HVAC - NON-RESIDENTIAL - EVAP COOLERS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-053	HVAC Non-Residential	Make-up Air Indirect Evaporative cooling	indirect evap cooling for make-up air only, 65% effectiveness	Central system: Chlr type, eff. and cond type based on bldg/vintage	Contractor	NEW	No	Low	FULL	$0.00	$533.59	$0.00	$49.15	$582.74	$/ton
D03-054	HVAC Non-Residential	Make-up Air Indirect Evaporative cooling	indirect evap cooling for make-up air only, 65% effectiveness	no evaporative cooling	Contractor	NEW	No	Low	FULL	$0.00	$515.74	$0.00	$49.15	$564.88	$/ton
D03-074	HVAC Non-Residential	Direct Evaporative Coolers	direct evap replaces DX cooling	packaged DX as defined by building type/vintage	Not available						Not available				
D03-082	HVAC Non-Residential	High eff. packaged system with evap cooled cond (< 65k)	14 EER Water-Cooled Package Air Conditioner	T24 minimum: A/C EER = 12.1	Contractor	RET/ROB/NEW	no	Low	FULL/INCR/INCR	$573.07	$740.93	$167.86	$229.97	$970.90	tons
D03-083	HVAC Non-Residential	High eff. packaged system with evap cooled cond (>= 65k)	14 EER Water-Cooled Package Air Conditioner	T24 minimum: A/C EER = 11.5	Contractor	RET/ROB/NEW	no	Low	FULL/INCR/INCR	$1,225.00	$1,437.50	$212.50	$127.86	$1,565.36	tons

HVAC - NON-RESIDENTIAL - FURNACES

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-065	HVAC Non-Residential	High efficiency gas furnace replace std efficiency	packaged system with 94 AFUE furnace	packaged system with 80 AFUE furnace	Contractor	ROB/NEW	Yes	Low	INCR/INCR	$0.00	Not Available	$0.00	$0.00	$0.00	Furnace

HVAC - NON-RESIDENTIAL - RESET

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-044	HVAC Non-Residential	Chilled Water Loop temperature control	Chilled water loop temperature set to 'Load Reset'	Constant chilled water temperature	Contractor	RET	No	Low	FULL	$0.00	$350.79	$0.00	$330.55	$681.34	Control
D03-045	HVAC Non-Residential	Hot Water Loop temperature control	Hot water loop temperature set to 'Load Reset'	Constant hot water temperature	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$503.55	$0.00	$330.55	$834.10	Control
D03-046	HVAC Non-Residential	Replace 3-way valves in CHW loop with 2-way	2-way valves, with single speed pump	3-way valves in chilled water loop	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$6.38	$0.00	$2.39	$8.77	GPM
D03-047	HVAC Non-Residential	Variable speed drive for chilled water loop	add variable speed pump to chilled water loop	2-way valves, with single speed drive	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$149.14	$0.00	$63.15	$212.29	HP
D03-048	HVAC Non-Residential	Replace 3-way valves in HW loop with 2-way	2-way valves, with single speed pump	3-way valves in hot water loop	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$10.01	$0.00	$7.79	$17.79	GPM
D03-049	HVAC Non-Residential	Variable speed drive for hot water loop	add variable speed pump to hot water loop	2-way valves, with single speed drive	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$149.14	$0.00	$63.15	$212.29	HP

Appendix B: Measure Cost Data

HVAC - NON-RESIDENTIAL - PACKAGED TERMINAL AIR CONDITIONING

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-084	HVAC Non-Residential	High eff. packaged terminal air-conditioner (< 7k)	11.29 EER (based on vintage) package terminal A/C	PTAC w/EER based on vintage	Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$472.06	$577.52	$105.46	$318.70	$896.22	PTAC
D03-099	HVAC Non-Residential	High eff. packaged terminal air-conditioner (7-15k)	10.27 EER (based on vintage) package terminal A/C	PTAC w/EER based on vintage	Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$741.81	$907.53	$165.72	$132.50	$1,040.03	PTAC
D03-100	HVAC Non-Residential	High eff. packaged terminal air-conditioner (> 15k)	9.25 EER (based on vintage) package terminal A/C	PTAC w/EER based on vintage	Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$1,011.56	$1,237.54	$225.99	$172.00	$1,409.54	PTAC

HVAC - NON-RESIDENTIAL - PACKAGED TERMINAL HEAT PUMP (PTHP)

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-085	HVAC Non-Residential	High eff. packaged terminal heat pump (< 7k)	11.17 EER / 3.3 COP (based on vintage) package terminal HP	PTHP w/EER & COP based on vintage	Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$589.12	$720.73	$131.61	$318.70	$1,039.43	PTHP
D03-101	HVAC Non-Residential	High eff. packaged terminal heat pump (7-15k)	10.15 EER / 3.1 COP (based on vintage) package terminal HP	PTHP w/EER & COP based on vintage	Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$925.75	$1,132.57	$206.82	$402.60	$1,535.17	PTHP
D03-102	HVAC Non-Residential	High eff. packaged terminal heat pump (> 15k)	9.13 EER / 3.0 COP (based on vintage) package terminal HP	PTHP w/EER & COP based on vintage	Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$1,262.39	$1,544.41	$282.02	$402.60	$1,947.01	PTHP

HVAC - NON-RESIDENTIAL - PACKAGED AC AND PACKAGED HP

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-078	HVAC Non-Residential	High eff. packaged unitary system A/C (< 65k, single phase)	14 SEER(12.15 EER) Package Air Conditioner	A/C EER based on vintage, no economizer	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$642.05	$817.86	$175.81	$459.88	$1,277.74	Ton
D03-110	HVAC Non-Residential	High eff. packaged unitary system A/C (< 65k, 13 SEER, 3 phase before 2008)	13 SEER three phase package A/C	A/C EER based on vintage, no economizer	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$642.05	$790.40	$148.36	$459.88	$1,250.29	Ton
D03-109	HVAC Non-Residential	High eff. packaged unitary system A/C (< 65k, 12 SEER, 3 phase before 2008)	12 SEER three phase package A/C	A/C EER based on vintage, no economizer	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$642.05	$746.45	$104.40	$459.88	$1,206.34	Ton
D03-079	HVAC Non-Residential	High eff. packaged unitary system A/C (65-134k)	11 EER Package Air Conditioner	A/C EER based on vintage, econo based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$608.25	$757.38	$149.13	$224.54	$981.92	Ton
D03-103	HVAC Non-Residential	High eff. packaged unitary system A/C (135-239k)	10.8 EER Package Air Conditioner	A/C EER based on vintage, econo based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$674.88	$785.77	$110.89	$187.71	$973.48	Ton
D03-104	HVAC Non-Residential	High eff. packaged unitary system A/C (240-759k)	10.0 EER Package Air Conditioner	A/C EER based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$534.50	$649.63	$115.13	$185.71	$835.34	Ton
D03-105	HVAC Non-Residential	High eff. packaged unitary system A/C (>= 760k)	10.0 EER Package Air Conditioner	A/C EER based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$456.77	$555.15	$98.39	$111.43	$666.59	Ton
D03-080	HVAC Non-Residential	High eff. packaged unitary system HP (< 65k, single phase)	14 SEER(12.19 EER)/8.6 HSPF(3.52 COP) Package A/C Heat Pump	Heat Pump SEER & HSPF based on vintage, no economizer	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$785.75	$995.13	$209.38	$459.88	$1,455.01	Ton
D03-113	HVAC Non-Residential	High eff. packaged unitary system HP (< 65k, 13 SEER, 3 phase before 2008)	13 SEER / 7.7 HSPF three phase package A/C Heat Pump	Heat Pump SEER & HSPF based on vintage, no economizer	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$802.25	$959.29	$157.04	$459.88	$1,419.17	Ton
D03-112	HVAC Non-Residential	High eff. packaged unitary system HP (< 65k, 12 SEER, 3 phase before 2008)	12 SEER / 7.4 HSPF three phase package A/C Heat Pump	Heat Pump SEER & HSPF based on vintage, no economizer	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$802.25	$906.94	$104.69	$459.88	$1,366.82	Ton
D03-081	HVAC Non-Residential	High eff. packaged unitary system HP (65-134k)	11 EER/3.4 COP Package A/C Heat Pump	Heat Pump EER & COP based on vintage, econo based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$837.81	$1,020.24	$182.43	$224.54	$1,244.78	Ton
D03-106	HVAC Non-Residential	High eff. packaged unitary system HP (135-239k)	10.8 EER/3.4 COP Package A/C Heat Pump	Heat Pump EER & COP based on vintage, econo based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$949.56	$1,075.00	$125.44	$187.71	$1,262.71	Ton

D03-107	HVAC Non-Residential	High eff. packaged unitary system HP (240-759k)	10.0 EER/3.4 COP Package A/C Heat Pump	Heat Pump EER & COP based on vintage, econo based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$696.25	$826.08	$129.83	$185.71	$1,011.79	Ton
D03-124	HVAC Non-Residential	High eff. packaged unitary system HP (>= 760k)	9.7 EER/3.3 COP Package A/C Heat Pump	Heat Pump EER & COP based on vintage, econo based on vintage	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$595.00	$705.94	$110.95	$111.43	$817.38	Ton

HVAC - NON-RESIDENTIAL - SPLIT AC & HP - 10 AND 13 SEER BASE

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$371.85	$802.16	$430.32	$604.18	$1,406.34	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$330.39	$706.17	$375.77	$483.34	$1,189.51	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$642.17	$362.45	$402.78	$1,044.95	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$297.76	$596.46	$298.70	$345.24	$941.70	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$287.19	$562.17	$274.99	$302.09	$864.26	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$233.49	$514.18	$280.68	$241.67	$755.85	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$663.23	$802.16	$138.93	$353.93	$1,156.09	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$595.02	$706.17	$111.14	$283.14	$989.31	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$549.55	$642.17	$92.62	$235.95	$878.12	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$517.07	$596.46	$79.39	$202.24	$798.70	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$492.71	$562.17	$69.46	$176.96	$739.14	tons
D03-076	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, single phase)	14 SEER (12.15 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$458.60	$514.18	$55.57	$141.57	$655.75	tons
D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$419.48	$904.24	$484.76	$604.18	$1,508.41	tons
D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$728.78	$365.60	$402.78	$1,131.56	tons

D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$335.04	$641.05	$306.01	$302.09	$943.14	tons
D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$318.15	$588.41	$270.26	$241.67	$830.08	tons
D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$775.78	$904.24	$128.46	$353.93	$1,258.16	tons
D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$630.84	$728.78	$97.94	$235.95	$964.73	tons
D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$558.38	$641.05	$82.67	$176.96	$818.01	tons
D03-077	HVAC Non-Residential	High eff. packaged split system HP (< 65k, single phase)	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$514.90	$588.41	$73.52	$141.57	$729.98	tons
D03-108	HVAC Non-Residential	High eff. packaged split system A/C (< 65k, 3 phase before 2008)	12 SEER three phase split-system A/C	T24 minimum: 10 SEER(9.17 EER) Three Phase Split A/C	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$398.61	$118.88	$402.78	$801.39	tons
D03-111	HVAC Non-Residential	High eff. packaged split system HP (< 65k, 3 phase before 2008)	12 SEER / 7.4 HSPF three phase split-system A/C heat pump	12 SEER(10.40 EER)/7.7 HSPF(3.20 COP) Three Phase Split A/C Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$549.68	$186.50	$207.35	$757.03	tons

HVAC - NON-RESIDENTIAL - SYSTEMS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-050	HVAC Non-Residential	VAV box retrofit on constant volume system	damper controlled VAV with 30% min-cfm-ratio	Constant Volume air flow	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$0.34	$0.00	$0.24	$0.59	CFM
D03-052	HVAC Non-Residential	Convert VAVS system to PIU system	Convert VAVS sytem to PIU system	damper controlled VAV with 30% min-cfm-ratio	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$0.99	$0.00	$0.20	$1.19	CFM
D03-056	HVAC Non-Residential	Heat recovery from exhaust hoods	70% heat recovery effectiveness	no exhaust heat recovery	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$1.70	$0.00	$0.29	$1.99	CFM
D03-057	HVAC Non-Residential	rotary air-to-air enthalpy heat recovery	70% sensible and latent recovery effectiveness	no exhaust heat recovery	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$1.78	$0.00	$0.33	$2.11	CFM
D03-058	HVAC Non-Residential	Packaged system Economizer retrofit	Add econo with Econo Lockout=NO, DB limit = 68, Max OSA = 100%	No Economizer	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$126.76	$0.00	$43.34	$170.11	tons
D03-059	HVAC Non-Residential	Central HVAC system Economizer retrofit	Add ecomizer with Econo Lockout=NO, DB limit = 68, Max OSA = 100%	T24 baseline matches prototype	Not available	RET/NEW			FULL/FULL		Not available				tons
D03-051	HVAC Non-Residential	Variable Frequency Drive motors use on VAV fans	VFD with 30% min-cfm-ratio	damper controlled VAV with 30% min-cfm-ratio	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$155.96	$0.00	$65.93	$221.88	HP
D03-098	HVAC Non-Residential	Add water economizer heat exchanger to CW Loop	Non integrated evaporator precooler heat exchanger	No water economizer	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00		$0.00	See Note	$462.69	tons
D03-070	HVAC Non-Residential	Variable flow hydronic water loop	2-way valves, with VSD pumping	constant flow hydronic water loop	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$16.65	$0.00	$9.48	$26.14	GPM
D03-069	HVAC Non-Residential	High efficiency WLHP system for Large Office	WLHP system with 14.0 EER / 4.6 COP	WLHP system with COP = 3.0	Contractor	RET/ROB/NEW	no	Low	FULL/INCR/INCR	$561.14	$740.93	$179.79	$229.97	$970.90	tons

HVAC - RESIDENTIAL - EVAP COOLERS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-405	HVAC Residential	Direct Evaporative Cooler	Direct Evaporative Cooler	10 SEER(8.7 EER) Split-System Air Conditioner	Retail/ Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$839.17	$813.44	($25.73)	$814.12	$1,627.56	Cooler
D03-407	HVAC Residential	Direct-Indirect Evaporative Cooler	Direct-Indirect Evaporative Cooler	10 SEER(8.7 EER) Split-System Air Conditioner	Retail/ Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$839.17	$1,553.00	$713.83	$814.12	$2,367.12	Cooler

HVAC - RESIDENTIAL - FURNACES

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 60,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$9.57	$21.53	$11.96	$19.98	$41.51	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 70,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$8.65	$18.37	$9.72	$17.12	$35.49	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 80,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.96	$16.20	$8.24	$14.98	$31.18	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 90,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.42	$14.69	$7.27	$13.32	$28.01	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace,100,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.99	$13.65	$6.66	$11.99	$25.63	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 110,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.64	$12.94	$6.31	$10.90	$23.84	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 115,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.48	$12.69	$6.21	$10.42	$23.11	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 120,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.34	$12.49	$6.15	$9.99	$22.48	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 125,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.21	$12.34	$6.13	$9.51	$21.85	kBtuh
D03-410	HVAC Residential	Condensing 90 AFUE (1.11 HIR) Furnace	Condensing 90 AFUE (1.11 HIR) Furnace, 140,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$5.88	$12.13	$6.25	$8.56	$20.69	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 60,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$9.57	$22.50	$12.93	$19.98	$42.48	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 70,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$8.65	$19.34	$10.69	$17.12	$36.46	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 80,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.96	$17.17	$9.21	$14.98	$32.15	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 90,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.42	$15.66	$8.24	$13.32	$28.98	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace,100,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.99	$14.62	$7.63	$11.99	$26.61	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 110,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.64	$13.92	$7.28	$10.90	$24.81	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 115,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.48	$13.66	$7.18	$10.42	$24.08	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 120,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.34	$13.46	$7.12	$9.99	$23.45	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 125,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.21	$13.31	$7.10	$9.51	$22.83	kBtuh
D03-411	HVAC Residential	Condensing 92 AFUE (1.08 HIR) Furnace	Condensing 92 AFUE (1.11 HIR) Furnace, 140,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$5.88	$13.10	$7.22	$8.56	$21.66	kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 60,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$9.57	$23.48	$13.90	$19.98	$43.45	kBtuh

D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 70,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$8.65	$20.31	$11.66	$17.12	$37.44 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 80,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.96	$18.14	$10.18	$14.98	$33.13 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 90,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.42	$16.64	$9.22	$13.32	$29.95 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace,100,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.99	$15.59	$8.60	$11.99	$27.58 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 110,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.64	$14.89	$8.25	$10.90	$25.79 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 115,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.48	$14.64	$8.15	$10.42	$25.06 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 120,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.34	$14.44	$8.09	$9.99	$24.43 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 125,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.21	$14.29	$8.07	$9.51	$23.80 kBtuh
D03-412	HVAC Residential	Condensing 94 AFUE (1.06 HIR) Furnace	Condensing 94 AFUE (1.11 HIR) Furnace, 140,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$5.88	$14.08	$8.19	$8.56	$22.64 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 60,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$9.57	$24.45	$14.88	$19.98	$44.43 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 70,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$8.65	$21.29	$12.63	$17.12	$38.41 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 80,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.96	$19.12	$11.16	$14.98	$34.10 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 90,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$7.42	$17.61	$10.19	$13.32	$30.93 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace,100,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.99	$16.57	$9.58	$11.99	$28.55 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 110,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.64	$15.86	$9.23	$10.90	$26.76 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 115,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.48	$15.61	$9.12	$10.42	$26.03 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 120,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.34	$15.41	$9.07	$9.99	$25.40 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 125,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$6.21	$15.26	$9.05	$9.51	$24.77 kBtuh
D03-413	HVAC Residential	Condensing 96 AFUE (1.03 HIR) Furnace	Condensing 96 AFUE (1.11 HIR) Furnace, 140,000 Btu single stage	80 AFUE(1.23 HIR) Furnace	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$5.88	$15.05	$9.17	$8.56	$23.61 kBtuh

HVAC - RESIDENTIAL - REFRIGERANT CHARGE AND DUCT SEALING

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-408	HVAC Residential	Typical Refrigerant Charge Adjustment (< ±20% rated charge)	Standard Cooling Performance (proper refrigerant charge)	Clg Eff Decreased by 15%	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$10.36	$0.00	$28.00	$38.36	tons
D03-409	HVAC Residential	High Refrigerant Charge Adjustment (>= ±20% rated charge)	Standard Cooling Performance (proper refrigerant charge)	Clg Eff Decreased by 15% & Supply Duct Leakage 20%	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$17.87	$0.00	$28.47	$46.33	tons

D03-459	HVAC Residential	Typical Refrigerant Charge Adjustment (< ±20% rated charge) + Duct Sealing	Standard Cooling Performance, reduced duct loss	Cooling Performance degraded, standard duct loss	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$27.03	$0.00	$119.24	$146.27	tons
D03-460	HVAC Residential	High Refrigerant Charge Adjustment (>= ±20% rated charge) + Duct Sealing	Standard Cooling Performance, reduced duct loss	Cooling Performance degraded, standard duct loss	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$34.53	$0.00	$119.71	$154.24	tons
D03-418	Labor Only	Duct Sealing (Total Leakage Reduced from 40% of AHU flow to 12%)	Duct Sealing (Total Leakage Reduced from 40% of AHU flow to 12%)	Supply/return/OA leakage 20/16/4% of AHU flow	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$16.67	$0.00	$91.24	$107.91	Tons
D03-458	Labor Only	Duct Sealing (Total Leakage Reduced from 24% of AHU flow to 12%)	Duct Sealing (Total Leakage Reduced from 24% of AHU flow to 12%)	Supply/return/OA leakage 12/9.6/2.4% of AHU flow	Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$16.67	$0.00	$91.24	$107.91	Tons

HVAC - RESIDENTIAL - SPLIT AC & HP - 10 AND 13 SEER BASE

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-402	HVAC Residential	13 SEER (11.09 EER) Split System Air Conditioner	13 SEER (11.09 EER) Split System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$371.85	$663.23	$291.39	$604.18	$1,267.41	tons
D03-402	HVAC Residential	13 SEER (11.09 EER) Split System Air Conditioner	13 SEER (11.09 EER) Split System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$330.39	$595.02	$264.63	$483.34	$1,078.36	tons
D03-402	HVAC Residential	13 SEER (11.09 EER) Split System Air Conditioner	13 SEER (11.09 EER) Split System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$549.55	$269.83	$402.78	$952.33	tons
D03-402	HVAC Residential	13 SEER (11.09 EER) Split System Air Conditioner	13 SEER (11.09 EER) Split System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$297.76	$517.07	$219.31	$345.24	$862.31	tons
D03-402	HVAC Residential	13 SEER (11.09 EER) Split System Air Conditioner	13 SEER (11.09 EER) Split System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$287.19	$492.71	$205.52	$302.09	$794.80	tons
D03-402	HVAC Residential	13 SEER (11.09 EER) Split System Air Conditioner	13 SEER (11.09 EER) Split System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$233.49	$458.60	$225.11	$241.67	$700.27	tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$371.85	$802.16	$430.32	$604.18	$1,406.34	tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$330.39	$706.17	$375.77	$483.34	$1,189.51	tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$642.17	$362.45	$402.78	$1,044.95	tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$297.76	$596.46	$298.70	$345.24	$941.70	tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$287.19	$562.17	$274.99	$302.09	$864.26	tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$233.49	$514.18	$280.68	$241.67	$755.85	tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$371.85	$941.09	$569.25	$604.18	$1,545.27	tons

D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$330.39	$817.31	$486.92	$483.34	$1,300.65 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$734.79	$455.07	$402.78	$1,137.57 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$297.76	$675.84	$378.08	$345.24	$1,021.09 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$287.19	$631.64	$344.45	$302.09	$933.72 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$233.49	$569.75	$336.25	$241.67	$811.42 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$371.85	$1,080.02	$708.17	$604.18	$1,684.19 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$330.39	$928.45	$598.06	$483.34	$1,411.79 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$827.41	$547.68	$402.78	$1,230.19 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$297.76	$755.23	$457.47	$345.24	$1,100.48 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$287.19	$701.10	$413.91	$302.09	$1,003.19 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$233.49	$625.32	$391.83	$241.67	$866.99 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$371.85	$1,218.95	$847.10	$604.18	$1,823.12 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$330.39	$1,039.59	$709.20	$483.34	$1,522.93 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$920.03	$640.30	$402.78	$1,322.81 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$297.76	$834.62	$536.86	$345.24	$1,179.86 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$287.19	$770.57	$483.38	$302.09	$1,072.65 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$233.49	$680.89	$447.40	$241.67	$922.56 tons

D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$371.85	$1,357.87	$986.03	$604.18	$1,962.05 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$330.39	$1,150.74	$820.34	$483.34	$1,634.08 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$279.72	$1,012.64	$732.92	$402.78	$1,415.43 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$297.76	$914.01	$616.25	$345.24	$1,259.25 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$287.19	$840.03	$552.84	$302.09	$1,142.12 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	10 SEER(8.7 EER) Split-System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$233.49	$736.46	$502.97	$241.67	$978.13 tons
D03-402	HVAC Residential	13 SEER (10 EER) Split-System Air Conditioner	13 SEER (11.09 EER) Split System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$549.55	$549.55	$ -	$235.95	$785.50 tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$663.23	$802.16	$138.93	$353.93	$1,156.09 tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$595.02	$706.17	$111.14	$283.14	$989.31 tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$549.55	$642.17	$92.62	$235.95	$878.12 tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$517.07	$596.46	$79.39	$202.24	$798.70 tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$492.71	$562.17	$69.46	$176.96	$739.14 tons
D03-403	HVAC Residential	14 SEER (11.99 EER) Split-System Air Conditioner	14 SEER (11.99 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$458.60	$514.18	$55.57	$141.57	$655.75 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$663.23	$941.09	$277.86	$353.93	$1,295.02 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$595.02	$817.31	$222.28	$283.14	$1,100.45 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$549.55	$734.79	$185.24	$235.95	$970.74 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$517.07	$675.84	$158.77	$202.24	$878.09 tons

D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$492.71	$631.64	$138.93	$176.96	$808.60 tons
D03-404	HVAC Residential	15 SEER (12.72 EER) Split-System Air Conditioner	15 SEER (12.72 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$458.60	$569.75	$111.14	$141.57	$711.32 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$663.23	$1,080.02	$416.78	$353.93	$1,433.94 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$595.02	$928.45	$333.43	$283.14	$1,211.59 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$549.55	$827.41	$277.86	$235.95	$1,063.36 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$517.07	$755.23	$238.16	$202.24	$957.48 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$492.71	$701.10	$208.39	$176.96	$878.06 tons
D03-463	HVAC Residential	16 SEER (11.61 EER) Split System Air Conditioner	16 SEER (11.61 EER) Split System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$458.60	$625.32	$166.71	$141.57	$766.89 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$663.23	$1,218.95	$555.71	$353.93	$1,572.87 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$595.02	$1,039.59	$444.57	$283.14	$1,322.73 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$549.55	$920.03	$370.47	$235.95	$1,155.98 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$517.07	$834.62	$317.55	$202.24	$1,036.86 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$492.71	$770.57	$277.86	$176.96	$947.53 tons
D03-464	HVAC Residential	17 SEER (12.28 EER) Split-System Air Conditioner	17 SEER (12.28 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$458.60	$680.89	$222.28	$141.57	$822.46 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 2 ton (24,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$663.23	$1,357.87	$694.64	$353.93	$1,711.80 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 2.5 ton (30,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$595.02	$1,150.74	$555.71	$283.14	$1,433.88 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 3 ton (36,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$549.55	$1,012.64	$463.09	$235.95	$1,248.59 tons

D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 3.5 ton (42,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$517.07	$914.01	$396.94	$202.24	$1,116.25 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 4 ton (48,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$492.71	$840.03	$347.32	$176.96	$1,016.99 tons
D03-465	HVAC Residential	18 SEER (13.37 EER) Split-System Air Conditioner	18 SEER (13.37 EER) Split-System Air Conditioner, 5 ton (60,000 Btu) condenser and matched cased coil	T24 minimum: 13 SEER(11.09 EER) Split System Air Conditioner	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$458.60	$736.46	$277.86	$141.57	$878.03 tons
D03-414	HVAC Residential	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump, 2 ton (24,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$419.48	$775.78	$356.30	$604.18	$1,379.96 tons
D03-414	HVAC Residential	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump. 3 ton (36,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$630.84	$267.66	$402.78	$1,033.63 tons
D03-414	HVAC Residential	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump, 4 ton (48,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$335.04	$558.38	$223.34	$302.09	$860.46 tons
D03-414	HVAC Residential	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump, 5 ton (60,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$318.15	$514.90	$196.75	$241.67	$756.57 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$419.48	$904.24	$484.76	$604.18	$1,508.41 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$728.78	$365.60	$402.78	$1,131.56 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$335.04	$641.05	$306.01	$302.09	$943.14 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$318.15	$588.41	$270.26	$241.67	$830.08 tons
D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$419.48	$1,032.70	$613.22	$604.18	$1,636.87 tons
D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$826.72	$463.53	$402.78	$1,229.50 tons
D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$335.04	$723.73	$388.69	$302.09	$1,025.81 tons
D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$318.15	$661.93	$343.78	$241.67	$903.60 tons
D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$419.48	$1,161.15	$741.68	$604.18	$1,765.33 tons
D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$924.65	$561.47	$402.78	$1,327.44 tons

D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$335.04	$806.40	$471.36	$302.09	$1,108.49 tons
D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$318.15	$735.45	$417.30	$241.67	$977.12 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$419.48	$1,289.61	$870.13	$604.18	$1,893.79 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$1,022.59	$659.40	$402.78	$1,425.37 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$335.04	$889.08	$554.04	$302.09	$1,191.16 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$318.15	$808.97	$490.82	$241.67	$1,050.64 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$419.48	$1,418.07	$998.59	$604.18	$2,022.25 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$363.18	$1,120.52	$757.34	$402.78	$1,523.31 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$335.04	$971.75	$636.71	$302.09	$1,273.84 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	10 SEER(8.7 EER)/6.8 HSPF(3.0 COP) Split-System Heat Pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$318.15	$882.49	$564.34	$241.67	$1,124.16 tons
D03-414	HVAC Residential	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat Pump	13 SEER (11.07 EER) / 8.1 HSPF (3.28 COP) A/C Heat pump. 3 ton (36,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$630.84	$630.84	$ -	$235.95	$866.79 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$775.78	$904.24	$128.46	$353.93	$1,258.16 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$630.84	$728.78	$97.94	$235.95	$964.73 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$558.38	$641.05	$82.67	$176.96	$818.01 tons
D03-415	HVAC Residential	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump	14 SEER (12.19 EER) / 8.6 HSPF (3.52 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$514.90	$588.41	$73.52	$141.57	$729.98 tons
D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$775.78	$1,032.70	$256.92	$353.93	$1,386.62 tons
D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$630.84	$826.72	$195.87	$235.95	$1,062.67 tons

D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$558.38	$723.73	$165.35	$176.96	$900.69 tons
D03-416	HVAC Residential	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump	15 SEER (12.70 EER) / 8.8 HSPF (3.74 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$514.90	$661.93	$147.04	$141.57	$803.50 tons
D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$775.78	$1,161.15	$385.37	$353.93	$1,515.08 tons
D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$630.84	$924.65	$293.81	$235.95	$1,160.60 tons
D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$558.38	$806.40	$248.02	$176.96	$983.36 tons
D03-466	HVAC Residential	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$514.90	$735.45	$220.56	$141.57	$877.02 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$775.78	$1,289.61	$513.83	$353.93	$1,643.54 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$630.84	$1,022.59	$391.74	$235.95	$1,258.54 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$558.38	$889.08	$330.70	$176.96	$1,066.04 tons
D03-467	HVAC Residential	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$514.90	$808.97	$294.07	$141.57	$950.54 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 2 ton (24,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$775.78	$1,418.07	$642.29	$353.93	$1,772.00 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 3 ton (36,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$630.84	$1,120.52	$489.68	$235.95	$1,356.47 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 4 ton (48,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$558.38	$971.75	$413.37	$176.96	$1,148.71 tons
D03-417	HVAC Residential	18 SEER (12.8 EER) / 9.2 HSPF (3.66 COP) A/C Heat Pump	18 SEER (12.88 EER) / 8.5 HSPF (3.32 COP) A/C Heat Pump, 5 ton (60,000 Btu) heat pump	T24 minimum: 13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$514.90	$882.49	$367.59	$141.57	$1,024.06 tons

Appendix B: Measure Cost Data

HVAC - RESIDENTIAL - WHOLE HOUSE FANS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-441	HVAC Residential	Whole House Fans	Whole House Fan (CFM <4000)	No Night Ventilation/Economizer	retail	RET/NEW	No	low	FULL/FULL	$0.00	$450.91	$0.00	$244.12	$695.03	Fan
D03-441	HVAC Residential	Whole House Fans	Whole House Fan (CFM 4000-6000)	No Night Ventilation/Economizer	retail	RET/NEW	No	low	FULL/FULL	$0.00	$243.17	$0.00	$269.72	$512.89	Fan
D03-441	HVAC Residential	Whole House Fans	Whole House Fan (CFM 6000-8000)	No Night Ventilation/Economizer	retail	RET/NEW	No	low	FULL/FULL	$0.00	$400.56	$0.00	$295.32	$695.88	Fan
D03-441	HVAC Residential	Whole House Fans	Whole House Fan (CFM >8000)	No Night Ventilation/Economizer	retail	RET/NEW	No	low	FULL/FULL	$0.00	$409.65	$0.00	$320.92	$730.57	Fan

INSULATION

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-419	Insulation	Ceiling R-19 Insulation	Ceiling R-19 Insulation	R-0 Ceiling Insulation	Retail/Contractor	RET	No	High	FULL	$0.00	$0.38	$0.00	$0.24	$0.62	SqFt
D03-420	Insulation	Ceiling R-0 to R-30 Insulation-Batts	Ceiling R-0 to R-30 Insulation-Batts	R-0 Ceiling Insulation	Retail/Contractor	RET	No	High	FULL	$0.00	$0.56	$0.00	$0.19	$0.76	SqFt
D03-421	Insulation	Ceiling R-0 to R-38 Insulation-Batts	Ceiling R-0 to R-38 Insulation-Batts	R-0 Ceiling Insulation	Retail/Contractor	RET	No	High	FULL	$0.00	$0.70	$0.00	$0.16	$0.86	SqFt
D03-422	Insulation	Ceiling Vintage to R-30 Insulation-Batts	Ceiling Vintage to R-30 Insulation-Batts	R-19 Ceiling Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.38	$0.56	$0.19	$0.19	$0.76	SqFt
D03-423	Insulation	Ceiling Vintage to R-38 Insulation-Batts	Ceiling Vintage to R-38 Insulation-Batts	R-19 Ceiling Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.38	$0.70	$0.33	$0.16	$0.86	SqFt
D03-424	Insulation	Ceiling Vintage to R-49 Insulation-Batts	Ceiling Vintage to R-49 Insulation-Batts	R-30 Ceiling Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.56	$0.70	$0.14	$0.16	$0.86	SqFt
D03-425	Insulation	Floor R-13 Insulation-Batts	Floor R-13 Insulation-Batts	R-0 Floor Insulation	Retail/Contractor	RET	No	High	FULL	$0.00	$0.27	$0.00	$0.42	$0.69	SqFt
D03-426	Insulation	Floor R-0 to R-19 Insulation Batts	Floor R-0 to R-19 Insulation Batts	R-0 Floor Insulation	Retail/Contractor	RET	No	High	FULL	$0.00	$0.38	$0.00	$0.51	$0.89	SqFt
D03-427	Insulation	Floor R-0 to R-30 Insulation Batts	Floor R-0 to R-30 Insulation Batts	R-0 Floor Insulation	Retail/Contractor	RET	No	High	FULL	$0.00	$0.56	$0.00	$0.78	$1.34	SqFt
D03-428	Insulation	Floor R-19 to R-30 Insulation-Batts	Floor R-19 to R-30 Insulation Batts	R-19 Floor Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.38	$0.56	$0.19	$0.78	$1.34	SqFt
D03-429	Insulation	Wall 2x4 R-15 Insulation-Batts	Wall 2x4 R-15 Insulation-Batts	2x4 Wall w/R-13 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.27	$0.31	$0.03	$0.30	$0.61	SqFt
D03-430	Insulation	Wall 2x6 R-19 Insulation-Batts	Wall 2x6 R-19 Insulation-Batts	2x4 Wall w/R-13 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.27	$0.38	$0.10	$0.28	$0.65	SqFt
D03-431	Insulation	Wall 2x6 R-21 Insulation-Batts	Wall 2x6 R-21 Insulation-Batts	2x4 Wall w/R-13 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.27	$0.41	$0.14	$0.27	$0.68	SqFt
D03-432	Insulation	Wall 2x6 R-19 Insulation-Batts	Wall 2x6 R-19 Insulation-Batts	2x4 Wall w/R-15 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.31	$0.38	$0.07	$0.28	$0.65	SqFt
D03-433	Insulation	Wall 2x6 R-21 Insulation-Batts	Wall 2x6 R-21 Insulation-Batts	2x4 Wall w/R-15 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.31	$0.41	$0.10	$0.27	$0.68	SqFt
D03-434	Insulation	Wall 2x6 R-21 Insulation-Batts	Wall 2x6 R-21 Insulation-Batts	2x6 Wall w/R-19 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.38	$0.41	$0.03	$0.27	$0.68	SqFt
D03-435	Insulation	Wall 2x4 R-13 Batts + R-5 Rigid	Wall 2x4 R-13 Batts + R-5 Rigid	2x4 Wall w/R-13 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.27	$0.72	$0.45	$0.65	$1.37	SqFt
D03-436	Insulation	Wall 2x6 R-19 Batts + R-5 Rigid	Wall 2x6 R-19 Batts + R-5 Rigid	2x6 Wall w/R-19 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.38	$0.82	$0.45	$0.74	$1.56	SqFt
D03-437	Insulation	Wall 2x6 R-21 Batts + R-5 Rigid	Wall 2x6 R-21 Batts + R-5 Rigid	2x6 Wall w/R-21 Insulation	Retail/Contractor	RET/NEW	No	High	FULL/INCR	$0.41	$0.86	$0.45	$0.98	$1.84	SqFt
D03-438	Insulation	Wall Blow-In R-13 Insulation	Wall Blow-In R-13 Insulation	2x4 Wall w/out Insulation	Retail/Contractor	RET	No	High	FULL	$0.00	$0.15	$0.00	$1.17	$1.32	SqFt
D03-013	Insulation	Older building ceiling/roof insulation up to current standards	Ceiling R-value for oldest vintages increased to 'new' level	Ceiling R-value based on vintage and climate zone	Retail/Contractor	RET	No	High	FULL	$0.00	$376.23	$0.00	$239.83	$616.06	1000 SqFt
D03-123	Insulation	Floor Insulation	Floor insulation raised to 2005 levels	T24 minimum floor insulation levels	Retail/Contractor	RET	No	High	FULL	$0.00	$0.27	$0.00	$0.42	$0.69	SqFt

INSULATION - DUCT INSULATION

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-075	Duct Insulation	Increased duct insulation in older vintages	Old vintage increases duct insulation to R-4.2, 78-91 vintage to R-8	Duct insulation level a function of Vintage/System type	Retail	RET	No	Low	FULL	$0.00	$0.68	$0.00	$2.40	$3.08	SqFt

INSULATION - TANK WRAP

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-014	DHW	Insulation added to poorly insulated DHW tanks	Approximately R-12 tank insulation, based on tank size	Approximately R-6 tank insulation, based on tank size	Retail	RET/NEW	No	Low	FULL/INCR	$16.10	$28.92	$12.81	$45.29	$74.21	Tank

LIGHTING - BALLASTS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-852	LTG	Premium T8 El Ballast	Four ft. 2 lamp fixture, ballast factor of less than or equal to 0.77	T8 32W El Ballast	Retail/Contractor	ROB/NEW	No	Low	INCR/INCR	$19.23	$23.42	$4.19	$0.00	$0.00	Fixture
D03-852	LTG	Premium T8 El Ballast	Four ft. 2 lamp fixture, ballast factor of less than or equal to 0.77	T8 32W El Ballast	Retail/Contractor	ROB/NEW	No	High	INCR/INCR	$15.54	$18.93	$3.39	$0.00	$0.00	Fixture
D03-853	LTG	T8 32W Dimming El Ballast	Four ft. 2 lamp fixture	T12 34W Mag ES Ballast	Contractor	RET/NEW	No	Low	FULL/INCR	$16.54	$72.89	$56.34	$16.96	$89.85	Fixture
D03-853	LTG	T8 32W Dimming El Ballast	Four ft. 2 lamp fixture	T12 34W Mag ES Ballast	Contractor	RET/NEW	No	High	FULL/INCR	$13.96	$61.49	$47.53	$16.96	$78.45	Fixture

LIGHTING - LAMPS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-801	LTG	7-13 Watt integral CFL	7-13 Watt < 800 Lumens - screw-in	40W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.57	$4.98	$4.40	$3.77	$8.18	Lamp
D03-801	LTG	7-13 Watt integral CFL	7-13 Watt < 800 Lumens - screw-in	40W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.57	$4.17	$3.60	$3.77	$7.37	Lamp
D03-802	LTG	13 Watt integral CFL	13 Watt ≥800 Lumens - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$4.87	$4.26	$3.77	$8.04	Lamp
D03-802	LTG	13 Watt integral CFL	13 Watt ≥800 Lumens - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$4.08	$3.47	$3.77	$7.25	Lamp
D03-803	LTG	14 Watt integral CFL	14 Watt - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$5.25	$4.64	$3.77	$8.41	Lamp
D03-803	LTG	14 Watt integral CFL	14 Watt - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$4.39	$3.79	$3.77	$7.56	Lamp
D03-804	LTG	15 Watt integral CFL	15 Watt - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$5.62	$5.01	$3.77	$8.79	Lamp
D03-804	LTG	15 Watt integral CFL	15 Watt - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$4.71	$4.10	$3.77	$7.87	Lamp
D03-805	LTG	16 Watt integral CFL	16 Watt - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$6.00	$5.39	$3.77	$9.16	Lamp
D03-805	LTG	16 Watt integral CFL	16 Watt - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$5.02	$4.41	$3.77	$8.19	Lamp
D03-806	LTG	18 Watt integral CFL	18 Watt < 1,100 Lumens - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$6.74	$6.14	$3.77	$9.91	Lamp
D03-806	LTG	18 Watt integral CFL	18 Watt < 1,100 Lumens - screw-in	60W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$5.65	$5.04	$3.77	$8.82	Lamp
D03-807	LTG	18 Watt integral CFL	18 Watt ≥1,100 Lumens - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$6.37	$5.77	$3.77	$9.54	Lamp
D03-807	LTG	18 Watt integral CFL	18 Watt ≥1,100 Lumens - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$5.34	$4.73	$3.77	$8.50	Lamp
D03-808	LTG	19 Watt integral CFL	19 Watt ≥1,100 Lumens - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$6.73	$6.12	$3.77	$9.89	Lamp
D03-808	LTG	19 Watt integral CFL	19 Watt ≥1,100 Lumens - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$5.63	$5.03	$3.77	$8.80	Lamp
D03-809	LTG	20 Watt integral CFL	20 Watt - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$7.08	$6.47	$3.77	$10.25	Lamp
D03-809	LTG	20 Watt integral CFL	20 Watt - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$5.93	$5.32	$3.77	$9.10	Lamp
D03-810	LTG	23 Watt integral CFL	23 Watt - screw-in	100W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$6.66	$6.05	$3.77	$9.82	Lamp
D03-810	LTG	23 Watt integral CFL	23 Watt - screw-in	100W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$5.58	$4.97	$3.77	$8.74	Lamp
D03-811	LTG	25 Watt integral CFL	25 Watt <1,600 Lumens - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	Low	FULL/INCR/INCR	$0.61	$8.85	$8.24	$3.77	$12.02	Lamp
D03-811	LTG	25 Watt integral CFL	25 Watt <1,600 Lumens - screw-in	75W Incandescent	Retail/Contractor	RET/ROB/NEW	Yes	High	FULL/INCR/INCR	$0.61	$7.41	$6.81	$3.77	$10.58	Lamp

D03-812	LTG	25 Watt integral CFL	25 Watt ≥1,600 Lumens - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	Low	FULL/INCR/INC R	$0.61	$7.24	$6.63	$3.77	$10.40 Lamp
D03-812	LTG	25 Watt integral CFL	25 Watt ≥1,600 Lumens - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	High	FULL/INCR/INC R	$0.61	$6.06	$5.45	$3.77	$9.23 Lamp
D03-813	LTG	26 Watt integral CFL	26 Watt <1,600 Lumens - screw-in	75W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	Low	FULL/INCR/INC R	$0.61	$9.21	$8.60	$3.77	$12.37 Lamp
D03-813	LTG	26 Watt integral CFL	26 Watt <1,600 Lumens - screw-in	75W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	High	FULL/INCR/INC R	$0.61	$7.71	$7.10	$3.77	$10.88 Lamp
D03-814	LTG	26 Watt integral CFL	26 Watt ≥1,600 Lumens - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	Low	FULL/INCR/INC R	$0.61	$7.52	$6.92	$3.77	$10.69 Lamp
D03-814	LTG	26 Watt integral CFL	26 Watt ≥1,600 Lumens - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	High	FULL/INCR/INC R	$0.61	$6.30	$5.69	$3.77	$9.47 Lamp
D03-815	LTG	28 Watt integral CFL	28 Watt - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	Low	FULL/INCR/INC R	$0.61	$8.10	$7.50	$3.77	$11.27 Lamp
D03-815	LTG	28 Watt integral CFL	28 Watt - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	High	FULL/INCR/INC R	$0.61	$6.79	$6.18	$3.77	$9.95 Lamp
D03-816	LTG	32 Watt integral CFL	32 Watt - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	Low	FULL/INCR/INC R	$0.61	$9.26	$8.65	$3.77	$12.43 Lamp
D03-816	LTG	32 Watt integral CFL	32 Watt - screw-in	100W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	High	FULL/INCR/INC R	$0.61	$7.76	$7.15	$3.77	$10.92 Lamp
D03-817	LTG	36 Watt integral CFL	36 Watt - screw-in	150W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	Low	FULL/INCR/INC R	$2.22	$9.19	$6.97	$3.77	$10.75 Lamp
D03-817	LTG	36 Watt integral CFL	36 Watt - screw-in	150W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	High	FULL/INCR/INC R	$2.22	$7.70	$5.48	$3.77	$9.26 Lamp
D03-818	LTG	50 Watt integral CFL	50 Watt - screw-in	150W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	Low	FULL/INCR/INC R	$2.22	$12.77	$10.55	$3.77	$14.32 Lamp
D03-818	LTG	50 Watt integral CFL	50 Watt - screw-in	150W Incandescent	Retail/Contract or	RET/ROB/NEW	Yes	High	FULL/INCR/INC R	$2.22	$10.69	$8.48	$3.77	$12.25 Lamp
D03-819	LTG	13 Watt Modular CFL	13 Watt < 800 Lumens - pin based	40W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$17.88	$0.00	$27.14	$45.02 Lamp
D03-819	LTG	13 Watt Modular CFL	13 Watt < 800 Lumens - pin based	40W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$17.43	$0.00	$27.14	$44.56 Lamp
D03-820	LTG	13 Watt Modular CFL	13 Watt ≥800 Lumens - pin based	60W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$17.88	$0.00	$27.14	$45.02 Lamp
D03-820	LTG	13 Watt Modular CFL	13 Watt ≥800 Lumens - pin based	60W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$17.43	$0.00	$27.14	$44.56 Lamp
D03-821	LTG	14 Watt Modular CFL	14 Watt - pin based	60W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$18.38	$0.00	$27.14	$45.51 Lamp
D03-821	LTG	14 Watt Modular CFL	14 Watt - pin based	60W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$17.91	$0.00	$27.14	$45.04 Lamp
D03-822	LTG	15 Watt Modular CFL	15 Watt - pin based	60W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$18.87	$0.00	$27.14	$46.01 Lamp
D03-822	LTG	15 Watt Modular CFL	15 Watt - pin based	60W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$18.39	$0.00	$27.14	$45.53 Lamp
D03-823	LTG	16 Watt Modular CFL	16 Watt - pin based	60W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$19.36	$0.00	$27.14	$46.50 Lamp
D03-823	LTG	16 Watt Modular CFL	16 Watt - pin based	60W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$18.87	$0.00	$27.14	$46.01 Lamp
D03-824	LTG	18 Watt Modular CFL	18 Watt < 1,100 Lumens - pin based	60W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$20.35	$0.00	$27.14	$47.49 Lamp
D03-824	LTG	18 Watt Modular CFL	18 Watt < 1,100 Lumens - pin based	60W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$19.83	$0.00	$27.14	$46.97 Lamp
D03-825	LTG	18 Watt Modular CFL	18 Watt ≥1,100 Lumens - pin based	75W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$20.35	$0.00	$27.14	$47.49 Lamp
D03-825	LTG	18 Watt Modular CFL	18 Watt ≥1,100 Lumens - pin based	75W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$19.83	$0.00	$27.14	$46.97 Lamp
D03-826	LTG	19 Watt Modular CFL	19 Watt ≥1,100 Lumens - pin based	75W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$20.84	$0.00	$27.14	$47.98 Lamp
D03-826	LTG	19 Watt Modular CFL	19 Watt ≥1,100 Lumens - pin based	75W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$20.31	$0.00	$27.14	$47.45 Lamp
D03-827	LTG	20 Watt Modular CFL	20 Watt - pin based	75W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$21.34	$0.00	$27.14	$48.48 Lamp
D03-827	LTG	20 Watt Modular CFL	20 Watt - pin based	75W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$20.79	$0.00	$27.14	$47.93 Lamp
D03-828	LTG	23 Watt Modular CFL	23 Watt - pin based	100W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$22.82	$0.00	$27.14	$49.96 Lamp
D03-828	LTG	23 Watt Modular CFL	23 Watt - pin based	100W Incandescent	Retail/Contract or	RET	Yes	High	FULL	$0.00	$22.23	$0.00	$27.14	$49.37 Lamp
D03-829	LTG	25 Watt Modular CFL	25 Watt <1,600 Lumens - pin based	75W Incandescent	Retail/Contract or	RET	Yes	Low	FULL	$0.00	$23.80	$0.00	$27.14	$50.94 Lamp

D03-829	LTG	25 Watt Modular CFL	25 Watt <1,600 Lumens - pin based	75W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$23.20	$0.00	$27.14	$50.33 Lamp
D03-830	LTG	25 Watt Modular CFL	25 Watt ≥1,600 Lumens - pin based	100W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$23.80	$0.00	$27.14	$50.94 Lamp
D03-830	LTG	25 Watt Modular CFL	25 Watt ≥1,600 Lumens - pin based	100W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$23.20	$0.00	$27.14	$50.33 Lamp
D03-831	LTG	26 Watt Modular CFL	26 Watt <1,600 Lumens - pin based	75W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$24.30	$0.00	$27.14	$51.44 Lamp
D03-831	LTG	26 Watt Modular CFL	26 Watt <1,600 Lumens - pin based	75W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$23.68	$0.00	$27.14	$50.81 Lamp
D03-832	LTG	26 Watt Modular CFL	26 Watt ≥1,600 Lumens - pin based	100W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$24.30	$0.00	$27.14	$51.44 Lamp
D03-832	LTG	26 Watt Modular CFL	26 Watt ≥1,600 Lumens - pin based	100W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$23.68	$0.00	$27.14	$50.81 Lamp
D03-833	LTG	28 Watt Modular CFL	28 Watt - pin based	100W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$25.28	$0.00	$27.14	$52.42 Lamp
D03-833	LTG	28 Watt Modular CFL	28 Watt - pin based	100W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$24.64	$0.00	$27.14	$51.78 Lamp
D03-834	LTG	30 Watt Modular CFL	30 Watt - pin based	120W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$26.27	$0.00	$27.14	$53.41 Lamp
D03-834	LTG	30 Watt Modular CFL	30 Watt - pin based	120W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$25.60	$0.00	$27.14	$52.74 Lamp
D03-835	LTG	40 Watt Modular CFL	40 Watt - pin based	120W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$31.20	$0.00	$27.14	$58.34 Lamp
D03-835	LTG	40 Watt Modular CFL	40 Watt - pin based	120W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$30.41	$0.00	$27.14	$57.54 Lamp
D03-836	LTG	55 Watt Modular CFL	55 Watt - pin based	200W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$38.60	$0.00	$27.14	$65.74 Lamp
D03-836	LTG	55 Watt Modular CFL	55 Watt - pin based	200W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$37.62	$0.00	$27.14	$64.75 Lamp
D03-837	LTG	65 Watt Modular CFL	65 Watt - pin based	200W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$43.54	$0.00	$27.14	$70.68 Lamp
D03-837	LTG	65 Watt Modular CFL	65 Watt - pin based	200W Incandescent	Retail/Contractor	RET	Yes	High	FULL	$0.00	$42.42	$0.00	$27.14	$69.56 Lamp

LIGHTING - CONTROLS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-001	LTG Controls	Reduced Lighting - 10% reduction	all lighting levels reduced by 10%	T24 maximum LPA per Table 146-C	Not priced						Not priced				
D03-002	LTG Controls	Reduced Lighting - 40% reduction	all lighting levels reduced by 40%	T24 maximum LPA per Table 146-C	Not priced						Not priced				
D03-003	LTG Controls	Small area lighting sensor control	lighting level reduced based on bldg type, activity area	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$210.13	$0.00	$112.21	$322.34	kW Ctrl
D03-004	LTG Controls	Large area lighting sensor control	lighting level reduced based on bldg type, activity area	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$99.38	$0.00	$90.67	$190.06	kW Ctrl
D03-005	LTG Controls	Add daylighting controls to side-lit space w/ cont. ctrl	add daylighting controls, min. lumen level based on bldg type	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$1,139.65	$0.00	$87.26	$1,226.91	kW Ctrl
D03-006	LTG Controls	Add daylighting controls to side-lit space w/ 2-step ctrl	add daylighting controls, min. lumen level based on bldg type	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$617.17	$0.00	$87.26	$704.43	kW Ctrl
D03-007	LTG Controls	Add daylighting controls to top-lit space w/ cont. ctrl	add daylighting controls, min. lumen level based on bldg type	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$733.20	$0.00	$23.80	$757.00	kW Ctrl
D03-008	LTG Controls	Add daylighting controls to top-lit space w/ 1-step ctrl	add daylighting controls, min. lumen level based on bldg type	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$79.20	$0.00	$23.80	$103.00	kW Ctrl
D03-009	LTG Controls	Add daylighting controls to top-lit space w/ 2-step ctrl	add daylighting controls, min. lumen level based on bldg type	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$79.20	$0.00	$23.80	$103.00	kW Ctrl
D03-010	LTG Controls	Timeclock for Lighting	minimum unoccupied lighting power density based on bldg type	N/A	retail/wholesale/contractor	RET/NEW	no	Low	FULL/FULL	$0.00	$76.96	$0.00	$41.73	$118.69	Timeclock
D03-856	LTG Controls	Occ-Sensor - Wall box	Assume control 3 2-lamp fixtures w/T8 34W EL Ballast	No Occupancy Sensor	Retail/Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$42.28	$0.00	$35.00	$77.28	Sensor

D03-858	LTG Controls	Timeclock:	Controling 4 - 70W (95W w/ballast) HPS fixtures	No Timeclock	Retail/Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$123.01	$0.00	$116.88	$239.89	Timeclock
D03-859	LTG Controls	Photocell:	Assume in conjunction with time-clock controling 4 - 70W (95W w/ballast) HPS fixtures	No Photocell	Retail/Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$12.06	$0.00	$47.75	$59.81	Photocell

LIGHTING - FIXTURES

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-838	LTG	20W CFL Table Lamp	20W CFL Table Lamp - pin based	60W Incandescent Table Lamp	Retail	RET/NEW	No	Low	INCR/INCR	$50.43	$50.43	$ -	$0.00	$0.00	Fixture
D03-839	LTG	25W CFL Table Lamp	25W CFL Table Lamp - pin based	75W Incandescent Table Lamp	Retail	RET/NEW	No	Low	INCR/INCR	$61.13	$61.13	$ -	$0.00	$0.00	Fixture
D03-840	LTG	30W CFL Table Lamp	30W CFL Table Lamp - pin based	100W Incandescent Table Lamp	Retail	RET/NEW	No	Low	INCR/INCR	$63.20	$63.20	$ -	$0.00	$0.00	Fixture
D03-841	LTG	55W CFL Table Lamp	55W CFL Table Lamp - pin based	150W Incandescent Table Lamp	Retail	RET/NEW	No	Low	INCR/INCR	$122.96	$122.96	$ -	$0.00	$0.00	Fixture
D03-842	LTG	55W CFL Torchiere	55W CFL Torchiere - pin based	300W Halogen Bulb Torchiere	Retail	RET/NEW	No	Low	INCR/INCR	$59.39	$59.39	$ -	$0.00	$0.00	Torchiere
D03-843	LTG	70W CFL Torchiere (two LAMPs)	70W CFL Torchiere (two LAMPs) - pin based	300W Halogen Bulb Torchiere	Retail	RET/NEW	No	Low	INCR/INCR	$55.76	$55.76	$ -	$0.00	$0.00	Torchiere
D03-844	LTG	50W Metal Halide	50W Metal Halide	150W Incandescent	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$113.85	$0.00	$100.51	$214.36	Fixture
D03-845	LTG	75 Metal Halide	75 Metal Halide	100W Mercury Vapor	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$120.09	$0.00	$100.51	$220.60	Fixture
D03-846	LTG	100W Metal Halide	100W Metal Halide	175W Mercury Vapor	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$126.66	$0.00	$100.51	$227.17	Fixture
D03-847	LTG	175W PS Metal Halide	175W PS Metal Halide	250W Metal Halide	Retail/Contractor	RET	No	Low	FULL	$0.00	$129.01	$0.00	$67.84	$196.86	Fixture
D03-848	LTG	175W PS Metal Halide	175W PS Metal Halide	500W Incandescent	Retail/Contractor	RET	No	Low	FULL	$0.00	$129.01	$0.00	$67.84	$196.86	Fixture
D03-849	LTG	250W PS Metal Halide	250W PS Metal Halide	400W Mercury Vapor	Retail/Contractor	RET	No	Low	FULL	$0.00	$152.08	$0.00	$67.84	$219.92	Fixture
D03-850	LTG	200W HPS	200W HPS	400W Mercury Vapor	Retail/Contractor	RET	No	Low	FULL	$0.00	$91.05	$0.00	$67.84	$158.89	Fixture
D03-851	LTG	180W LPS	180W LPS	400W Mercury Vapor	Retail/Contractor	RET	No	Low	FULL	$0.00	$74.62	$0.00	$67.84	$142.46	Fixture
D03-854	LTG	De-lamp from 4', 4 lamp/fixture	Four ft. 4 lamp fixture	Four ft. 4 lamp fixture	Retail/Contractor	RET	No	Low	FULL	$0.00	$3.08	$0.00	$22.63	$25.71	Fixture
D03-855	LTG	De-lamp from 8', 4 lamp/fixture	Eight ft. 4 lamp fixture	Eight ft. 4 lamp fixture	Retail/Contractor	RET	No	Low	FULL	$0.00	$3.28	$0.00	$22.63	$25.91	Fixture
D03-860	LTG	LED Exit Sign (New)	LED Exit Sign (New)	Incandescent Exit Sign	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$31.52	$0.00	$33.92	$65.44	Sign
D03-860	LTG	LED Exit Sign (New)	LED Exit Sign (New)	Incandescent Exit Sign	Retail/Contractor	RET	Yes	High	FULL	$0.00	$29.02	$0.00	$33.92	$62.94	Sign
D03-861	LTG	LED Exit Sign Retrofit Kit	LED Exit Sign Retrofit Kit	Incandescent Exit Sign	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$16.66	$0.00	$33.92	$50.58	Sign
D03-861	LTG	LED Exit Sign Retrofit Kit	LED Exit Sign Retrofit Kit	Incandescent Exit Sign	Retail/Contractor	RET	Yes	High	FULL	$0.00	$15.34	$0.00	$33.92	$49.27	Sign
D03-862	LTG	Electroluminescent Exit Sign (New)	Electroluminescent Exit Sign (New)	Incandescent Exit Sign	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$73.42	$0.00	$33.92	$107.34	Sign
D03-862	LTG	Electroluminescent Exit Sign (New)	Electroluminescent Exit Sign (New)	Incandescent Exit Sign	Retail/Contractor	RET	Yes	High	FULL	$0.00	$67.61	$0.00	$33.92	$101.53	Sign
D03-863	LTG	Electroluminescent Exit Sign Retrofit Kit	Electroluminescent Exit Sign Retrofit Kit	Incandescent Exit Sign	Retail/Contractor	RET	Yes	Low	FULL	$0.00	$70.14	$0.00	$33.92	$104.06	Sign
D03-863	LTG	Electroluminescent Exit Sign Retrofit Kit	Electroluminescent Exit Sign Retrofit Kit	Incandescent Exit Sign	Retail/Contractor	RET	Yes	High	FULL	$0.00	$64.59	$0.00	$33.92	$98.51	Sign

LIGHTING - SKYLIGHTS AND CONTROLS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-031	SkyLights	High perf glass (PI 0.81) and cont dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, cont. ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.77	$0.99	$2.53	$30.29	Sq Ft
D03-032	SkyLights	High perf glass (PI 0.92) and cont dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, cont. ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.90	$1.13	$2.53	$30.43	Sq Ft

D03-033	SkyLights	High perf glass (PI 1.03) and cont dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, cont. ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$28.04	$1.27	$2.53	$30.57	Sq Ft
D03-034	SkyLights	High perf glass (PI 0.81) and 1-step dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, 1-step ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.01	$0.24	$2.53	$29.54	Sq Ft
D03-035	SkyLights	High perf glass (PI 0.92) and 1-step dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, 1-step ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.15	$0.38	$2.53	$29.68	Sq Ft
D03-036	SkyLights	High perf glass (PI 1.03) and 1-step dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, 1-step ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.29	$0.52	$2.53	$29.82	Sq Ft
D03-037	SkyLights	High perf glass (PI 0.81) and 2-step dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, 2-step ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.01	$0.24	$2.53	$29.54	Sq Ft
D03-038	SkyLights	High perf glass (PI 0.92) and 2-step dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, 2-step ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.15	$0.38	$2.53	$29.68	Sq Ft
D03-039	SkyLights	High perf glass (PI 1.03) and 2-step dayltg ctrls in top-lit spaces	skylight w/ indicated performance index & T24 reqmts in daylit spaces, 2-step ctrl	skylights with properties based on location, no dayltg ctrls	retail/wholesale/contractor	RET/NEW	N/A	High	FULL/INCR	$26.77	$27.29	$0.52	$2.53	$29.82	Sq Ft

MOTORS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-914	Motors	Premium Efficiency Motor - 1 HP	Premium Efficiency Motor - 1 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$316.81	$347.79	$30.98	$0.00	$0.00	Motor
D03-915	Motors	Premium Efficiency Motor - 5 HP	Premium Efficiency Motor - 5 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$639.36	$743.60	$104.24	$0.00	$0.00	Motor
D03-916	Motors	Premium Efficiency Motor - 10 HP	Premium Efficiency Motor - 10 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,365.09	$1,665.28	$300.20	$0.00	$0.00	Motor
D03-917	Motors	Premium Efficiency Motor - 15 HP	Premium Efficiency Motor - 15 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,706.90	$1,998.92	$292.02	$0.00	$0.00	Motor
D03-918	Motors	Premium Efficiency Motor - 20 HP	Premium Efficiency Motor - 20 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,930.59	$2,185.01	$254.43	$0.00	$0.00	Motor
D03-919	Motors	Premium Efficiency Motor - 25 HP	Premium Efficiency Motor - 25 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$2,458.98	$2,455.45	$ -	$0.00	$0.00	Motor
D03-920	Motors	Premium Efficiency Motor - 50 HP	Premium Efficiency Motor - 50 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$4,060.97	$4,554.88	$493.91	$0.00	$0.00	Motor
D03-921	Motors	Premium Efficiency Motor - 100 HP	Premium Efficiency Motor - 100 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$7,368.18	$8,128.33	$760.15	$0.00	$0.00	Motor
D03-922	Motors	Premium Efficiency Motor - 150 HP	Premium Efficiency Motor - 150 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$10,604.64	$11,062.00	$457.36	$0.00	$0.00	Motor
D03-923	Motors	Premium Efficiency Motor - 200 HP	Premium Efficiency Motor - 200 HP ODP 1200 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$13,703.87	$15,754.00	$2,050.13	$0.00	$0.00	Motor
D03-914	Motors	Premium Efficiency Motor - 1 HP	Premium Efficiency Motor - 1 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$226.86	$291.43	$64.57	$0.00	$0.00	Motor
D03-915	Motors	Premium Efficiency Motor - 5 HP	Premium Efficiency Motor - 5 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$474.61	$515.36	$40.76	$0.00	$0.00	Motor
D03-916	Motors	Premium Efficiency Motor - 10 HP	Premium Efficiency Motor - 10 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$820.19	$894.66	$74.47	$0.00	$0.00	Motor
D03-917	Motors	Premium Efficiency Motor - 15 HP	Premium Efficiency Motor - 15 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,019.26	$1,072.31	$53.05	$0.00	$0.00	Motor
D03-918	Motors	Premium Efficiency Motor - 20 HP	Premium Efficiency Motor - 20 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,053.22	$1,278.52	$225.29	$0.00	$0.00	Motor
D03-919	Motors	Premium Efficiency Motor - 25 HP	Premium Efficiency Motor - 25 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,276.67	$1,560.14	$283.47	$0.00	$0.00	Motor
D03-920	Motors	Premium Efficiency Motor - 50 HP	Premium Efficiency Motor - 50 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,782.75	$2,487.62	$704.87	$0.00	$0.00	Motor
D03-921	Motors	Premium Efficiency Motor - 100 HP	Premium Efficiency Motor - 100 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$4,290.93	$4,781.61	$490.69	$0.00	$0.00	Motor
D03-922	Motors	Premium Efficiency Motor - 150 HP	Premium Efficiency Motor - 150 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$7,251.89	$8,296.68	$1,044.79	$0.00	$0.00	Motor

D03-923	Motors	Premium Efficiency Motor - 200 HP	Premium Efficiency Motor - 200 HP ODP 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$10,801.10	$11,880.25	$1,079.15	$0.00	$0.00 Motor
D03-914	Motors	Premium Efficiency Motor - 1 HP	Premium Efficiency Motor - 1 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$201.03	$253.71	$52.67	$0.00	$0.00 Motor
D03-915	Motors	Premium Efficiency Motor - 5 HP	Premium Efficiency Motor - 5 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$312.45	$384.36	$71.91	$0.00	$0.00 Motor
D03-916	Motors	Premium Efficiency Motor - 10 HP	Premium Efficiency Motor - 10 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$661.24	$784.51	$123.27	$0.00	$0.00 Motor
D03-917	Motors	Premium Efficiency Motor - 15 HP	Premium Efficiency Motor - 15 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,022.02	$1,190.00	$167.98	$0.00	$0.00 Motor
D03-918	Motors	Premium Efficiency Motor - 20 HP	Premium Efficiency Motor - 20 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,070.42	$1,245.59	$175.18	$0.00	$0.00 Motor
D03-919	Motors	Premium Efficiency Motor - 25 HP	Premium Efficiency Motor - 25 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,340.00	$1,583.80	$243.80	$0.00	$0.00 Motor
D03-920	Motors	Premium Efficiency Motor - 50 HP	Premium Efficiency Motor - 50 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$2,858.70	$3,059.13	$200.43	$0.00	$0.00 Motor
D03-921	Motors	Premium Efficiency Motor - 100 HP	Premium Efficiency Motor - 100 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$5,349.00	$5,640.67	$291.67	$0.00	$0.00 Motor
D03-922	Motors	Premium Efficiency Motor - 150 HP	Premium Efficiency Motor - 150 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$7,976.73	$8,737.04	$760.31	$0.00	$0.00 Motor
D03-923	Motors	Premium Efficiency Motor - 200 HP	Premium Efficiency Motor - 200 HP ODP 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$13,313.16	$14,873.14	$1,559.98	$0.00	$0.00 Motor
D03-924	Motors	Premium Efficiency Motor - 1 HP	Premium Efficiency Motor - 1 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$350.53	$532.48	$181.95	$0.00	$0.00 Motor
D03-925	Motors	Premium Efficiency Motor - 5 HP	Premium Efficiency Motor - 5 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,008.31	$1,108.62	$100.32	$0.00	$0.00 Motor
D03-926	Motors	Premium Efficiency Motor - 10 HP	Premium Efficiency Motor - 10 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,501.04	$1,810.23	$309.19	$0.00	$0.00 Motor
D03-927	Motors	Premium Efficiency Motor - 15 HP	Premium Efficiency Motor - 15 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,932.13	$2,369.81	$437.68	$0.00	$0.00 Motor
D03-928	Motors	Premium Efficiency Motor - 20 HP	Premium Efficiency Motor - 20 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$2,599.68	$3,108.76	$509.08	$0.00	$0.00 Motor
D03-929	Motors	Premium Efficiency Motor - 25 HP	Premium Efficiency Motor - 25 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$3,153.29	$3,583.53	$430.23	$0.00	$0.00 Motor
D03-930	Motors	Premium Efficiency Motor - 50 HP	Premium Efficiency Motor - 50 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$5,531.04	$6,345.17	$814.13	$0.00	$0.00 Motor
D03-931	Motors	Premium Efficiency Motor - 100 HP	Premium Efficiency Motor - 100 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$10,099.55	$11,941.43	$1,841.89	$0.00	$0.00 Motor
D03-932	Motors	Premium Efficiency Motor - 150 HP	Premium Efficiency Motor - 150 HP TEFC 1200 PRM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$14,892.10	$16,073.40	$1,181.30	$0.00	$0.00 Motor
D03-933	Motors	Premium Efficiency Motor - 200 HP	Premium Efficiency Motor - 200 HP TEFC 1200 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$16,800.22	$18,741.20	$1,940.98	$0.00	$0.00 Motor
D03-924	Motors	Premium Efficiency Motor - 1 HP	Premium Efficiency Motor - 1 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$364.52	$432.03	$67.51	$0.00	$0.00 Motor
D03-925	Motors	Premium Efficiency Motor - 5 HP	Premium Efficiency Motor - 5 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$578.35	$637.38	$59.03	$0.00	$0.00 Motor
D03-926	Motors	Premium Efficiency Motor - 10 HP	Premium Efficiency Motor - 10 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$923.97	$1,046.42	$122.45	$0.00	$0.00 Motor
D03-927	Motors	Premium Efficiency Motor - 15 HP	Premium Efficiency Motor - 15 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,129.85	$1,370.30	$240.45	$0.00	$0.00 Motor
D03-928	Motors	Premium Efficiency Motor - 20 HP	Premium Efficiency Motor - 20 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,620.53	$1,730.04	$109.51	$0.00	$0.00 Motor
D03-929	Motors	Premium Efficiency Motor - 25 HP	Premium Efficiency Motor - 25 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,683.79	$2,151.75	$467.96	$0.00	$0.00 Motor
D03-930	Motors	Premium Efficiency Motor - 50 HP	Premium Efficiency Motor - 50 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$3,162.34	$3,851.21	$688.86	$0.00	$0.00 Motor
D03-931	Motors	Premium Efficiency Motor - 100 HP	Premium Efficiency Motor - 100 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$8,561.75	$8,775.46	$213.71	$0.00	$0.00 Motor
D03-932	Motors	Premium Efficiency Motor - 150 HP	Premium Efficiency Motor - 150 HP TEFC 1800 PRM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$11,644.55	$12,915.23	$1,270.68	$0.00	$0.00 Motor
D03-933	Motors	Premium Efficiency Motor - 200 HP	Premium Efficiency Motor - 200 HP TEFC 1800 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$15,111.83	$15,596.14	$484.31	$0.00	$0.00 Motor
D03-924	Motors	Premium Efficiency Motor - 1 HP	Premium Efficiency Motor - 1 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$382.55	$398.94	$16.39	$0.00	$0.00 Motor
D03-925	Motors	Premium Efficiency Motor - 5 HP	Premium Efficiency Motor - 5 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$597.78	$686.78	$89.00	$0.00	$0.00 Motor
D03-926	Motors	Premium Efficiency Motor - 10 HP	Premium Efficiency Motor - 10 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$866.83	$1,020.90	$154.07	$0.00	$0.00 Motor
D03-927	Motors	Premium Efficiency Motor - 15 HP	Premium Efficiency Motor - 15 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contract or	ROB/NEW	yes	Low	INCR/INCR	$1,186.30	$1,386.59	$200.29	$0.00	$0.00 Motor

D03-928	Motors	Premium Efficiency Motor - 20 HP	Premium Efficiency Motor - 20 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,423.91	$1,691.37	$267.46	$0.00	$0.00	Motor
D03-929	Motors	Premium Efficiency Motor - 25 HP	Premium Efficiency Motor - 25 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$1,750.63	$2,133.41	$382.78	$0.00	$0.00	Motor
D03-930	Motors	Premium Efficiency Motor - 50 HP	Premium Efficiency Motor - 50 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$3,209.02	$3,999.17	$790.15	$0.00	$0.00	Motor
D03-931	Motors	Premium Efficiency Motor - 100 HP	Premium Efficiency Motor - 100 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$8,797.52	$9,240.33	$442.81	$0.00	$0.00	Motor
D03-932	Motors	Premium Efficiency Motor - 150 HP	Premium Efficiency Motor - 150 HP TEFC 3600 PRM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$14,572.38	$14,544.17	$ -	$0.00	$0.00	Motor
D03-933	Motors	Premium Efficiency Motor - 200 HP	Premium Efficiency Motor - 200 HP TEFC 3600 RPM	EPAct Efficiency Motors	Retail/Contractor	ROB/NEW	yes	Low	INCR/INCR	$18,119.50	$18,357.50	$238.00	$0.00	$0.00	Motor

POOL PUMPS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-966	Pool Pumps	Efficient Single Speed Pool Pumps	Efficient Single Speed Pool Pumps, 0.75 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$294.82	$334.63	$39.81	$271.02	$605.64	Pump
D03-966	Pool Pumps	Efficient Single Speed Pool Pumps	Efficient Single Speed Pool Pumps, 1.0 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$315.94	$373.68	$57.75	$271.27	$644.95	Pump
D03-966	Pool Pumps	Efficient Single Speed Pool Pumps	Efficient Single Speed Pool Pumps, 1.5 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$345.03	$395.94	$50.91	$357.12	$753.06	Pump
D03-966	Pool Pumps	Efficient Single Speed Pool Pumps	Efficient Single Speed Pool Pumps, 2.0 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$395.67	$447.53	$51.86	$357.62	$805.14	Pump
D03-966	Pool Pumps	Efficient Single Speed Pool Pumps	Efficient Single Speed Pool Pumps, 2.5 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$456.40	$510.00	$53.60	$358.12	$868.12	Pump
D03-967	Pool Pumps	Efficient Two Speed Pool Pumps	Efficient Two Speed Pool Pumps, 1.0 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$315.94	$536.99	$221.05	$271.27	$808.26	Pump
D03-967	Pool Pumps	Efficient Two Speed Pool Pumps	Efficient Two Speed Pool Pumps, 1.5 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$345.03	$527.21	$182.18	$357.12	$884.33	Pump
D03-967	Pool Pumps	Efficient Two Speed Pool Pumps	Efficient Two Speed Pool Pumps, 2.0 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$395.67	$659.70	$264.04	$357.62	$1,017.32	Pump
D03-967	Pool Pumps	Efficient Two Speed Pool Pumps	Efficient Two Speed Pool Pumps, 2.5 HP	Inefficient Single Speed Pool Pumps	Retail/Contractor	RET/ROB/NEW	No	Low	FULL/INCR/INCR	$456.40	$700.39	$243.99	$358.12	$1,058.51	Pump

REFRIGERATION - SUPERMARKET

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-201	Supermarket Refrigeration	Retrocommisioning	Std prototype A/C multiplex sys with extensive refg equip maint.	Standard A/C multiplex, SST setpt reduced 3F, SCT setpt raised 3F.	Contractor	RET	No	single	FULL	$0.00	$0.00	$0.00	$49.60	$49.60	tons
D03-202	Supermarket Refrigeration	High-efficiency walk-in fan motors	Substitute high effy motors for standard effy.	Utiliizes a shaded pole motor.	Contractor	RET/ROB/NEW	No	bulk	FULL/INCR/INCR	$0.00	$167.43	$90.50	$41.89	$209.32	Motor
D03-203	Supermarket Refrigeration	High-efficiency display fan motors	Substitute high effy motors for standard effy.	Utiliizes a shaded pole motor.	Contractor	RET/ROB/NEW	No	bulk	FULL/INCR/INCR	$0.00	$13.58	$6.79	$13.67	$27.25	LinFt
D03-204	Supermarket Refrigeration	Heat Recovery form Central Refrigeration System	Adds an 85F holdback valve, active only when needed.	Standard A/C multiplex system, no heat reclaim.	Contractor	NEW	No	single	FULL	$0.00	$0.36	$0.00	$0.14	$0.51	SqFt
D03-204	Supermarket Refrigeration	Heat Recovery form Central Refrigeration System	Adds an 85F holdback valve, active only when needed.	Standard A/C multiplex system, no heat reclaim.	Contractor	RET	No	single	FULL	$0.00	$0.50	$0.00	$0.41	$0.91	SqFt
D03-205	Supermarket Refrigeration	Night Covers for Disply Cases (Med. Temp)	Night cover reduces	Open cases with no night cover.	Contractor	RET/NEW	No	bulk	FULL/FULL	$0.00	$33.75	$0.00	$3.79	$37.54	LinFt
D03-206	Supermarket Refrigeration	Medium Temp Glass Doors	Cover open MT cases between 1-5 AM.	Open cases with no night cover.	Contractor	RET	No	bulk	FULL	$0.00	$514.13	$0.00	$99.81	$613.95	LinFt
D03-207	Supermarket Refrigeration	New Med. Temp Display Case with Doors	Retrofit glass doors on open MT cases.	Open cases with no night cover.	Contractor	RET	No	bulk	FULL	$0.00	$515.58	$0.00	$329.66	$845.24	LinFt
D03-208	Supermarket Refrigeration	Auto-closers on Main Cooler Doors	Install automatic door closers on walk-in cooler doors.	No door closer.	Contractor	RET/NEW	No	bulk	FULL/FULL	$0.00	$322.59	$0.00	$110.63	$433.22	Door
D03-209	Supermarket Refrigeration	Auto-closers on Main Freezer Doors	Install automatic door closers on walk-in freezer doors.	No door closer.	Contractor	RET/NEW	No	bulk	FULL/FULL	$0.00	$322.59	$0.00	$110.63	$433.22	Door
D03-210	Supermarket Refrigeration	Evaporator Fan Control on Walk-in Coolers & Freezers	Cycle fan off with thermostat; duty cycle occasionally when off.	Evaporator fans run continuoulsly PSC or SP motor based on vintage.	Contractor	NEW	No	single	FULL	$0.00	$52.50	$0.00	$38.25	$90.75	Motor
D03-210	Supermarket Refrigeration	Evaporator Fan Control on Walk-in Coolers & Freezers	Cycle fan off with thermostat; duty cycle occasionally when off.	Evaporator fans run continuoulsly PSC or SP motor based on vintage.	Contractor	RET	No	single	FULL	$0.00	$62.50	$0.00	$83.25	$145.75	Motor

D03-211	Supermarket Refrigeration	Air-Cooled Condenser to Evap. Condenser	Replace multiplex air-cooled condenser with evap condenser.	Multiplex A/C condenser of vintage-dependent size and efficiency.	Contractor	RET	No	single	FULL	$0.00	$430.60	$0.00	$264.96	$695.57 tons
D03-212	Supermarket Refrigeration	Energy Efficient Air-Cooled Condenser	Upgrade from 53 Btu/Watt @ 10TD to 84 Btu/Watt	Multiplex A/C condenser of vintage-dependent size and efficiency.	Contractor	RET/ROB/NEW	No	single	FULL/INCR/INCR	$0.00	$652.75	$140.30	$152.68	$805.43 tons
D03-213	Supermarket Refrigeration	Energy Efficient Evap-Cooled Condenser	Reduce SCT by ~5F and improve effy to 200 Btu/Watt	Multiplex evap condenser of vintage-dependent size and efficiency.	Contractor	RET/ROB/NEW	No	single	FULL/INCR/INCR	$0.00	$495.00	$86.94	$182.69	$677.69 tons
D03-214	Supermarket Refrigeration	Multiplex Sys With Mech Subcooling (air-cooled)	Replace single comp sys with subcooled multiplex, FHP w/ fixed stpt.	Single compressor sys, A/C cond of vintage dependent size and effy.	Contractor	RET/ROB	No	single	FULL/FULL	$0.00	$1,972.97	$0.00	$906.54	$2,879.50 tons
D03-215	Supermarket Refrigeration	Multiplex Sys With Mech Subcool (evap-cooled)	Replace single comp sys with subcooled multiplex, FHP w/ fixed stpt.	Single compressor sys, evap cond of vintage dependent size and effy.	Contractor	RET/ROB	No	single	FULL/FULL	$0.00	$1,779.87	$0.00	$896.88	$2,676.76 tons
D03-216	Supermarket Refrigeration	Multiplex Sys With Mech Subcool (high eff air-cooled)	Replace single comp sys with subcooled multi., hi-effy cond, FHP w/ fixed stpt.	Single compressor sys, A/C cond of vintage dependent size and effy.	Contractor	RET/ROB	No	single	FULL/FULL	$0.00	$2,138.03	$0.00	$914.79	$3,052.82 tons
D03-217	Supermarket Refrigeration	Multiplex Sys With Mech Subcool (high eff evap-cooled)	Replace single comp sys with subcooled multi., hi-effy cond, FHP w/ fixed stpt.	Single compressor sys, evap cond of vintage dependent size and effy.	Contractor	RET/ROB	No	single	FULL/FULL	$0.00	$1,885.53	$0.00	$902.16	$2,787.70 tons
D03-218	Supermarket Refrigeration	Low Temp Mech Subcooling	Addition of a LT subcooler to an A/C multiplex.	Standard A/C multiplex sys, no subcool (<92), 70F subcool (92-2000).	Contractor	RET	No	single	FULL	$0.00	$227.04	$0.00	$191.79	$418.82 tons
D03-219	Supermarket Refrigeration	Low and Med Temp Mech Subcooling	Addition of LT and MT subcoolers to an A/C multiplex.	Standard A/C multiplex sys, no subcool (<92), 70F subcool (92-2000).	Contractor	NEW	No	single	FULL	$0.00	$ -	$0.00	$0.00	$0.00 tons
D03-219	Supermarket Refrigeration	Low and Med Temp Mech Subcooling	Addition of LT and MT subcoolers to an A/C multiplex.	Standard A/C multiplex sys, no subcool (<92), 70F subcool (92-2000).	Contractor	RET	No	single	FULL	$0.00	$447.94	$0.00	$199.88	$647.82 tons
D03-220	Supermarket Refrigeration	Floating SST control on LT and MT suction groups	SST setpoint reset based on worst-case demand	Standard A/C multiplex sys, SST controlled to fixed setpoint.	Contractor	NEW	No	single	FULL	$0.00	$ -	$0.00	$18.60	$18.60 tons
D03-220	Supermarket Refrigeration	Floating Suction Pressure	Floating SST control on LT and MT suction groups.	Standard A/C multiplex sys, SST controlled to fixed setpoint.	Contractor	RET	No	single	FULL	$0.00	$13.18	$0.00	$26.78	$39.96 tons
D03-221	Supermarket Refrigeration	Floating Head Pressure (FHP), Fixed Setpoint (air-cooled)	Floating SCT controlled to 70F.	Standard A/C multiplex sys, SCT control temp by vintage.	Contractor	NEW	No	single	FULL	$0.00	$ -	$0.00	$22.32	$22.32 tons
D03-221	Supermarket Refrigeration	Floating Head Pressure (FHP), Fixed Setpoint (air-cooled)	Floating SCT controlled to 70F.	Standard A/C multiplex sys, SCT control temp by vintage.	Contractor	RET	No	single	FULL	$0.00	$ -	$0.00	$27.90	$27.90 tons
D03-222	Supermarket Refrigeration	FHP, Fixed Setpoint (evap-cooled)	Floating SCT controlled to 70F.	Standard evap cooled multiplex sys, SCT control temp by vintage.	Contractor	NEW	No	single	FULL	$0.00	$ -	$0.00	$22.32	$22.32 tons
D03-222	Supermarket Refrigeration	FHP, Fixed Setpoint (evap-cooled)	Floating SCT controlled to 70F.	Standard evap cooled multiplex sys, SCT control temp by vintage.	Contractor	RET	No	single	FULL	$0.00	$ -	$0.00	$27.90	$27.90 tons
D03-223	Supermarket Refrigeration	FHP, Variable Setpoint (air-cooled)	Ambient following SCT setpoint, 70F minimum.	Standard A/C multiplex sys, SCT control temp by vintage.	Contractor	NEW	No	single	FULL	$0.00	$8.13	$0.00	$29.01	$37.14 tons
D03-223	Supermarket Refrigeration	FHP, Variable Setpoint (air-cooled)	Ambient following SCT setpoint, 70F minimum.	Standard A/C multiplex sys, SCT control temp by vintage.	Contractor	RET	No	single	FULL	$0.00	$10.04	$0.00	$40.92	$50.95 tons
D03-224	Supermarket Refrigeration	FHP, Variable Setpoint (evap-cooled)	Wetbulb following SCT setpoint, 70F minimum.	Standard evap cooled multiplex sys, SCT control temp by vintage.	Contractor	NEW	No	single	FULL	$0.00	$7.02	$0.00	$30.87	$37.90 tons
D03-224	Supermarket Refrigeration	FHP, Variable Setpoint (evap-cooled)	Wetbulb following SCT setpoint, 70F minimum.	Standard evap cooled multiplex sys, SCT control temp by vintage.	Contractor	RET	No	single	FULL	$0.00	$8.93	$0.00	$40.92	$49.85 tons
D03-225	Supermarket Refrigeration	FHP, Variable Setpt & Speed (air-cooled)	Ambient following SCT setpoint, 70F min, variable spd cond fan.	Standard A/C multiplex sys, SCT control temp by vintage.	Contractor	NEW	No	single	FULL	$0.00	$275.54	$0.00	$52.08	$327.62 tons
D03-225	Supermarket Refrigeration	FHP, Variable Setpt & Speed (air-cooled)	Ambient following SCT setpoint, 70F min, variable spd cond fan.	Standard A/C multiplex sys, SCT control temp by vintage.	Contractor	RET	No	single	FULL	$0.00	$294.33	$0.00	$91.66	$385.99 tons
D03-226	Supermarket Refrigeration	FHP, Variable Setpt & Speed (evap-cooled)	Wetbulb following SCT setpoint, 70F min, variable spd cond fan.	Standard evap cooled multiplex sys, SCT control temp by vintage.	Contractor	NEW	No	single	FULL	$0.00	$68.15	$0.00	$40.17	$108.33 tons

D03-226	Supermarket Refrigeration	FHP, Variable Setpt & Speed (evap-cooled)	Wetbulb following SCT setpoint, 70F min, variable spd cond fan.	Standard evap cooled multiplex sys, SCT control temp by vintage.	Contractor	RET	No	single	FULL	$0.00	$151.97	$0.00	$68.92	$220.89	tons
D03-227	Supermarket Refrigeration	Display Case Lighting Control	Turn off fixture lights when store is closed (midnight-6AM).	Lights on all hours	Contractor	NEW	No	bulk	FULL	$0.00	$1.56	$0.00	$0.78	$2.34	LinFt
D03-227	Supermarket Refrigeration	Display Case Lighting Control	Turn off fixture lights when store is closed (midnight-6AM).	Lights on all hours	Contractor	RET	No	bulk	FULL	$0.00	$3.08	$0.00	$2.75	$5.84	LinFt
D03-228	Supermarket Refrigeration	Zero Heat Reach-in Glass Door Cases	Eliminate anti-sweat heaters from doors.	Door and frame heaters.	Contractor	NEW	No	bulk	INCR	$0.00	$0.00	$28.00	$0.00	$28.00	Door

REFRIGERATION - WAREHOUSE

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-301	Warehouse Refrigeration	Retrocommissioning	Extensive refrigeration equpiment maintenance.	Std. A/C multiplex, SST stpt reduced 3F, SCT stpt raised 2F.	Contractor	RET	No	Low	FULL	$0.00	$0.00	$0.00	$35.27	$35.27	Tons
D03-302	Warehouse Refrigeration	Oversized evap condenser	Size cond to 5F lower TD, 400Btu/Watt.	Cond sized at ~24F TD, Effy and SCT based on vintage.	Contractor	NEW	No	Low	INCR	$0.00	$0.00	$88.26	$0.00	$88.26	Tons
D03-302	Warehouse Refrigeration	Oversized evap condenser	Size cond to 5F lower TD, 400Btu/Watt.	Cond sized at ~24F TD, Effy and SCT based on vintage.	Contractor	RET/ROB	No	Low	FULL/FULL	$0.00	$321.17	$0.00	$65.56	$386.73	Tons
D03-303	Warehouse Refrigeration	Oversized evap cond w/ FHP	Size cond to 5F lower TD, 400Btu/Watt, VFD & WBT following	Cond sized at ~24F TD, Effy and SCT based on vintage.	Contractor	NEW	No	Low	INCR	$0.00	$0.00	$188.20	$14.80	$203.00	Tons
D03-303	Warehouse Refrigeration	Oversized evap cond w/ FHP	Size cond to 5F lower TD, 400Btu/Watt, VFD & WBT following	Cond sized at ~24F TD, Effy and SCT based on vintage.	Contractor	RET/ROB	No	Low	FULL/FULL	$0.00	$448.18	$0.00	$102.10	$550.27	Tons
D03-304	Warehouse Refrigeration	Variable speed compressors	Add VFD to 1 comp in ea. suction group.	All compressors have slide valve control.	Contractor	NEW	No	Low	FULL	$0.00	$115.45	$0.00	$56.03	$171.48	Tons
D03-304	Warehouse Refrigeration	Variable speed compressors	Add VFD to 1 comp in ea. suction group.	All compressors have slide valve control.	Contractor	RET	No	Low	FULL	$0.00	$159.97	$0.00	$106.93	$266.90	Tons
D03-305	Warehouse Refrigeration	Low temp subcooling	Add mechanical subcooler to LT liq line, fed by MT system.	No subcooling or flash cooling on LT system liquid.	Contractor	RET	No	Low	FULL	$0.00	$330.77	$0.00	$125.40	$456.17	Tons
D03-306	Warehouse Refrigeration	Floating suction pressure	Floating SST control on LT and MT suction groups.	Suction temperature controlled to fixed setpoint.	Contractor	NEW	No	Low	FULL	$0.00	$0.00	$0.00	$27.20	$27.20	Tons
D03-306	Warehouse Refrigeration	Floating suction pressure	Floating SST control on LT and MT suction groups.	Suction temperature controlled to fixed setpoint.	Contractor	RET	No	Low	FULL	$0.00	$17.46	$0.00	$23.93	$41.39	Tons
D03-307	Warehouse Refrigeration	FHP, fixed setpoint (evap cooled)	Floating SCT controlled to 70F.	SCT based on vintage, fixed setpoint with fan cycling.	Contractor	NEW	No	Low	FULL	$0.00	$13.33	$0.00	$6.80	$20.13	Tons
D03-307	Warehouse Refrigeration	FHP, fixed setpoint (evap cooled)	Floating SCT controlled to 70F.	SCT based on vintage, fixed setpoint with fan cycling.	Contractor	RET	No	Low	FULL	$0.00	$0.00	$0.00	$15.87	$15.87	Tons
D03-308	Warehouse Refrigeration	FHP, variable setpt (evap cooled)	Wetbulb following SCT setpoint, 70F min.	SCT based on vintage, fixed setpoint with fan cycling.	Contractor	NRE	No	Low	FULL	$0.00	$17.98	$0.00	$9.80	$27.78	Tons
D03-308	Warehouse Refrigeration	FHP, variable setpt (evap cooled)	Wetbulb following SCT setpoint, 70F min.	SCT based on vintage, fixed setpoint with fan cycling.	Contractor	RET	No	Low	FULL	$0.00	$6.15	$0.00	$19.60	$25.75	Tons
D03-309	Warehouse Refrigeration	FHP, VSP and VFD (evap cooled)	Wetbulb following SCT setpoint, 70F min., VFD on cond.	SCT based on vintage, fixed setpoint with fan cycling.	Contractor	NEW	No	Low	FULL	$0.00	$112.21	$0.00	$14.80	$127.01	Tons
D03-309	Warehouse Refrigeration	FHP, VSP and VFD (evap cooled)	Wetbulb following SCT setpoint, 70F min., VFD on cond.	SCT based on vintage, fixed setpoint with fan cycling.	Contractor	RET	No	Low	FULL	$0.00	$129.26	$0.00	$33.50	$162.76	Tons

VENDING MACHINE CONTROLS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-912	Vending	Vending Machine Controller	Cold Drink Vending Machine	none	Retail/Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$180.00	$0.00	$35.50	$215.50	Machine
D03-912	Vending	Vending Machine Controller	Cold Drink Vending Machine	none	Retail/Contractor	RET/NEW	No	High	FULL/FULL	$0.00	$154.72	$0.00	$28.17	$182.88	Machine
D03-913	Vending	Vending Machine Controller	Uncooled Snack Machine	none	Retail/Contractor	RET/NEW	No	Low	FULL/FULL	$0.00	$75.00	$0.00	$33.00	$108.00	Machine
D03-913	Vending	Vending Machine Controller	Uncooled Snack Machine	none	Retail/Contractor	RET/NEW	No	High	FULL/FULL	$0.00	$71.53	$0.00	$25.67	$97.20	Machine

WINDOWS - COMMERCIAL

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-017	Commercial Windows	North glass SHGC 15% less than required	North glass SHGC 15% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$25.38	$24.02	($1.35)	$4.92	$28.94	SqFt
D03-018	Commercial Windows	East glass SHGC 20% less than required	East glass SHGC 20% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$33.21	$40.20	$6.99	$4.92	$45.12	SqFt
D03-019	Commercial Windows	Sourth glass SHGC 20% less than required	South glass SHGC 20% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$33.21	$40.20	$6.99	$4.92	$45.12	SqFt
D03-020	Commercial Windows	West glass SHGC 20% less than required	West glass SHGC 20% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$33.21	$40.20	$6.99	$4.92	$45.12	SqFt
D03-021	Commercial Windows	North glass SHGC 20% less than required	North glass SHGC 20% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$25.38	$28.10	$2.72	$4.92	$33.01	SqFt
D03-022	Commercial Windows	East glass SHGC 30% less than required	East glass SHGC 30% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$33.21	$47.17	$13.96	$4.92	$52.08	SqFt
D03-023	Commercial Windows	Sourth glass SHGC 30% less than required	South glass SHGC 30% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$33.21	$47.17	$13.96	$4.92	$52.08	SqFt
D03-024	Commercial Windows	West glass SHGC 30% less than required	West glass SHGC 30% less than required by T-24	glass type as defined by location and window-wall ratio	Contractor	RET/NEW	No	High	FULL/INCR	$33.21	$47.17	$13.96	$4.92	$52.08	SqFt
D03-025	Commercial Windows	High perf glass (PI 1.15) and cont dayltg ctrls in side-lit spaces	High perf glass (PI 1.15) and cont dayltg ctrls in side-lit spaces	base case has std glass types, no daylighting controls	Contractor	RET/NEW	No	High	FULL/INCR	$41.07	$45.91	$4.83	$5.15	$51.06	SqFt
D03-026	Commercial Windows	High perf glass (PI 1.26) and cont dayltg ctrls in side-lit spaces	glass w/ indicated performance index in daylit spaces, cont. ctrl	base case has std glass types, no daylighting controls	Contractor	RET/NEW	No	High	FULL/INCR	$41.07	$45.91	$4.83	$5.15	$51.06	SqFt
D03-027	Commercial Windows	High perf glass (PI 1.38) and cont dayltg ctrls in side-lit spaces	glass w/ indicated performance index in daylit spaces, cont. ctrl	base case has std glass types, no daylighting controls	Contractor	RET/NEW	No	High	FULL/INCR	$41.07	$45.91	$4.83	$5.15	$51.06	SqFt
D03-028	Commercial Windows	High perf glass (PI 1.15) and 2-step dayltg ctrls in side-lit spaces	glass w/ indicated performance index in daylit spaces, 2-step ctrl	base case has std glass types, no daylighting controls	Contractor	RET/NEW	No	High	FULL/INCR	$41.07	$43.69	$2.62	$5.15	$48.84	SqFt
D03-029	Commercial Windows	High perf glass (PI 1.26) and 2-step dayltg ctrls in side-lit spaces	glass w/ indicated performance index in daylit spaces, 2-step ctrl	base case has std glass types, no daylighting controls	Contractor	RET/NEW	No	High	FULL/INCR	$41.07	$43.69	$2.62	$5.15	$48.84	SqFt
D03-030	Commercial Windows	High perf glass (PI 1.38) and 2-step dayltg ctrls in side-lit spaces	glass w/ indicated performance index in daylit spaces, 2-step ctrl	base case has std glass types, no daylighting controls	Contractor	RET/NEW	No	High	FULL/INCR	$41.07	$43.69	$2.62	$5.15	$48.84	SqFt

WINDOWS - FILMS AND SUNSCREENS

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-443	Window Films	Single Pane Clear Glass With Reflective Film	Single Pane Clear Glass With Reflective Film	NA	retail/contractor	RET	No	High	FULL	$0.00	$1.49	$0.00	$0.64	$2.13	SqFt
D03-444	Window Films	Single Pane Clear Glass With Spectrally Selective Film	Single Pane Clear Glass With Spectrally Selective Film	NA	retail/contractor	RET	No	High	FULL	$0.00	$2.06	$0.00	$0.64	$2.70	SqFt
D03-445	Window Films	Single Pane Clear Glass With Standard Film	Single Pane Clear Glass With Standard Film	NA	retail/contractor	RET	No	High	FULL	$0.00	$0.90	$0.00	$0.64	$1.54	SqFt
D03-442	SunScreens	Default Window With Sunscreen	Default Window With Sunscreen	NA	retail/contractor	RET/NEW	No	High	FULL/FULL	$0.00	$0.63	$0.00	$0.64	$1.27	SqFt

WINDOWS - RESIDENTIAL

Measure ID	Category	Measure Name	Measure Description	Base Description	Delivery Channel	Application	Energy Star?	Purchase Volume	Cost Basis	Base Equipment Cost	Measure Equipment Cost	Incremental Equipment Cost	Labor Cost	Installed Cost	Cost Unit
D03-446	Residential Windows	U-0.50 / SHGC-0.65 (clear) Window	U-0.50 / SHGC-0.65 (clear) Window	Double Pane Clear Window	Contractor	RET/NEW	No	Low	FULL/INCR	$16.41	$17.13	$0.72	$2.07	$19.20	SqFt
D03-447	Residential Windows	U-0.40 / SHGC-0.65 (clear) Window	U-0.40 / SHGC-0.65 (clear) Window	Double Pane Clear Window	Contractor	RET/NEW	No	Low	FULL/INCR	$16.41	$11.03	($5.38)	$2.07	$13.10	SqFt
D03-448	Residential Windows	U-0.35 / SHGC-0.55 (clear) Window	U-0.35 / SHGC-0.55 (clear) Window	Double Pane Clear Window	Contractor	RET/NEW	No	Low	FULL/INCR	$16.41	$11.85	($4.56)	$2.07	$13.92	SqFt
D03-449	Residential Windows	U-0.25 / SHGC-0.35 (clear) Window	U-0.25 / SHGC-0.35 (clear) Window	Double Pane Clear Window	Contractor	RET/NEW	Yes	Low	FULL/INCR	$16.41	$13.48	($2.93)	$2.07	$15.55	SqFt
D03-450	Residential Windows	U-0.50 / SHGC-0.40 (tint) Window	U-0.50 / SHGC-0.40 (tint) Window	Double Pane Clear Window	Contractor	RET/NEW	No	Low	FULL/INCR	$16.41	$26.79	$10.38	$2.07	$28.86	SqFt
D03-451	Residential Windows	U-0.40 / SHGC-0.40 (tint) Window	U-0.40 / SHGC-0.40 (tint) Window	Double Pane Clear Window	Contractor	RET/NEW	Yes	Low	FULL/INCR	$16.41	$20.70	$4.29	$2.07	$22.77	SqFt
D03-452	Residential Windows	U-0.35 / SHGC-0.32 (tint) Window	U-0.35 / SHGC-0.32 (tint) Window	Double Pane Clear Window	Contractor	RET/NEW	Yes	Low	FULL/INCR	$16.41	$20.74	$4.33	$2.07	$22.81	SqFt
D03-453	Residential Windows	U-0.25 / SHGC-0.22 (tint) Window	U-0.25 / SHGC-0.22 (tint) Window	Double Pane Clear Window	Contractor	RET/NEW	Yes	Low	FULL/INCR	$16.41	$18.51	$2.10	$2.07	$20.58	SqFt

D03-454	Residential Windows	U-0.50 / SHGC-0.40 (tint) Window	U-0.50 / SHGC-0.40 (tint) Window	Double Pane Tinted Window	Contractor	RET/NEW	No	Low	FULL/INCR	$16.41	$26.79	$10.38	$2.07	$28.86 SqFt
D03-455	Residential Windows	U-0.40 / SHGC-0.40 (tint) Window	U-0.40 / SHGC-0.40 (tint) Window	Double Pane Tinted Window	Contractor	RET/NEW	Yes	Low	FULL/INCR	$16.41	$20.70	$4.29	$2.07	$22.77 SqFt
D03-456	Residential Windows	U-0.35 / SHGC-0.32 (tint) Window	U-0.35 / SHGC-0.32 (tint) Window	Double Pane Tinted Window	Contractor	RET/NEW	Yes	Low	FULL/INCR	$16.41	$20.74	$4.33	$2.07	$22.81 SqFt
D03-457	Residential Windows	U-0.25 / SHGC-0.22 (tint) Window	U-0.25 / SHGC-0.22 (tint) Window	Double Pane Tinted Window	Contractor	RET/NEW	Yes	Low	FULL/INCR	$16.41	$18.51	$2.10	$2.07	$20.58 SqFt

APPENDIX C: ANALYTIC METHODS, OBSERVATIONS, AND MEASURE STATISTICS

Non-Residential Weather Sensitive Analytic Methods, Observations, and Measure Statistics

Residential Weather Sensitive Analytic Methods, Observations, and Measure Statistics

Non-Residential and Residential Non-Weather Sensitive Analytic Methods, Observations, and Measure Statistics

Refrigeration Analytic Methods, Observations, and Measure Statistics

Appendix C: Non-Residential Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	Measure Name	Analytic Method	No. of Observations	Mean	Min	Max	Precision @ 95%	R^2	Mean	Min	Max	Precision @ 95%	R^2
D03-003	Occupancy Sensor Pack-200 SF	Weighted average	19										
D03-004	Occupancy Sensor Pack-1000 SF	Weighted average	6										
D03-005	DayLtg Controls, Side Ltg, Cont. Ctrl	Weighted average	26										
D03-006	DayLtg Controls, Side Ltg, 2-step Ctrl	Weighted average	12										
D03-007	DayLtg Controls, Top Ltg, Cont. Ctrl	Weighted average	8										
D03-008	DayLtg Controls, Top Ltg, 1-step Ctrl	Weighted average	4										
D03-009	DayLtg Controls, Top Ltg, 2-step Ctrl	Weighted average	8										
D03-010	Timeclock for Lighting	Weighted average	15										
D03-013	Ceiling/Roof Insulation	regression	23					0.345					
D03-014	Tank Insulation-Fiber Blanket	regression	10					0.395					
D03-016	Light Colored Roof	Regression	25					0.129					
D03-017	Low SHGC Windows -15% - North	Regression	27					0.530					
D03-018	Low SHGC Windows -20% - East	Regression	27					0.530					
D03-019	Low SHGC Windows -20% - South	Regression	27					0.530					
D03-020	Low SHGC Windows -20% - West	Regression	27					0.530					
D03-021	Low SHGC Windows -20% - North	Regression	27					0.530					
D03-022	Low SHGC Windows -30% - East	Regression	27					0.530					
D03-023	Low SHGC Windows -30% - South	Regression	27					0.530					
D03-024	Low SHGC Windows -30% - West	Regression	27					0.530					
D03-025	Hi Perf. Glass, PI=1.15, Side Ltg, Cont. Ctrl	Measure = Regression, Base = Average	27					0.530	$ 41.07	$ 7.30	$ 85.67	28%	
D03-026	Hi Perf. Glass, PI=1.26, Side Ltg, Cont. Ctrl	Measure = Regression, Base = Average	27					0.530	$ 41.07	$ 7.30	$ 85.67	28%	
D03-027	Hi Perf. Glass, PI=1.38, Side Ltg, Cont. Ctrl	Measure = Regression, Base = Average	27					0.530	$ 41.07	$ 7.30	$ 85.67	28%	
D03-028	Hi Perf. Glass, PI=1.15, Side Ltg, 2-Step Ctrl	Measure = Regression, Base = Average	27					0.530	$ 41.07	$ 7.30	$ 85.67	28%	
D03-029	Hi Perf. Glass, PI=1.26, Side Ltg, 2-Step Ctrl	Measure = Regression, Base = Average	27					0.530	$ 41.07	$ 7.30	$ 85.67	28%	
D03-030	Hi Perf. Glass, PI=1.38, Side Ltg, 2-Step Ctrl	Measure = Regression, Base = Average	27					0.530	$ 41.07	$ 7.30	$ 85.67	28%	
D03-031	Hi Perf. Glass, PI=0.81, Top Ltg, Cont. Ctrl	Regression	81					0.001					
D03-032	Hi Perf. Glass, PI=0.92, Top Ltg, Cont. Ctrl	Regression	81					0.001					
D03-033	Hi Perf. Glass, PI=1.03, Top Ltg, Cont. Ctrl	Regression	81					0.001					
D03-034	Hi Perf. Glass, PI=0.81, Top Ltg, 1-Step Ctrl	Regression	81					0.001					
D03-037	Hi Perf. Glass, PI=0.81, Top Ltg, 2-Step Ctrl	Regression	81					0.001					
D03-038	Hi Perf. Glass, PI=0.92, Top Ltg, 2-Step Ctrl	Regression	81					0.001					

Appendix C: Non-Residential Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	**Measure Name**	**Analytic Method**	**No. of Observations**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**
D03-039	Hi Perf. Glass, PI=1.03, Top Ltg, 2-Step Ctrl	Regression	81					0.001					
D03-040	High Efficiency Centrifugal Chillers < 150 Tons	Regression	26					0.779					0.645
D03-041	High Efficiency Air-Cooled Recip Packaged Chillers	Weighted Average	13										
D03-042	High Efficiency VSD Centrifugal Chillers < 150 Tons	Regression	21					0.656					0.847
D03-043	Gas Absorption Chiller	Weighted Average	39										
D03-044	Chilled Water Reset	Custom	6										
D03-045	Hot Water Reset	Custom	7										
D03-046	Variable Flow Chilled Water Loop	Custom	8										
D03-047	VSD Chilled Water Loop Pump	Custom	8										
D03-048	Variable Flow Hot Water Loop	Custom	8										
D03-049	VSD Hot Water Loop Pump	Custom	8										
D03-050	Variable Air Volume Box	Regression	24					0.601					
D03-051	VSD Supply Fan Motors	Regression	21					0.279					
D03-052	Fan Powered Mixing Boxes	Regression	16					0.552					
D03-053	Evap Cool Indirect - Central System	Regression	18					0.006					
D03-054	Evap Cool Indirect - Packaged Sys	Regression	19					0.155					
D03-055	Reducing Overventilation	Average	5	$ 39.84	$ 15.60	$ 72.00	53%						
D03-056	Air To Air Heat Exchanger	Regression	15					0.011					
D03-057	Rotary Heat Recovery	Regression	22					0.093					
D03-058	Economizer - Packaged System	Regression	6					0.670					
D03-060	Economizer Maintenance	Regression	5					0.159					
D03-061	Clean Condenser Coils	Regression	23					0.216					
D03-062	Cooling Tower for Packaged System	custom	10										
D03-063	Two-Speed Cooling Tower Fans	Custom	28										
D03-064	VSD Cooling Tower Fans	Custom	36										
D03-065	Efficient Gas Furnace	Not priced	---										
D03-066	High Efficiency Large Boilers	regression	243					0.701					
D03-067	High Efficiency Small HW Boilers	regression	205					0.897					
D03-068	High Efficiency Small Steam Boilers	regression	38					0.941					
D03-069	Efficient Water Source Heat Pump	average	13	$ 740.93	$ 503.80	$ 1,116.00	29%		$ 561.14	$ 378.60	$ 1,032.00	25%	
D03-070	Hydronic Heat Pump Var Flow Valve	Custom	13										
D03-071	Time Clocks (heating/cooling)	Average	51	$ 162.08	$ 45.00	$ 426.50	16%						
D03-072	Energy Management System	Regression	55					0.187					
D03-073	Setback Programmable Thermostats	Median	55										
D03-075	Duct Insulation Material	average	10	$ 0.68	$ 0.23	$ 1.04	24%						
D03-078	H.E. Air-Cooled Package A/C < 65k (single phase)	Custom	35										
D03-079	H.E. Air-Cooled Split/Package A/C 65k-134k	Average	22	$ 757.38	$ 553.50	$ 903.53	21%		$ 608.25	$ 435.90	$ 780.60	56%	
D03-080	H.E. Air-Cooled Package HP < 65k (single phase)	Custom	9										
D03-081	H.E. Air-Cooled Split/Package HP 65k-134k	Custom	7										

Appendix C: Non-Residential Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	**Measure Name**	**Analytic Method**	**No. of Observations**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**
D03-082	H.E. Evap/Water-Cooled Pkg A/C < 65k	average	10	$ 740.93	$ 503.80	$ 1,116.00	29%		$ 573.07	$ 378.60	$ 1,032.00	41%	
D03-083	H.E. Evap/Water-Cooled Pkg A/C >=65k	custom	14										
D03-084	H.E. Package Terminal A/C < 7k	Regression	69					0.957					
D03-085	H.E. Package Terminal HP < 7k	Regression	35					0.964					
D03-086	Efficient HVAC Motors - Supply Fans	Weighted Average	84										
D03-087	Efficient HVAC Motors - Return Fans	Weighted Average	84										
D03-088	Efficient HVAC Motors - Clg Tower Fans	weighted average	59										
D03-089	Effic. Motors - Chilled Water Loop Pumps	Weighted Average	84										
D03-090	Effic. Motors - Hot Water Loop Pumps	weighted average	84										
D03-091	Effic. Motors - Cond. Water Loop Pumps	weighted average	84										
D03-092	High Efficiency Gas Water Heater	Average	27	$ 534.44	$ 394.00	$ 1,002.30	33%		$ 455.73	$ 308.00	$ 1,131.92	21%	
D03-093	Gas Tankless Water Heating	measure = regression, base = average	31					0.573	$ 1,844.19	$ 709.72	$ 3,498.23	26%	
D03-094	Point of Use Water Heating	regression	146					0.776					0.546
D03-095	Circulation Pump Timeclock Retrofit	average	4	$ 59.00	$ 46.75	$ 69.62	16%						
D03-096	High Eff Large Size Gas Water Heater	regression	88					0.255					
D03-097	High Eff Med Size Gas Water Heater	regression	88					0.255					
D03-098	Water Side Economizer	Custom	17										
D03-099	H.E. Package Terminal A/C 7k-15k	Regression	69					0.957					
D03-100	H.E. Package Terminal A/C > 15k	Regression	69					0.957					
D03-101	H.E. Package Terminal HP 7k-15k	Regression	35					0.964					
D03-102	H.E. Package Terminal HP > 15k	Regression	35					0.964					
D03-103	H.E. Air-Cooled Split/Package A/C 135-239k	Average	21	$ 785.77	$ 404.20	$ 1,305.00	8%		$ 674.88	$ 409.02	$ 1,000.00	33%	
D03-104	H.E. Air-Cooled Split/Package A/C 240-759k	Measure = Average, Base = Custom	21	$ 649.63	$ 649.63	$ 649.63	N/A						
D03-105	H.E. Air-Cooled Split/Package A/C >= 760k	Measure = Average, Base = Custom	21	$ 555.15	$ 555.15	$ 555.15	N/A						
D03-108	H.E. Air-Cooled Split A/C < 65k (3 phase before 2008)	Regression	44					0.775					
D03-109	H.E. Air-Cooled Package A/C < 65k (12 SEER, 3 phase before 2008)	Custom	34										
D03-110	H.E. Air-Cooled Package A/C < 65k (13 SEER, 3 phase before 2008)	Custom	34										
D03-111	H.E. Air-Cooled Split HP < 65k (3 phase before 2008)	Regression	38					0.540					
D03-112	H.E. Air-Cooled Package HP < 65k (12 SEER, 3 phase before 2008)	Custom	9										

Appendix C: Non-Residential Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	**Measure Name**	**Analytic Method**	**No. of Observations**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**
D03-113	H.E. Air-Cooled Package HP < 65k (13 SEER, 3 phase before 2008)	Custom	9										
D03-114	High Efficiency Air-Cooled Screw Packaged Chillers	Regression	5					1.000					
D03-115	High Efficiency Water-Cooled Recip Chillers	Average	5	$ 478.86	$ 268.66	$ 637.93	45%		$ 462.59	$ 348.62	$ 576.55	48%	
D03-116	High Efficiency Centrifugal Chillers 150-299 Tons	Regression	26					0.779					0.645
D03-117	High Efficiency Centrifugal Chillers >= 300 Tons	Regression	26					0.779					0.645
D03-118	High Efficiency Screw Chillers < 150 Tons	Regression	7					0.978					
D03-119	High Efficiency Screw Chillers 150-299 Tons	Regression	7					0.978					
D03-120	High Efficiency Screw Chillers >= 300 Tons	Regression	7					0.978					
D03-121	High Efficiency VSD Centrifugal Chillers 150-299 Tons	Regression	21					0.656					0.847
D03-122	High Efficiency VSD Centrifugal Chillers >= 300 Tons	Regression	21					0.656					0.847
D03-123	Floor Insulation	regression	22					0.803					
D03-124	H.E. Air-Cooled Split/Package HP >= 760k	Custom	7										

Appendix C: Residential Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	**Measure Name**	**Analytic Method**	**No. of Observations**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**
D03-401	Programmable Thermostat	Average of all costs at or below median	50	$ 56.37	$ 27.50	$ 80.00	7%						
D03-402	13 SEER(11.09 EER) Split System Air Conditioner	regression	27					0.420					
D03-403	14 SEER(12.15 EER) Split-System Air Conditioner	regression	27					0.420					
D03-404	15 SEER(12.72 EER) Split-System Air Conditioner	regression	27					0.420					
D03-463	16 SEER (11.61 EER) Split System Air Conditioner	regression	27					0.420					
D03-464	17 SEER (12.28 EER) Split-System Air Conditioner	regression	27					0.420					
D03-465	18 SEER (13.37 EER) Split-System Air Conditioner	regression	26					0.420					
D03-405	Direct Evaporative Cooler	Measure = Average Base = Weighted Average	55	$ 813.44	$ 250.00	$ 1,444.00	9%						
D03-406	Indirect Evaporative Cooler	Not priced	-										
D03-407	Direct-Indirect Evaporative Cooler	Measure = Average Base = Weighted Average	15	$ 1,553.00	$ 1,553.00	$ 1,553.00	single observation						
D03-408	Refrigerant charge - typical charge adjustment	Average	10	$ 10.36	$ 3.08	$ 28.83	45%						
D03-409	Refrigerant charge - high charge adjustment	Average	10	$ 17.87	$ 6.00	$ 37.00	33%						
D03-410	Condensing 90 AFUE(1.11 HIR) Furnace	regression	99					0.662					0.095
D03-411	Condensing 92 AFUE(1.08 HIR) Furnace	regression	99					0.662					0.095
D03-412	Condensing 94 AFUE(1.06 HIR) Furnace	regression	98					0.662					0.095
D03-413	Condensing 96 AFUE(1.03 HIR) Furnace	regression	98					0.662					0.095
D03-414	13 SEER(11.07 EER)/8.1 HSPF(3.28 COP) A/C Heat pump	Regression	29					0.969					
D03-415	14 SEER(12.19 EER)/8.6 HSPF(3.52 COP) A/C Heat Pump	Regression	29					0.969					
D03-416	15 SEER(12.70 EER)/8.8 HSPF(3.74 COP) A/C Heat Pump	Regression	29					0.969					
D03-466	16 SEER (12.06 EER) / 8.4 HSPF (3.48 COP) A/C Heat Pump	Regression	28					0.969					
D03-467	17 SEER (12.52 EER) / 8.6 HSPF (3.26 COP) A/C Heat Pump	Regression	28					0.969					
D03-417	18 SEER(12.8 EER)/9.2 HSPF(3.66 COP) A/C Heat Pump	Regression	28					0.969					
D03-418	Duct Sealing (Total Leakage Reduction 28% of AHU flow)	Custom	6										
D03-420	Ceiling R-0 to R-30 Insulation-Batts	regression	23					0.345					

Appendix C: Residential Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	**Measure Name**	**Analytic Method**	**No. of Observations**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**
D03-423	R-38 Insulation-Batts	regression	23					0.345					
D03-424	R-49 Insulation-Batts	regression	23					0.345					
D03-426	Floor R-0 to R-19 Insulation Batts	regression	22					0.803					
D03-427	Floor R-0 to R-30 Insulation Batts	regression	22					0.803					
D03-428	Floor R-19 to R-30 Insulation-Batts	regression	22					0.803					
D03-429	Wall 2x4 R-15 Insulation-Batts	regression	22					0.803					
D03-430	Wall 2x6 R-19 Insulation-Batts	regression	22					0.803					
D03-431	Wall 2x6 R-21 Insulation-Batts	regression	22					0.803					
D03-435	Wall 2x4 R-13 Batts + R-5 Rigid	measure = average & regression base = regression	47	$ 0.45	$ 0.31	$ 0.59	36%						0.803
D03-436	Wall 2x6 R-19 Batts + R-5 Rigid	measure = average & regression; base = regression (see notes)	47	$ 0.45	$ 0.31	$ 0.59	36%						0.803
D03-437	Wall 2x6 R-21 Batts + R-5 Rigid	measure = average & regression; base = regression (see notes)	47	$ 0.45	$ 0.31	$ 0.59	36%						0.803
D03-438	Wall Blow-In R-0 to R-13 Insulation	regression	10					0.031					
D03-441	Whole House Fans	Average	10	$ 400.56	$ 302.25	$ 568.00	12%						
D03-442	Default Window With Sunscreen	Regression	68					0.203					
D03-443	Single Pane Clear Glass With Reflective Film	Regression	25					0.031					
D03-444	Single Pane Clear Glass With Spectrally Selective Film	Regression	10					0.621					
D03-445	Single Pane Clear Glass With Standard Film	Regression	33					0.004					
D03-446	U-0.50/SHGC-0.65 (clear) Window	regression	30					0.070					
D03-447	U-0.40/SHGC-0.65 (clear) Window	regression	30					0.070					
D03-448	U-0.35/SHGC-0.55 (clear) Window	regression	30					0.070					
D03-449	U-0.25/SHGC-0.35 (clear) Window	regression	30					0.070					
D03-450	U-0.50/SHGC-0.40 (tint) Window	regression	30					0.070					
D03-451	U-0.40/SHGC-0.40 (tint) Window	regression	30					0.070					
D03-452	U-0.35/SHGC-0.32 (tint) Window	regression	30					0.070					
D03-453	U-0.25/SHGC-0.22 (tint) Window	regression	30					0.070					
D03-454	U-0.50 / SHGC-0.40 (tint) Window	regression	30					0.070					
D03-455	U-0.40 / SHGC-0.40 (tint) Window	regression	30					0.070					
D03-456	U-0.35 / SHGC-0.32 (tint) Window	regression	30					0.070					
D03-457	U-0.25 / SHGC-0.22 (tint) Window	regression	30					0.070					
D03-460	Refrigerant charge - high charge adjustment & duct sealing	Average	10	$ 17.87	$ 6.00	$ 37.00	33%						

Appendix C: Non-Residential and Residential Non-Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	Measure Name	Analytic Method	No. of Observations	Mean	Min	Max	Precision @ 95%	R^2	Mean	Min	Max	Precision @ 95%	R^2
D03-801	13 Watt Intergral CFL	Base: Average; Measure: Regression	26					0.894	$ 0.57	$ 0.36	$ 1.25	58%	
D03-802	13 Watt Intergral CFL	Base: Average; Measure: Regression	31					0.936	$ 0.61	$ 0.36	$ 1.42	66%	
D03-803	14 Watt Intergral CFL	Base: Average; Measure: Regression	31					0.936	$ 0.61	$ 0.36	$ 1.42	66%	
D03-804	15 Watt Intergral CFL	Base: Average; Measure: Regression	31					0.936	$ 0.61	$ 0.36	$ 1.42	66%	
D03-805	16 Watt Intergral CFL	Base: Average; Measure: Regression	31					0.936	$ 0.61	$ 0.36	$ 1.42	66%	
D03-806	18 Watt Intergral CFL	Base: Average; Measure: Regression	31					0.936	$ 0.61	$ 0.36	$ 1.42	66%	
D03-807	18 Watt Intergral CFL	Base: Average; Measure: Regression	29					0.900	$ 0.61	$ 0.36	$ 1.42	66%	
D03-808	19 Watt Intergral CFL	Base: Average; Measure: Regression	29					0.900	$ 0.61	$ 0.36	$ 1.42	66%	
D03-809	20 Watt Intergral CFL	Base: Average; Measure: Regression	29					0.900	$ 0.61	$ 0.36	$ 1.42	66%	
D03-810	23 Watt Intergral CFL	Base: Average; Measure: Regression	35					0.933	$ 0.61	$ 0.36	$ 1.42	66%	
D03-811	25 Watt Intergral CFL	Base: Average; Measure: Regression	29					0.900	$ 0.61	$ 0.36	$ 1.42	66%	
D03-812	25 Watt Intergral CFL	Base: Average; Measure: Regression	35					0.933	$ 0.61	$ 0.36	$ 1.42	66%	
D03-813	26 Watt Intergral CFL	Base: Average; Measure: Regression	29					0.900	$ 0.61	$ 0.36	$ 1.42	66%	
D03-814	26 Watt Intergral CFL	Base: Average; Measure: Regression	35					0.933	$ 0.61	$ 0.36	$ 1.42	66%	
D03-815	28 Watt Intergral CFL	Base: Average; Measure: Regression	35					0.933	$ 0.61	$ 0.36	$ 1.42	66%	
D03-816	30 Watt Intergral CFL	Base: Average; Measure: Regression	35					0.933	$ 0.61	$ 0.36	$ 1.42	66%	
D03-817	36 Watt Intergral CFL	Base: Average; Measure: Regression	16					0.959	$ 2.22	$ 1.09	$ 2.98	34%	
D03-818	40 Watt Intergral CFL	Base: Average; Measure: Regression	16					0.959	$ 2.22	$ 1.09	$ 2.98	34%	
D03-819	13 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.57	$ 0.36	$ 1.25	58%	
D03-820	13 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-821	14 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-822	15 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	

Appendix C: Non-Residential and Residential Non-Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	Measure Name	Analytic Method	No. of Observations	Mean	Min	Max	Precision @ 95%	R^2	Mean	Min	Max	Precision @ 95%	R^2
D03-825	18 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-826	19 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-827	20 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-828	23 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-829	25 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-830	25 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-831	26 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-832	26 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-833	28 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-834	30 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-835	40 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 0.61	$ 0.36	$ 1.42	66%	
D03-836	55 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 2.22	$ 1.09	$ 2.98	34%	
D03-837	65 Watt Modular CFL	Dual Regression on Ballast and Lamp for measure; average for base	137					N/A	$ 2.22	$ 1.09	$ 2.98	34%	
D03-838	20W CFL Table Lamp	average	38	$ 50.43	$ 22.95	$ 73.99	14%		$ 50.43	$ 22.95	$ 73.99	14%	
D03-839	25W CFL Table Lamp	average	36	$ 61.13	$ 39.00	$ 79.95	12%		$ 61.13	$ 39.00	$ 79.95	12%	
D03-840	32W CFL Table Lamp	average	42	$ 63.20	$ 30.00	$ 119.00	16%		$ 63.20	$ 30.00	$ 119.00	16%	

Appendix C: Non-Residential and Residential Non-Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	**Measure Name**	**Analytic Method**	**No. of Observations**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**
D03-841	50W CFL Table Lamp	average	6	$ 122.96	$ 99.99	$ 136.95	18%		$ 122.96	$ 99.99	$ 136.95	18%	
D03-842	55W CFL Torchiere	Average	42	$ 59.39	$ 12.73	$ 89.99	15%		$ 59.39	$ 12.73	$ 89.99	15%	
D03-843	70W CFL Torchiere (two bulbs)	Average	40	$ 55.76	$ 12.73	$ 149.99	21%		$ 55.76	$ 12.73	$ 149.99	21%	
D03-844	50W Metal Halide	Average	5	$ 102.29	$ 56.06	$ 161.53	38%						
D03-845	75W Metal Halide	Average	8	$ 120.09	$ 56.06	$ 154.80	19%						
D03-846	100W Metal Halide	Average	7	$ 126.66	$ 68.98	$ 172.58	19%						
D03-847	175W PS Metal Halide	Average	5	$ 129.01	$ 91.82	$ 182.25	23%						

Appendix C: Non-Residential and Residential Non-Weather Sensitive Analytic Methods, Observations and Measure Statistics

				Measure					Base				
Measure ID	Measure Name	Analytic Method	No. of Observations	Mean	Min	Max	Precision @ 95%	R^2	Mean	Min	Max	Precision @ 95%	R^2
D03-850	200W HPS	Average	2	$ 91.05	$ 68.25	$ 113.84	49%						
D03-851	180W LPS	Average	8	$ 74.62	$ 44.10	$ 101.66	16%						
D03-852	Premium T8 El Ballast	average	16	$ 23.42	$ 15.63	$ 32.54	21%		$ 19.23	$ 13.11	$ 26.99	18%	
D03-853	T8 32W Dimming El Ballast	average	21	$ 72.89	$ 44.34	$ 104.99	16%		$ 16.54	$ 11.50	$ 21.51	19%	
D03-854	De-lamp from 4', 4 lamp/fixture	labor cost = average	46	$ 22.63	$ 16.75	$ 29.25	4%						
D03-855	De-lamp from 8', 4 lamp/fixture	labor cost = average	46	$ 22.63	$ 16.75	$ 29.25	4%						
D03-856	Occ-Sensor - Wall box	average	3	$ 42.28	$ 28.65	$ 65.90	55%						
D03-857	Occ-Sensor - Plug loads	average	4	$ 82.25	$ 71.00	$ 90.00	11%						
D03-858	Timeclock:	Average	8	$ 123.01	$ 39.25	$ 270.75	43%						
D03-859	Photocell:	Average	16	$ 12.06	$ 9.96	$ 13.95	6%						
D03-860	LED Exit Sign (New)	average	9	$ 31.52	$ 18.50	$ 56.23	26%						
D03-861	LED Exit Sign Retrofit Kit	average	10	$ 16.66	$ 9.99	$ 24.60	18%						
D03-862	Electroluminescent Exit Sign (New)	average	2	$ 73.42	$ 56.63	$ 90.21	45%						
D03-863	Electroluminescent Exit Sign Retrofit Kit	average	2	$ 70.14	$ 46.76	$ 93.52	65%						
D03-901	High Efficiency Copier	normalized average	27										
D03-902	High Efficiency Copier	normalized average	10										
D03-903	High Efficiency Copier	Average	4	$ 10,924.63	$ 7,857.00	$ 16,995.00	37%						
D03-904	High Efficiency Gas Fryer	Average	65	$ 4,103.15	$ 3,389.33	$ 5,159.35	15%		$ 1,520.61	$ 594.15	$ 3,379.00	11%	
D03-905	High Efficiency Gas Griddle	Average	45	$ 3,860.67	$ 1,137.78	$ 5,927.20	23%		$ 1,758.36	$ 672.00	$ 4,765.00	19%	
D03-906	High Efficiency Electric Fryer	Average	27	$ 12,088.62	$ 4,121.01	$ 25,931.00	43%		$ 3,326.73	$ 2,279.00	$ 4,588.00	8%	
D03-907	Hot Food Holding Cabinet	Average	79	$ 2,589.81	$ 1,062.50	$ 5,017.00	8%		$ 1,545.67	$ 869.97	$ 2,019.00	11%	
D03-908	Connectionless Steamer	Average	70	$ 3,206.64	$ 789.78	$ 6,702.12	20%		$ 5,128.24	$ 2,662.63	$ 11,292.19	12%	
D03-909	Point of Use Water Heat	measure = regression, base = average	125					0.573	$ 492.96	$ 258.00	$ 1,615.90	13%	
D03-910	Circulation Pump Timeclock	average	4	$ 59.00	$ 46.75	$ 69.62	16%						
D03-911	High Eff. Water Heater, EF=0.64	Average	26	$ 464.64	$ 278.00	$ 926.25	34%		$ 375.65	$ 258.00	$ 879.45	18%	
D03-912	Vending Machine Controller	Weighted Average	8										
D03-913	Vending Machine Controller	Weighted Average	16										
D03-914	Premium Efficiency Motor - 1 HP	Average	2	$ 291.43	$ 257.85	$ 325.00	23%						
D03-915	Premium Efficiency Motor - 5 HP	Average	4	$ 515.36	$ 389.00	$ 796.00	36%						
D03-916	Premium Efficiency Motor - 10 HP	Average	3	$ 894.66	$ 664.00	$ 1,293.00	44%						
D03-917	Premium Efficiency Motor - 15 HP	Average	4	$ 1,072.31	$ 884.00	$ 1,504.00	26%						
D03-918	Premium Efficiency Motor - 20 HP	Average	3	$ 1,278.52	$ 1,079.00	$ 1,578.00	23%						
D03-919	Premium Efficiency Motor - 25 HP	Average	4	$ 1,560.14	$ 1,344.00	$ 1,834.00	15%						
D03-920	Premium Efficiency Motor - 50 HP	Average	3	$ 2,487.62	$ 2,309.85	$ 2,831.00	14%						
D03-921	Premium Efficiency Motor - 100 HP	Average	4	$ 4,781.61	$ 4,130.00	$ 5,884.00	16%						
D03-922	Premium Efficiency Motor - 150 HP	Average	5	$ 8,296.68	$ 7,141.00	$ 10,176.00	13%						
D03-923	Premium Efficiency Motor - 200 HP	Average	4	$ 11,880.25	$ 9,022.00	$ 19,505.00	42%						
D03-924	Premium Efficiency Motor - 1 HP	Average	9	$ 432.03	$ 317.25	$ 680.00	17%						
D03-925	Premium Efficiency Motor - 5 HP	Average	9	$ 637.38	$ 518.74	$ 949.05	13%						
D03-926	Premium Efficiency Motor - 10 HP	Average	10	$ 1,149.68	$ 888.00	$ 2,079.00	20%						
D03-927	Premium Efficiency Motor - 15 HP	Average	9	$ 1,370.30	$ 1,031.00	$ 2,079.00	15%						
D03-928	Premium Efficiency Motor - 20 HP	Average	9	$ 1,730.04	$ 1,441.00	$ 2,551.50	13%						
D03-929	Premium Efficiency Motor - 25 HP	Average	9	$ 2,151.75	$ 1,707.75	$ 3,190.05	14%						
D03-930	Premium Efficiency Motor - 50 HP	Average	7	$ 3,851.21	$ 3,181.95	$ 5,764.50	17%						

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				Measure					Base				
Measure ID	**Measure Name**	**Analytic Method**	**No. of Observations**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**	**Mean**	**Min**	**Max**	**Precision @ 95%**	**R^2**
D03-933	Premium Efficiency Motor - 200 HP	Average	7	$ 15,596.14	$ 13,775.00	$ 17,906.00	7%						
D03-934	Faucet Aerators	average	112	$ 7.12	$ 1.61	$ 33.36	12%						
D03-935	Heat Pump Water Heater	average	2	$ 1,539.13	$ 1,274.90	$ 1,803.36	34%						
D03-936	Pipe Wrap	average	19	$ 0.37	$ 0.07	$ 0.91	30%						
D03-937	Low Flow Showerhead	average	14	$ 22.95	$ 8.00	$ 42.95	25%						
D03-938	High Efficiency Water Heater	Average	26	$ 464.64	$ 278.00	$ 926.25	34%		$ 375.65	$ 258.00	$ 879.45	18%	
D03-939	High Efficiency Water Heater	Regression	78					0.546					
D03-940	Point of Use Water Heat	measure = regression, base = average	125					0.573	$ 492.96	$ 258.00	$ 1,615.90	13%	
D03-941	Efficient Clothes Dryer	Average	78	$ 557.25	$ 261.18	$ 869.00	9%		$ 319.02	$ 224.10	$ 508.50	8%	
D03-942	Efficient Clothes Dryer	Average	64	$ 604.91	$ 386.10	$ 899.10	8%		$ 362.65	$ 269.10	$ 574.20	9%	
D03-943	Energy Star Clothes Washer	Average	-						$ 565.08	$ 565.08	$ 565.08	single observation	
D03-944	Energy Star Clothes Washer	Average	7	$ 946.40	$ 677.08	$ 1,353.00	21%		$ 565.08	$ 565.08	$ 565.08	single observation	
D03-945	Energy Star Clothes Washer	Average	14	$ 1,349.87	$ 483.08	$ 2,108.00	18%		$ 565.08	$ 565.08	$ 565.08	single observation	
D03-946	Energy Star Clothes Washer	Average	44	$ 769.17	$ 655.00	$ 848.08	4%		$ 588.39	$ 295.00	$ 1,208.00	22%	
D03-947	Energy Star Clothes Washer	Average	115	$ 1,137.38	$ 594.00	$ 2,018.08	6%		$ 588.39	$ 295.00	$ 1,208.00	22%	
D03-948	Energy Star Clothes Washer	Average	41	$ 1,181.16	$ 711.23	$ 2,108.00	18%		$ 588.39	$ 295.00	$ 1,208.00	22%	
D03-949	Energy Star Clothes Washer	Average	124	$ 761.68	$ 528.00	$ 1,148.08	8%		$ 515.54	$ 303.23	$ 805.00	5%	
D03-950	Energy Star Clothes Washer	Average	89	$ 1,368.54	$ 1,139.00	$ 1,598.08	33%		$ 515.54	$ 303.23	$ 805.00	5%	
D03-951	Energy Star Clothes Washer	Average	143	$ 1,280.46	$ 905.00	$ 1,758.00	4%		$ 515.54	$ 303.23	$ 805.00	5%	
D03-952	Energy Star Dish Washer	Average	93	$ 426.30	$ 197.99	$ 768.60	7%		$ 292.65	$ 179.00	$ 419.00	11%	
D03-953	Energy Star Dish Washer	Average	93	$ 426.30	$ 197.99	$ 768.60	7%		$ 292.65	$ 179.00	$ 419.00	11%	
D03-954	Refrigerator: Bottom Mount Freezer without through-the-door ice	Average	17	$ 894.66	$ 647.10	$ 1,300.00	11%		$ 880.00	$ 820.00	$ 950.00	8%	
D03-955	Refrigerator: Bottom Mount Freezer without through-the-door ice	Average	20	$ 1,086.81	$ 791.10	$ 1,400.00	8%		$ 945.00	$ 920.00	$ 970.00	5%	
D03-956	Refrigerator: Top Mount Freezer without through-the-door ice	Average	11	$ 450.75	$ 349.00	$ 570.00	22%		$ 507.14	$ 430.00	$ 600.00	8%	
D03-957	Refrigerator: Top Mount Freezer without through-the-door ice	Average	17	$ 590.00	$ 449.00	$ 719.00	13%		$ 448.64	$ 349.00	$ 649.00	13%	
D03-958	Refrigerator: Top Mount Freezer without through-the-door ice	Average	14	$ 698.67	$ 595.00	$ 807.00	10%		$ 537.75	$ 439.00	$ 717.00	11%	
D03-959	Refrigerator: Side Mount Freezer without through-the-door ice	Average	18	$ 1,890.41	$ 1,579.00	$ 2,177.10	6%		$ 939.60	$ 854.10	$ 1,000.00	3%	
D03-960	Refrigerator: Side Mount Freezer without through-the-door ice	Average	6	$ 1,150.48	$ 809.10	$ 1,296.90	20%		$ 1,052.10	$ 899.10	$ 1,205.10	29%	
D03-961	Refrigerator: Side Mount Freezer with through-the-door ice	Average	17	$ 1,153.52	$ 809.10	$ 1,945.80	28%		$ 983.30	$ 700.00	$ 1,853.10	18%	
D03-962	Refrigerator: Side Mount Freezer with through-the-door ice	Average	13	$ 1,064.50	$ 899.10	$ 1,259.10	9%		$ 928.74	$ 730.00	$ 1,025.10	8%	
D03-964	Refrigerator Recycling	Average	2	$ 97.75	$ 96.50	$ 99.00	3%						
D03-965	Freezer Recycling	Average	2	$ 97.75	$ 96.50	$ 99.00	3%						
D03-966	Efficient Single Speed Pool Pump	Average	47	$ 263.96	$ 218.00	$ 320.00	5%		$ 230.02	$ 133.33	$ 326.67	8%	
D03-967	Efficient Two Speed Pool Pump	Average	38	$ 278.81	$ 173.33	$ 340.00	15%		$ 230.02	$ 133.33	$ 326.67	8%	

Appendix C: Refrigeration Analytic Methods, Observations, and Measure Statistics

Measure ID	Measure Name	Analytic Method	No. of Observations
D03-201	Retrocommissioning	Custom	1
D03-202	High Efficiency Walk-in Fan Motors	Custom	7
D03-203	High Efficiency Display Fan Motors	Custom	4
D03-204	Heat Recovery from Central Refrigeration System	Custom	11
D03-205	Night Covers for Display Cases (medium temp)	Custom	5
D03-206	Medium Temp Glass Doors (open display cases)	Custom	8
D03-207	New Medium Temp Refrig Display Case with Doors	Custom	9
D03-208	Auto-Closers on Main Cooler Doors	Custom	4
D03-209	Auto-Closers on Main Freezer Doors	Custom	4
D03-210	Evaporator Fan Control on Walk-in Coolers & Freezers	Custom	6
D03-211	Air-Cooled Condenser to Evaporative Condenser	Custom	12
D03-212	Energy Efficient Air-Cooled Condenser	Custom	14
D03-213	Energy Efficient Evap-Cooled Condenser	Custom	16
D03-214	Multiplex System with Mech Subcooling (air-cooled)	Custom	14
D03-215	Multiplex System with Mech Subcooling (evap-cooled)	Custom	15
D03-216	Multiplex System with Mech Subcooling (high eff air-cooled)	Custom	14
D03-217	Multiplex System with Mech Subcooling (high eff evap-cooled)	Custom	15
D03-218	Low Temperature Mechanical Subcooling	Custom	8
D03-219	Low and Medium Temp Mechanical Subcooling	Custom	13
D03-220	Floating Suction Pressure	Custom	4
D03-221	Floating Head Pressure, Fixed Setpoint (air-cooled)	Custom	2
D03-222	Floating Head Pressure, Fixed Setpoint (evap-cooled)	Custom	2
D03-223	Floating Head Pressure, Variable Setpoint (air-cooled)	Custom	7
D03-224	Floating Head Pressure, Variable Setpoint (evap-cooled)	Custom	7
D03-225	Floating Head Pressure, Variable Setpt & Speed (air-cooled)	Custom	9
D03-226	Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	Custom	9
D03-227	Display Case Lighting Control	Custom	9
D03-228	Zero Heat Reach-in Glass Doors	Custom	2
D03-**301**	Retrocommissioning	custom	3
D03-303	Oversized Evaporative Condenser & Floating Head	custom	20
D03-304	Variable-Speed Compressors	custom	13

Appendix C: Refrigeration Analytic Methods, Observations, and Measure Statistics

Measure ID	Measure Name	Analytic Method	No. of Observations
D03-305	Low-Temperature Subcooling	custom	5
D03-306	Floating Suction Pressure	custom	7
D03-307	Floating Head Pressure, Fixed Setpoint (evap-cooled)	custom	4
D03-308	Floating Head Pressure, Variable Setpoint (evap-cooled)	custom	11
D03-309	Floating Head Pressure, Variable Setpt & Speed (evap-cooled)	custom	11